

**Labour Market Performance of Immigrants in Atlantic Canada: A Sequence**

**Analysis**

by

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BSS(Economics), Shahjalal University of Science and Technology, 2018

A Report Submitted in Partial Fulfillment  
of the Requirements for the Degree of

**Master of Arts**

in the Graduate Academic Unit of Economics

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This report is accepted by the  
Dean of Graduate Studies

THE UNIVERSITY OF NEW BRUNSWICK

April 2022

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## ABSTRACT

Labour market integration of immigrants has been one of the significant agendas for policymakers in Atlantic Canada. The labour market performance of the immigrants plays a vital role in attracting and retaining immigrants. Using the Immigrants Longitudinal Database (IMDB) from 1982 onward, we examine the labour market performance of different cohorts and categories of immigrants in Atlantic Canada. We conduct the duration and sequence analysis of various labour market statuses and identify the length of different sequences, e.g., employed, unemployed, self-employed, and student. Our findings based on the longitudinal data reflect that the employed status is the most frequent sequence. To compare the labour market performance over time, we use four cohorts based on immigrants' landing years 2001, 2006, 2011, and 2016, which are also census years. Along with the sequence analysis, we also employ multinomial logistic regression to estimate the socio-economic factors, e.g., immigrant category, sex, world area of birth, educational attainment, etc., that influence different labour market statuses and sequences for immigrants. The findings based on this study are expected to help the provinces in Atlantic Canada and similar locations to design effective labour market integration for immigrants.

**Keywords:** Immigration, Labour Market Performance, Atlantic Canada, Sequence Analysis

***JEL classification codes:*** J15, J61, E24

## ACKNOWLEDGEMENTS

- This research is funded by NBIF-Research Assistantship Initiative (NBIF-RAI 2019-22).
- Initial conceptualization, securing funding, and writing the proposal to gain access to the Research Data Centre was done by Dr. Murshed Chowdhury.
- This research was conducted at the University of New Brunswick Research Data Centre (NB-RDC), a part of the Canadian Research Data Centre Network (CRDCN). This service is provided through the support of the University of New Brunswick, the province (s) of New Brunswick, the New Brunswick Social Policy Research Network (NBSPRN), the Canadian Foundation for Innovation, the Canadian Institute of Health Research, the Social Science and Humanities Research Council, and Statistics Canada. All views expressed in this work are our own.
- The report would not be possible without the help of many people. Many thanks to my supervisor Dr. Murshed Chowdhury who guided me throughout the process and read my numerous revisions. Thanks to the University of New Brunswick for providing me with the opportunity.

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## Introduction

Immigration has been a prevalent phenomenon over the last few decades as communication and travel methods have improved. Some individuals migrate willingly for various reasons (education, family reunification, job, etc.). In contrast, others are forced to move to defend themselves and survive due to persecution or conflict in their home country (Yu et al., 2021). Canada's immigration strategy is primarily focused on promoting economic growth by selecting immigrants with a high degree of human capital, reuniting families, responding to international crises, and providing protection to vulnerable persons (IRCC, 2017). Unlike many European nations today, which have shifted from emigration to immigration, Canada has long been a nation of migrants. During the 16th and 17th centuries, France and Britain sought migrants to practically populate new regions. Since 1851, annual immigration to Canada has averaged roughly 120,000, with significant variance between the peaks of the 1900s, 1910s, and 1950s with dips in the 1890s, late 1910s, 1930s, and early 1940s (Edmonston, 2016). Enrollment and colonization of these migrants were critical in establishing each European country's claim to a wide dominion of Aboriginal lands (Boyd & Alboim, 2012). Canada has a relatively high net migration rate<sup>1</sup> in comparison to other developed countries at present. In 2017, Canada's net migration rate was 5.7 %, while the United States' net migration rate was 3.9 % (Kaushik & Drolet, 2018). In 2016, Canada had a 7.5 million foreign-born population, accounting for 21.9 % of the overall population. Between 2011 and 2016, about 1.2 million persons of foreign origin moved to Canada (Government of Canada, 2017). According to The Conference Board of Canada (2022) births will no longer exceed deaths in Canada, leaving immigration as the sole source of net population increase. This is mainly noticeable in the Atlantic regions and Quebec.

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<sup>1</sup> The gap between the total number of immigrants and emigrants per 1,000 population

Immigrants are seen as valuable contributors to Canada's social and economic health, according to immigration policy. Canada is known across the world for its good immigration policy and integration programs, as well as the public debate on the relevance of immigrants to federal and provincial economies (Sidney, 2014). In a global and information-based economy, immigration has developed as a *de facto* demographic and labour force strategy that has given answers to various demographic concerns in Canada, including an ageing population, diminishing birth rate, an increasing dependence ratio, and skills shortages (Boyd & Alboim, 2012). Since World War II, decreased fertility rates and net outmigration have contributed to Atlantic Canada's diminishing population growth. In addition to that the outmigration rate is still high among the newcomers (Newbold, 2017).

Numerous policy decisions have been made in response to this decreasing population growth, with international immigration playing a significant role (Akbari, 2011). Despite better retention rates among recent cohorts in Atlantic provinces, studies found it is still low compared to the other areas (Vancouver, Toronto and Edmonton) (Whalen et al., 2021). New Brunswick (64 %) has the lowest retention rate of immigrants, while Ontario has the highest (93 % ) (Urquia et al., 2021). Existing research on immigrant retention focuses mostly on individual-level policy such as age, education level, and employment status. Employment and economic opportunities play a crucial role in the outmigration of immigrants (Bruce, 2007).

Immigrants' settlement support programs and services designed for newcomers in Atlantic Canada fall into three categories: employment, business help, and language instruction (Akbari & Sun, 2006). These programs are designed to assist newcomers in surmounting certain obstacles and gaps connected with getting established in their new country and integrating into a new work environment. Hum and Simpson (2000) claim that talented immigrants settle and integrate relatively easily in Canada and those skilled immigrants perform well after a brief adjustment period, as long as they remain

effective and engaged. However, numerous obstacles preclude their effective integration into mainstream culture (Picot & Sweetman, 2012). Indeed, Ortiz and Lowe (2015) described Canada's economic and social effects from skilled immigration as "disappointing." Employment (labour force) status is a critical measure of immigrants' success in integrating into Canadian labour markets. When foreign-born workers, particularly those from non-traditional source countries arrive in Canada, they are entirely new to Canadian labour employment opportunities, may lack language proficiency, and have restricted access to employment networks. Prior to the 1960s, most immigrants came from Western, Northern, and Southern Europe; however, immigrants currently come from Eastern and Central Europe, Asia, Africa, and Latin America. The term "non-traditional source" refers to immigrants from these latter nations (Bilodeau & Kanji, 2006). There are reasons to believe that these new waves of immigrants may face higher integration hurdles from the labour market due to language and cultural disparities. Additionally, immigrants may carry with them credentials that are frequently unrecognized. As a result, these factors may contribute to extended periods of unemployment, underemployment, or even departure from the labour force. These issues appear to be particularly acute in regulated professions. If these obstacles are significant, one may see a disproportionate concentration of foreign-born employees in part-time work, among the jobless, or not in the labour force (Sharif, 2006). These problems are more acute in Atlantic Canada, where the labour market is relatively small, and the concentration of ethnic communities are meagre.

Immigration is a crucial source of population growth in Atlantic Canada. Numerous policy documents have recognized the importance of newcomer recruitment and integration over the years, including Newfoundland and Labrador's Population Growth Strategy 2015-2025 and Immigration Action Plan 2017, and New Brunswick's Population Growth Strategy 2019-2024. In addition, the Canadian federal government announced the Atlantic Growth Strategy and the Atlantic Immigration Pilot programme in 2016 to stimulate economic growth in the Atlantic region through immigration, trade, innovation, and investment. To help immigrants overcome the struggles of integrating



in the labour market, over the years, several programs have been employed either by the government or Non-Government Organizations (NGOs). Some of the notable programs and associations for assisting immigrant's integration to Atlantic Canada are the Metropolitan Immigrant Settlement Association (MISA), settlement services provided by the Multicultural Association of Fredericton (MAF), The PEI Association for Newcomers to Canada, and The Association for New Canadians in Newfoundland and Labrador.

Despite adopting various policies and increased immigration rates over the last decade, the retention rates of immigrants in Atlantic Canada are the least compared to the other provinces (Radford, 2007). In Canada, the overall retention rate was 87.9% five years after admission and 85.8% ten years after admission. Ontario (91.5 %), British Columbia (87.3 %), and Alberta had the highest 10-year retention rates (86.1 %). Nova Scotia has the highest 10-year retention rate among Atlantic provinces (58.0 %) (Statistics Canada, 2021). Immigrants face difficulties in labour market integration due to various issues, including the small labour market, lack of employment opportunities, skill mismatch, lack of language proficiency, lack of ethnic labour market, and lack of networks. Moreover, they also go through different phases in the labour market to enhance their integration in the labour market. The low retention of immigrants also sparked arguments over immigration and integration strategies and cast doubts on recipient economies' absorptive potential. Immigrants' labour market integration is a key topic in migration study, and it plays a vital role in immigrants' retention at their initial destination. It warrants a detailed analysis to examine the phases of the labour market that the newcomers face. However, to the best of our knowledge, there has been no study on Atlantic Canada that pays detailed attention to the labour market integration process of immigrants. Baker and Benjamin (1994) studied the labour market performance of immigrants of Canada where they explained the earning assimilation of immigrants with native born people. Their study of labour market was focused on wage rather than the various labour market status. Akbari (2011) examined the immigrants labour market performance in Atlantic Canada though the study was limited to

immigrants from western countries. Fuller & Martin, (2012) examined the month-by-month trajectory of immigrants, however their study didn't examine the factors that may influence immigrant trajectory. Moreover, they didn't pay specific attention to Atlantic Canada where labour market integration of immigrants is likely to have different conditions. They used the Longitudinal Survey of Immigrants to Canada (LSIC) which was discontinued after 2005. Therefore, we intend to fill these gaps by examining the detail labour market integration process of immigrants who landed in Atlantic Canada in four different cohorts (2001, 2006, 2011, 2016).

The primary objective of this report is to analyze the labour market performance of immigrants in Atlantic Canada. To accomplish this objective, we answer the following questions:

1. What's the labour market performance of different cohorts of immigrants in Atlantic Canada? How does it vary across different cohorts and categories of immigrants?
2. What factors influence immigrants' sequence (e.g., employed, unemployed, self-employed) and spells in the labour market?
3. Does the labour market integration for immigrants in New Brunswick vary from the rest of the Atlantic Provinces?
4. How does the labour market performance of immigrants vary across immigrants' geographic locations (world area of birth)?

We answer these questions using the data from four cohorts of immigrants in the Longitudinal Immigration Database (IMDB). Our use of sequence analysis revealed that immigrant's longest sequence for all cohorts is employed. Though we witnessed similarities for all the cohorts for the most frequent sequence, there are differences in the second most frequent sequences among different cohorts. For the cohort of 2001,

the second most frequent sequence is where immigrants were in the Others<sup>2</sup> category. In 2006, a sequence of employed was the first most frequent and then becoming a student was the second most frequent. Multinomial logistic regression further revealed that factors such as age, marital status, world area of birth, and destination province play an important role in immigrants labour market performance.

Our findings from this study could inform policymakers in Atlantic Canada to further understand labour market integration of immigrants. Also, it will help to formulate policies for better integration of immigrants in the labour market upon their arrival. The rest of the paper is organized as follows. Section two provides a brief literature review. Section three presents' data and methodology, and we explain the strategy for sequence analysis. Section four analyzes the findings from our statistical analyses. Section five concludes and outlines policy recommendations.

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<sup>2</sup> Others category for Cohort 2001 and 2006 consists of immigrants who are normally in non-economic activities such as family care. For Cohort 2011 and 2016, students were also in the Others category.

## **Literature Review**

The significance of immigration on the labour market has been thoroughly documented, with research examining various facets of immigration and their effect on the labour market (Borjas, 2006; Butcher, 1998; East et al., 2018; Edo, 2019; Edo & Rapoport, 2019). If immigrants are unable to integrate into the labour market properly, the purpose of policymakers using immigration to alleviate labour market shortages are jeopardized. Immigrants have been shown to boost economic growth in Canada, albeit the effect is less pronounced in locations with a lower immigrant population (Akbari & Haider, 2018). Immigration may have a wide range of consequences on the domestic labour market, depending on the type of migrants that arrive. The immigrant assimilation model is the most often used conceptual framework for studying the process of labour market integration (Ager & Strang, 2008). Assimilation theory implies that immigrants will undergo some occupational lowering upon arrival but will eventually gain the requisite labour market experience and augment human capital for further ascent. These two indicators (labour market experience, human capital) indicate a U-shaped occupational adjustment trajectory (Akresh, 2008). Numerous studies on immigrant integration also have emphasized the human capital (Becker, 1964) and social capital hypothesis (Bourdieu, 1972). Education, language skills, and social networks are all predicted to improve an individual's employment results and social well-being. Diverse educational levels, socioeconomic factors, and demographic composition also influence the labour market performance of immigrants (Dustmann et al., 2003). Labour market performance of immigrants also depends on factors such as language proficiency

(Dustmann & Fabbri, 2003), immigration category (Tani, 2017), origin country (Amuedo-Dorantes & De La Rica, 2007; Bell, 1997).

Chiswick (1978) performed the most well-known and pioneering research on immigrant labour market performance using census population of the USA for foreign-born adult white men and reported that due to less understanding of the host country's language and less job-specific training, immigrants earn less than the natives. However, over time, immigrants' salaries converge with natives as they build in human capital and seek employment that pays more, are more suitable for them, or are in higher-paying sectors and professions. Additionally, companies gradually get an understanding of the immigrants' productivity. The study used earning equations to examine the earning difference between immigrants and native born men. Boyd and Pikkov (2005) also reported that immigrants face employment difficulties primarily owing to a lack of proficiency in the prevailing language, skills and knowledge not well matched to new country jobs, and restricted social networks. This leads to a temporary contraction of the labour market standing. It is evident that knowledge of host country's language plays an important role in immigrant's labour market performance (Dustmann & Fabbri, 2003; Leslie & Lindley, 2001).

Sweetman (2004) using Canadian Census 1986, 1991 and 1996 reported that immigrants from source countries with poorer-quality educational achievements, as judged by international test scores, have a lower average return on their education in the Canadian labour market than those from higher-quality nations. In addition to that, immigrants who come at a younger age don't get any advantage from their native country's obtained education. Though due to the labour shortage in STEM jobs (science, technology, engineering, and mathematics), Clarke et al. (2019) found that immigrants with prior STEM knowledge get some advantage in the labour market. Age also has a role in immigrant integration into the labour market, as older individuals are less adaptive (Fuller & Martin, 2012). Fuller and Martin (2012) also suggest that older men are more likely to be self employed due to the delayed integration. Using data from the Longitudinal Survey of Immigrants to Canada (LSIC), they evaluate factors influencing new immigrants' month-by-month employment trajectories over their first four years in

Canada. Implying Optimal Matching Analysis, they generated the typology of 4-year labour market trajectory (full time employment, part time employment, self employment, family care, study, other). They use multinomial logistic regression to determine the factors associated with following each of the several types of trajectories. Their findings are consistent with the classic human capital thesis, which holds that immigrants with greater levels of education, language competence, and experience will do better in the labour market. They also witnessed the inconsistency in the human capital argument. For example, higher education does not always promote quick integration. Increased proficiency in Canada's official languages does not necessarily lower the risk of diversion, partial integration, or delayed labour market entry for women and less-educated men. Additionally, older employees do not gain from increased job experience, and those who did not work before immigration are no more likely to face delays in integration or redirection. They also revealed that if an immigrant moves to a place with more people that share the same ethnic background, their probability of being self-employed increases.

Clark and Drinkwater (2008) also found consistent results with basic human capital theory. Their study suggests that a new immigrant's labour market performance is the value placed on their prior education, experience, and training in the destination country. They investigate the determinants that have been identified as influencing labour market performance in the receiving nation and the performance of immigrants in the United Kingdom. Migrant groups have markedly different labour market outcomes. Non-white migrants face prejudice during the recruiting process, resulting in a lower employment rate (Clark & Drinkwater, 2008). They stated that recent migrants' labour market results are likely to be determined by the volume and quality of their human capital, their intended duration of stay, and how host-country companies treat them based on their ethnic origin or background. Friedberg (2000) studied labour market for Israel and contends that human capital is imperfectly transferable between countries, resulting in immigrants' delayed integration into the landing country's labour market. The imperfection in human capital transfer clearly explains why immigrants earn less than equivalent natives in Israel. The variation in the return on foreign

education among origin nations may indicate disparities in the quality and compatibility of foreign education with the host labour market. Generally, the return on overseas work experience is negligible. Continuing education following immigration tends to give a cumulative benefit by increasing the rate of return on education earned overseas. Additionally, Blackaby et al. (1997) report significant variances between ethnic groupings. They examined inequalities in male and female unemployment across Britain's ethnic minorities using a sample of around one million observations created by merging two micro datasets from the 1991 Census of Population using the logit model. Their findings indicate that non-white immigrants have remarkably low employment prospects. Their study demonstrates that there are similarly large disparities in female unemployment rates, as there are in male unemployment rates, between the white majority and non-white ethnic minorities.

Apart from human capital, research indicates that social capital plays a significant role in immigrant labour market integration. Researcher contends that social relationships can aid work by providing access to resources such as job recommendations (Burt, 2002; Granovetter, 1995). Numerous immigrants arrive in their destination country due to familial relationships with previous immigrants (so-called "chain migration"). These immigrants make immigration decisions based on information obtained from relatives in the target country. This minimizes the chance of making poor selections based on erroneous or incorrect information regarding the destination country's job market prospects. Additionally, kinship-based immigrants have access to their family members' networks, which aids in their absorption into the new nation. However, working-age kinship-based immigrants are typically less competent than working-age local employees, posing economic integration issues (Aydemir, 2020). Several immigration academics have emphasized the need for strong bonding, claiming that close friends and family, and strongly linked ethnic communities are more likely to create sentiments of duty that result in help (McPherson et al., 2001). This is a legal requirement for sponsors of family-class immigrants. Sponsors must give financial support (if necessary) for three to ten years, providing an incentive to assist family members in finding jobs. Proximity is particularly important when it comes to providing some types

of employment-related support, such as daycare (Greve & Salaff, 2003). When all other factors are equal, family class immigrants and those with nearby friends should have an advantage over those with more physically or socially distant connections, as should those who settle in areas with a higher proportion of co ethnics, increasing the likelihood of rapid integration and decreasing the likelihood of delayed labour market entry, partial integration, and exclusion. Additionally, immigrant enclaves can stimulate entrepreneurialism by offering access to supplier networks and an ethnic client base. Thus, settling in a location with a higher proportion of co-ethnics should improve the likelihood of pursuing self-employment (Ealdrich et al., 1997).

While the preceding arguments have emphasized the benefits of social capital, a counterargument implies that the same links that initially facilitate employment might also harm immigrants in the long term. Informal hiring practices amplify the value of network connections for gaining access to employment at the labour market's bottom (Waldinger & Lichter, 2003). Besides, living in ethnolinguistic enclaves' limits exposure to and opportunity to utilise the host nation language where immigrants who do not attain basic fluency in the host nation language often struggle to integrate economically and socially (Chiswick & Miller, 1996; Isphording, 2015).

However, immigrant labour market trajectories should also be shaped by household features, wealth, and perceptions of family duties. Women's labour market activity is frequently constrained by children (Cohen & Blanchi, 1999). Family relationships are also likely to influence the options open to various family members. If one partner is more employable, the other may take on a greater amount of unpaid work to help establish the family and care for it. Given that the most employable spouse will receive the most immigration points and be dubbed the "primary applicant," individuals who immigrate as "spouses or dependents" are more likely to defer or forego paid employment or work part-time. Women are less likely to be the "primary applicant" to enter Canada (Boyd & Pikkov, 2005). Women who join Canada under the family class due to their children's sponsorship frequently provide care for grandkids (Creese et al., 2008).



Immigrants may accept "survival job" that does not satisfy the primary applicant's work goals but offers some income while the principal applicant conducts a more extensive job search, pursues educational advancement, or creates a company. This type of "family investment strategy" may explain in part why immigrant women in Canada face slower income integration and a reduced chance of finding professional or management jobs comparable to their pre-immigration career (Baker & Benjamin, 1997). Akresh (2008) also reports that class of admission influence immigrants labour market performance. A series of studies using the US and Canadian data observe that immigrant women married to immigrant men were more likely to work immediately after migration, but they earn lower wage and they have lower intention to gain country-specific human capital (host countries language, country specific job skill, etc.) than immigrant women married to native-born men (Baker & Benjamin, 1997; Duleep & Sanders, 1993; Worswick, 1999). These findings corroborate a prominent theory of immigrant women's labour supply decisions (the Family Investment Hypothesis), which emphasizes their position as secondary (or lower wage) earners in the home. This argument is based on conventional gender roles within families. It asserts that recent immigrant women enter the labour market primarily to support their husbands' investment in local skills that depreciate upon migration. According to recent studies, married immigrant women make more labour supply decisions (whether to work or to leisure) than their husband (Basilio et al., 2009; Blau et al., 2003).

Neither integration nor entrapment perspectives adequately describe the experience of all immigrants. Experts increasingly hypothesize that immigrant integration processes are not just unequal but also multipath (Portes et al., 2002; Waldinger & Lichter, 2003). While statistical research has examined various characteristics associated with disparities in specific immigrant employment outcomes, explicit modelling of multiple forms of labour market inclusion as they unfold over time is rare. To analyze the experience of immigrant's overtime, we need to look at different stages the immigrants face during their settlement process. Fuller & Martin (2012) evaluate factors influencing new immigrants' month-by-month employment trajectories over their first four years in Canada using data from the Longitudinal Survey of Immigrants to Canada. Their study

mapped immigrant's month by month labour market trajectory by six statuses: full-time-dependent employment, part-time-dependent employment, self-employment, family care, exclusive study, and other non-employment. The six states reflect varying degrees and kinds of employment (or non-employment) that often influence economic security. They studied immigrant's labour market performance for entire Canada and no specific attention to Atlantic Canada was given where the immigrant's integration and labour market performance could be different. Besides, they used Longitudinal Survey of Immigrants to Canada (LSIC) which stopped after 3 waves and didn't provide any information after 2005. In addition to that the attrition rate in LSIC waves are very high which may produce bias outcomes.

Other researchers contend that the assimilation model developed to account for the experiences of older cohorts of immigrants may not adequately account for the experiences of younger groups. Scholars observe that as immigrants become more diverse, the challenges and possibilities they face also alter. Such as, immigration pattern changes very often, educational attainment of immigrants of each year is not same, labour market's need of type of immigrants also changes, etc. Certain barriers diminish over time, while others are replaced (Nakhaie & Kazemipur, 2013). Thus, considerable research on various cohorts of Canadian immigrants is required. Besides, most immigrant's labour market performance studies are focused on wage assimilation of immigrants with native born which present an incomplete picture of immigrant's integration to host country's labour market. Though Fuller & Martin (2012) studied immigrant's integration process and identified factors that could influence the process, their study didn't pay specific attention to relatively smaller region like Atlantic Canada. The purpose of our study is to close these gaps in the literature. We use IMDB dataset which have immigrant's year by year information since arrival. With the IMDB dataset we merge yearly tax file to find immigrant's labour market performance. We estimate immigrants' labour market performance using sequence analysis for 2001, 2006, 2011 and 2016. Moreover, we extended our discussion to observe the factors that influence labour market performance of immigrants in Atlantic Canada.

## Data and Methodology

### Data and Variables

In this report, we use the Longitudinal Immigration Database (IMDB) by Statistics Canada, where each year immigrant's administrative data is preserved. The IMDB allows us to link immigrants landing records with their tax files longitudinally, starting from 1982. It is the only longitudinal dataset that enables users to examine the characteristics of immigrants to Canada at the time of their admission and their economic results and regional mobility over a 30-year period (Evra & Prokopenko, 2018).

The data set includes individuals aged 15 to 65. As our focus is to examine the labour market integration of immigrants in Atlantic Canada, we reduced the dataset to four provinces: New Brunswick, Newfoundland and Labrador, Prince Edward Island, and Nova Scotia. Merging yearly tax files with landing files gives us immigrants' employment history in Canada. We studied immigrants who landed in Canada in 2001, 2006, 2011 and 2016 and compared them. We have 15,870 observations for the cohort of 2001. These numbers are 22,635, 24,850 and 21,800, respectively, for 2006, 2011 and 2016<sup>3</sup>.

We use the data to identify different statuses of immigrants since their arrival to Canada. For 2001 and 2006 cohorts, we classified immigrants labour market integration into five statuses: employed, student, self-employed, unemployed and others. The others variable consists of immigrants who are in non-economic activities like family care. The Student variable can only be generated for 2001 and 2006 as the information for student status is no longer available for the later years. Therefore, we identify only four

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<sup>3</sup> This number doesn't represent the total number of people who landed in Atlantic Canada in that year; instead, it shows the combined number for each cohort from their arrival until the last year of study.

status for 2011 and 2016.<sup>4</sup> We use the datasets to report various descriptive statistics and to perform regression analysis. Our descriptive statistics consists of sequence frequency and reporting various lengths for each cohort. In the regression analysis section, we use multinomial logit regression to examine the factors that influence immigrants' labour market status.

After merging the landing files with tax files for subsequent years for each cohort, we identify immigrants' labour market integration using the Sequence Analysis. Biologists devised sequence analysis to compare DNA sequences to assess the degree to which two DNA strands are homologous or, in other words, the distance between them (Kruskal, 1983). The sequence analysis technique enables the treatment of whole careers or segments thereof as a series of changing states throughout time (Kogan, 2004). We identify annual cohorts based on landing year (Cohort 2001 includes those who landed in 2001). After creating the cohort, we created labour market trajectories based on their tax information to study the labour market performance. A similar approach was also introduced by Fuller & Martin, (2012) to study immigrant's employment sequence. Sequence analysis provide variables like length, length1, length2, length3, length5, elemnum and epinum. While the length variables show the length of different elements, epinum shows the episodes for each sequence. Episode represents the section of equal elements in each sequence. Length variable shows the length of a sequence. Say for cohort 2001, we studied immigrants labour market performance for 16 years, the maximum sequence length will be 16. Length1 variable shows the length of employed on each observed sequence. If the length of employed on a sequence for cohort is 16, it means the immigrants were employed all 16 years. If an immigrant experienced employed, student and unemployed statuses during their stay in

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<sup>4</sup> In IMDB data, our student variable is generated based on "education deduction for full-time and part-time students". From 2016 onwards, the variable that allows deducing information regarding students is no longer reported in the dataset. We could have used students in our 2011 cohort for four years, however, to keep 2011 and 2016 comparable, we didn't use it in the 2011 cohort.

Canada, then the elemnum will be 3. Similarly, if immigrants were employed first and then become unemployed and finally become employed, that means he/she changes employment status three times. So, his/her episode is 3. The tabulation of labour market statuses will help understand the immigrant’s employment pattern over the years. Moreover, the immigrants sequence pattern will reflect their labour market performance. Table 1 shows the list of variables included in the sequence analysis.

**Table 01. list of the variables included in the Sequence Analysis.**

<b>Variables</b>	<b>Description</b>
<b>Length</b>	length of each observed sequences
<b>Length1</b>	length of element 1(Employed) on each observed sequence
<b>Length2</b>	length of element 2 on each observed sequence
<b>Length3</b>	length of element 3 on each observed sequence
<b>Length4</b>	length of element 4 on each observed sequence
<b>Length5</b>	length of element 5 on each observed sequence
<b>Elemnum</b>	Number of different elements in each sequence
<b>Epinum</b>	Number of episodes for each sequence

### **Determinants of Labour Market Status: Multinomial Logistic Regressions**

To identify the determinants of different sequences, we run multinomial logit models. Our dependent variable is different labour market statuses of immigrants: employed, student, self-employed, unemployed, others. Independent variables are derived based on the existing literature (Adsera & Chiswick, 2006; Fuller & Martin, 2012; Kogan, 2004; Sweetman, 2004). We create four age-groups to compare the statuses of immigrants at various ages. We also considered immigrants’ marital statuses and immigration types for the study. Literature review suggests that there exists gender bias in the labour market, therefore, we use a dummy variable to separate male and female. The country of origin is likely to play an important role in immigrants’ integration to the destination country (Adsera & Chiswick, 2006). Hence, we considered the “world

area of birth” as a variable too. Language proficiency is a significant labour market tool, and it is also used in our study. To examine whether labour market integration for immigrants in New Brunswick varies from the rest of the Atlantic Provinces, we apply “destination province” as one of our variables.

When the dependent variable is composed of many non-ordinal categories (i.e., they lack natural ordering), the ordinary least squares estimator cannot be utilized. Instead a maximum likelihood estimator such as probit or multinomial logit model should be utilized (Kwak & Clayton-Matthews, 2002). In multinomial logit regression, one value is assigned as the reference category (usually the first). The likelihood of belonging to other categories is compared to the likelihood of belonging to the reference group. Borooah (2002) outlines the general equation as follows:

If the first category is the reference, then, for  $m = 2, \dots, M$ ,

$$P(Y_i=m) = \frac{\exp(Z_i\beta_m)}{1 + \sum_{h=2}^m \exp(Z_i\beta_h)} \text{----- (1)}$$

$Y_i$  captures the labour market status (student, self-employed, unemployed, others).

$Z$  represents our independent variables: sex, marriage, education level, landing\_age\_group4, immigration class, knowledge of official language, world\_area\_birth, destination\_province. We run very similar models for the 2011 and 2016 cohorts with the exception that we have only four statuses, there is no status reported as student in these last two cohorts.

We estimate marginal effects following the multinomial logistic model to predict the probability of each category affecting a particular status in reference to their base category.

The following table summarises and illustrates our dependent and independent variables:

**Table 02. list of the variables included in the empirical measures.**

<b>Variables</b>	<b>Description</b>
<i>Dependent variables (2001 and 2006)</i>	
<b>Labour Market Status</b>	"Employed" (Labour market status= 1) is the reference category, measured as: 1=Employed; 2= Student); 3= Self employed; 4= Unemployed; 5= Others
<i>Dependent variables (2011 and 2016)</i>	
<b>Labour Market Status</b>	"Employed" (Labour market status= 1) is the reference category, measured as: 1=Employed; 2= Self employed; 3= Unemployed; 4= Others
<i>Independent variables</i>	
<b>Sex</b>	Categorical variable, where 0= Female, 1= Male
<b>Marital Status</b>	Categorical variable, where 1= Married, 2= Single
<b>Immigration Class</b>	Categorical Variable, where 1= Economic Class, 2= Family Class, 3= Refugee and other
<b>Landing Age Group<sup>4</sup></b>	Categorical Variable, where the groups are "15-24 years", "25-34 years" "35-49 years" and "50-65 years"
<b>Education Level</b>	Categorical Variable, where the groups are "high school or less", "Some college or diploma" and "University"
<b>Official Language</b>	Categorical Variable, where 1= English Only, 2= French only, 3= Both English and French and 4= Neither English nor French
<b>World Area of Birth</b>	Categorical Variable, where 1= Europe, 2= Africa and the middle east , 3= Southern Asia , 4= Eastern Asia , 5= Oceania and other Asia, 6= South and Central America, 7=

## Results and Analysis

### Summary Statistics

Table 3 reports the summary statistics of the variables used in this study. For all four cohorts, most immigrants reported to have knowledge of English. However, a very small percentage of immigrants are competent in both official languages (English and French). Considering the variable world area birth, for cohort 2001 and cohort 2016, the highest percentage of immigrants are from Africa and the Middle East. For cohorts 2006 and 2011, the highest percentage is from Eastern Asia. These two regions (Africa and the Middle East and Eastern Asia) are responsible for almost half of the immigrants landing in Atlantic Canada. The landing age group 50 to 65 years has the lowest percentage of immigrants in every cohort compared to other age groups where most immigrants are ages from 25 to 49 years, which can be explained by the high number of economic class immigrants for these cohorts. As Canada is looking for skilled migrants, a substantial weight is given to the younger immigrants. The average age for economic class immigrants is 26.3 years (Beach et al. 2007). Among the four cohorts, the university level educated has the highest percentage compared to others, except for the 2016 cohort. In cohort-2016, the group with high school or less education represents the highest percentage of landed immigrants. A high number of Syrian refugees who arrived during this time may have contributed to the high proportion of high school or less educated people in the 2016 cohort.

Among the three immigration classes, the economic class has the highest percentage of people for cohort- 2006, 2011 and 2016. Single people are less in percentage than married people in each cohort of immigrants. In every cohort, female is greater in

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<sup>5</sup> These categorizations are done in Immigration Database.



percentage than male. In terms of the labour market status, the percentage of employed people is highest among all categories.

**Table 03. Summary of Categorical variables**

Variables	Description	Cohort	Cohort	Cohort	Cohort
		2001	2006	2011	2016
		%	%	%	%
Knowledge of official language	1: Only English	60.09	71.42	65.85	75.55
	2: Only French	2.96	1.52	2.21	2.71
	3: Both English and French	6.93	7.22	5.84	0.62
	4: Neither English nor French	30.02	19.86	26.12	19.72
WORLD_AREA_BIRTH	1 Europe	24.73	17.23	17.00	10.92
	2 Africa and the middle east	31.70	22.00	21.17	31.63
	3 Southern Asia	9.77	9.21	13.24	14.93
	4 Eastern Asia	12.19	30.10	30.06	20.50

	5 Oceania and other Asia	7.31	8.37	10.00	15.22
	6 South and Central America	7.59	6.65	4.36	4.29
	7 United states and other miscellaneous	6.77	6.38	4.12	2.50
Landing_agegroup4	15-24y	15.81	13.34	14.38	9.95
	25-34y		33.84	33.17	43.66
		45.13			
	35-49y	35.12	45.26	42.83	40.91
	50-65y	3.94	7.58	9.61	5.46
Education level	Highschool or less	33.30	29.47	34.50	43.38
	Some college or diploma	25.36	23.06	25.45	19.37
	University	41.34	47.47	40.02	37.21
Immigration Class	Economic Class	33.30	65.79	72.25	66.06
	Family Class	25.36	21.69	17.34	11.67
	Refugee and other	41.34	12.52	10.40	22.27
Marital Status	Married	72.84	76.24	73.94	79.04
	Single	27.16	23.74	26.06	20.96

Sex	Female	53.76	50.18	50.48	50.24
	Male	46.20	49.82	49.52	49.71
Labour Market Status	Employed	59.11	56.37	68.69	68.62
	Student	6.90	11.16	-	-
	Self	10.84	12.79	10.04	6.44
	Employed				
	Unemployed	11.28	8.64	8.41	7.66
	Others	11.94	11.09	12.86	17.25
Number of Observations		15,870	22,635	24,850	21,800

### Sequence Analysis

Table-04 shows the immigrants' labour market scenario in Atlantic Canada for all four cohorts. The table depicts that the larger share of immigrants is employed where the gender differentials are minimal. For 2001 and 2006, the fewest numbers of immigrants were students, among them the majority are female. Data shows an increase in the "others" category for 2011 and 2016 due to students being counted in that category. Another critical finding the data reveals is that, for all cohorts, a significant portion of males are in the self-employed category and unemployed females are consistently larger than unemployed males. For all the cohorts we can see that majority immigrants of Others Category are females. It's likely that females' wait to enter into to labour market until it fits their skillset or accommodate other relevant factors, e.g., raising kids (Barsoum, 2019).

**Table 04. Labour Market Scenario**

Cohort	Labour	Female	Male	Total
	Market			
	Status			

<b>2001</b>	Employed	4875	4505	9380
	Student	570	525	1095
	Self	695	1020	1715
	employed			
	Unemployed	1030	760	1790
	Others	1370	525	1895
	Total	8535	7340	15870
<b>2006</b>	Employed	6315	6435	12755
	Student	1320	1200	2525
	Self	1110	1785	2895
	employed			
	Unemployed	1060	900	1960
	Others	1550	955	2505
	Total	11360	11275	22635
<b>2011</b>	Employed	8185	8885	17070
	Self	1080	1420	2490
	employed			
	Unemployed	1185	905	2090
	Others	2100	1095	3195
	Total	12545	12305	24850
<b>2016</b>	Employed	6555	8410	14965
	Self	505	905	1405
	employed			
	Unemployed	995	670	1665
	Others	2900	855	3760
	Total	10955	10845	21800

Table-05 shows the 10 most frequent sequences for 2001 and 2006, and Table-06 reports the 10 most frequent sequences for 2011 and 2016 cohorts. The sequence containing only element 1 (employed) is the most frequent sequence for 2001 and 2006. There are 55 such sequences in 2001 where the immigrants were in the others category. For the cohort of 2006, the second most frequent (200 sequences) are where the immigrants were employed first and then become student. The least frequent (25 sequences) in these 10 sequences for 2001 represent such sequences where the immigrants were employed first and then become self employed and finally become employed again. For cohort 2006, a similar sequence is also the least frequent (55 sequences). Although immigrants for both cohorts had similarities in terms of the highest and least sequence, there were substantial differences in other sequences. For example, the third most sequence for the cohort of 2001 shows that immigrants followed employed-unemployed-employed. On the other hand, for the 2006 cohort, the third frequent sequence is students. The diversity in sequence reflects different labour market integration processes for immigrants in Atlantic Canada.

**Table-05: Frequency table of sequences for cohort 2001 and 2006**

Cohort 2001		Cohort 2006	
Sequence Order	Freq.	Sequence Order	Freq.
1	290	1	355
5	55	1 2	200
1 4 1	55	2	145
5 1	50	5	110
1 5	30	5 1	90
3	35	3	90
1 3	35	1 4 1	90
1 4	30	1 5	75
1 2 1	25	1 3	65
1 3 1	25	1 3 1	55
<b>Total</b>	630		1265

*Note: Labour market status: 1: Employed; 2: Student; 3: Self-employed; 4: Unemployed; 5: Others*

For cohort 2011 and cohort 2016, the most frequent sequence is also employed followed by a sequence where the immigrants were in others status first and then become employed. This means there are 275 and 730 such sequences in 2011 and 2016, respectively, where the immigrants were in the “others” category at first and then move on to employed status. For cohort 2011, the least frequent sequence (90) for immigrants is when immigrants were employed first, then move to others status and finally become employed again. For cohort 2016, the least frequent sequence (105) is the sequence of only unemployed.

**Table-06: Frequency table of sequences for cohort 2011 and 2016**

Cohort 2011		Cohort 2016	
Sequence Order	Freq.	Sequence Order	Freq.
1	1225	1	3660
4 1	275	4 1	730
1 3 1	220	1 3	620
4	155	4	595
1 3	150	1 4	465
1 2	135	1 2	400
1 4	130	2	140
1 2 1	120	3 1	130
4 1 4	110	1 3 1	105
1 4 1	90	3	105
<b>Total</b>	2610		6935

*Note: Labour market status: 1: Employed; 2: Self-employed; 3: Unemployed; 4: Others*

While length shows the length of each observed sequences, length1, length2, length3, length4, length5 shows the length of element (element 1,2,3,4,5) in each observed sequence. Elemnum shows the number of different elements in each sequence, where epinum separates a sequence into sections of equal elements and shows the number of episodes. Table-07, Table-08, Table-09, Table-10 shows the statistics of above-mentioned variables (length, length1, length2, length3, length4, length5, elemnum, epinum) for cohort 2001, 2006, 2011 and 2016, respectively.

Table-07 shows that we have 1,460 sequences. The maximum sequence length is 16 and the minimum sequence length is 1. This means, there are some observations where we have immigrants' information for 16 years and there are some observations where we have immigrants' information for 1 year only. The average sequence length 10.88. This is because, we only consider immigrants of working age. When an immigrant becomes 65 or above, he/she is dropped from our study from that point. Length1 shows

that some of the sequences contain element 1(employed), and there is at least one sequence where all the 16 positions contain the element, which means that an individual was employed for all the 16 years. There is at least one sequence where the person was never employed. On average only six positions are occupied by employed. Similarly, there is at least one sequence where 15 positions are occupied by student and at least one sequence where the immigrants were never a student. On average only one position is occupied by a student where self-employed, unemployed and others occupy on average 1 position. For Cohort 2006, the maximum sequence length is 11 where on average employed, student, self-employed, unemployed, and others occupy 5, 1,1,1,1 position, respectively. This indicate that during our study period majority of the immigrants are employed most of the time. Additionally, immigrants have almost similar unemployment, self-employment, and others duration. It is evident that immigrants spend less time on education.

Elemnum shows several different elements in a sequence. For example, table-07 and Table-08 show that there are such sequences where we have all the five elements, and there are such sequences where we have only one element. This means there at least one immigrant who were employed, student, self-employed, unemployed and others in the studied periods. This helps to understand whether immigrants change their labour market status during the study period. Epinum shows the number of episodes in a sequence. It helps us understand how many times an immigrant changes their employment status. It explains the vulnerability in the integration process for the immigrants in the labour market as frequent changes in status may infer instability in the labour market. For 2001, the maximum number of episodes is 12, whereas the maximum number is 9 for 2006. In 2001, at least one immigrant changed their labour market status 12 times over the 16 years studied. There is also at least one immigrant who didn't change their labour market status and remained the same for the studied period. Some immigrants have more frequent transitions from one labour market status to another, while some have prolonged episodes.



**Table 07. Descriptive Statistics for 2001 Cohort**

Variable	Obs	Mean	Std. Dev	Min	Max
Length	1460	10.88615	5.455448	1	16
length1	1460	6.431413	4.77163	0	16
length2	1460	0.7524005	1.71665	0	15
length3	1460	1.176955	2.700866	0	16
length4	1460	1.227023	2.186854	0	16
length5	1460	1.298354	2.686198	0	16
elemnum	1460	2.195473	0.994594	1	5
Epinum	1460	3.383402	2.281596	1	12

**Table 08. Descriptive Statistics for 2006 Cohort**

Variable	Obs	Mean	Std. Dev	Min	Max
Length	2735	8.286237	3.605915	1	11
length1	2730	4.669107	3.673556	0	11
length2	2730	0.9231332	1.572821	0	11
length3	2730	1.060029	2.267707	0	11
length4	2735	0.716325	1.487548	0	11
length5	2730	0.9176428	1.922564	0	11
elemnum	2730	2.110176	0.8676279	1	5
Epinum	2735	2.842972	1.677564	1	9

For Cohort 2011 and 2016, we have four labour market statuses. In 2011, the maximum sequence length is 8, where employed, self-employed, unemployed and others occupy

5,1,1,1 position, respectively. The maximum sequence length for 2016 is 3, where employed, self-employed, unemployed and others occupy 2,1,1,1 position, respectively. For 2011, Table-09 shows that there are such sequences where we have all four elements, and there are such sequences where we have only one element. But in 2016, as we have studied only three subsequent years, we have sequences with 3 elements, and we have sequences containing only 1 element. For 2011, the maximum number of episodes is 8, whereas the maximum number is 3 for 2016. The results demonstrate that all immigrants have longer employment durations. Immigrants have almost similar duration of self-employed, unemployed and others.

**Table 09. Descriptive Statistics for 2011 Cohort**

Variable	Obs	Mean	Std. Dev	Min	Max
Length	3745	6.638792	2.316583	1	8
length1	3745	4.560246	2.653224	0	8
length2	3745	0.6663104	1.527953	0	8
length3	3745	0.5583756	1.1456	0	8
length4	3745	0.8538605	1.590917	0	8
elemnum	3745	1.769436	0.7329067	1	4
Epinum	3740	2.259685	1.329835	1	8

**Table 10. Descriptive Statistics for 2016 Cohort**

Variable	Obs	Mean	Std. Dev	Min	Max
Length	7570	2.881063	0.4300004	1	3
length1	7570	1.977402	1.072518	0	3
length2	7570	0.1860711	0.555416	0	3
length3	7565	0.220563	0.5769931	0	3
length4	7565	0.4970266	0.8961163	0	3
elemnum	7565	1.428647	0.5393927	1	3
Epinum	7565	1.475423	0.6237017	1	3

## **Determinants of Labour Market Status**

To determine the factors that influence various labour market statuses of immigrants, we report the marginal effects following the multinomial logit models. Marginal effects describe the average effect of changes in the independent variable on the change in the likelihood of outcomes in multinomial logistic regression. We reported the outcome of multinomial logistic regression in the Appendix (Table 13 & Table 14).

### **Marginal Effects for Cohort 2001 and Cohort 2006**

Our marginal effect estimations uncover the patterns of relationship between immigrant labour market status and immigrants' characteristics. Our results for cohorts 2001 and 2006 are reported in Table-11, whereas Table-12 shows the results for 2011 and 2016. Recall that the conventional human capital argument holds that immigrants with higher education, language competence, and experience will have a better chance of finding work. In our instance, this means they should be more likely to follow an employed trajectory than students, self-employed, unemployed and others. For Cohort 2001 and 2006, males are 4% and 1.59% more likely to be employed than females, respectively. A similar sign found for Self-employed in both 2001 and 2006. These findings align with Duleep and Sanders (1993), who they argue that immigrant females are more likely to help in their husbands' business than having their own. Besides, we observe that female is more likely to be a student or in others category than a male in both the cohorts. . Marriage found to be a significant factor determining the labour market statuses of immigrants. For the 2006 cohort, single immigrants are 5.87% more likely to be employed than a married immigrant. We also found that for both cohorts single immigrants are less likely to be in others category.

Economic class is the base group in the immigration class category. Both family class and refugee class immigrants are more likely to be employed than economic class immigrants. On the contrary, economic class immigrants are more likely to be student than other two (family class and refugee class) groups. We hypothesize that without

having family members or extended support, economic class may experience difficulties settling in the new country. On the other hand, having a clear tie before coming to Canada (family class) may create some advantage for them to gain access to the job market (Chowdhury & Das, 2016; Ealdrich et al., 1997). Moreover, the economic class immigrants may not accept a survival job and take extra time to find a suitable job. Often, economic class faces difficulty to get their credentials recognized upon arrival to the host country (Guo, 2009; Hawthorne, 2016). They may also gain skills by attending schools to improve their employability, ultimately leading them to have a better labour market trajectory. Such a findings warrants for further investigation on the integration of economic class immigrants in Canada. It also raises the question of 'brain waste' or skill underutilization among immigrants. Both family class and refugee class immigrants are less likely to be self-employed than economic class immigrants. This findings contradict with the existing literature which suggest that settling in a location with a higher proportion of co-ethnics should improve the likelihood of pursuing self-employment as family class and refugee class immigrants migrate to region where there is higher proportion of co-ethnics (Ealdrich et al., 1997). We assume, critical mass is missing here in Atlantic Canada as Raijman (2001) reported that to support an ethnic business critical mass is needed.

Education level matters for immigrants' labour market outcome and higher level of education refers to higher earning in labour market (Adsera & Chiswick, 2006). Highschool or less is our base outcome for education level. Those with some college or diploma education have a higher possibility of being employed. For Cohort 2001, immigrants with higher level of study than High School or less are more likely to be student. Cohort 2006 shows that immigrant with a university degree is less likely to be unemployed than the immigrants with education level of high school or less. This finding aligns with Borjas (1988). Immigrants with some college and diploma and immigrants with university-level education are less likely to be in others category than the immigrants with high school or less education.

We divide the immigrants into four age groups where the base outcome is 15-24 years. While we thought that, immigrants of older age might suffer employment problem in the

labor market due to less adaptiveness, there is no evidence for this. Our results suggest that people in higher age groups are more likely to be employed than the 15-24 age group. Similarly, immigrants in a higher age group are less likely to be students than the 15-24 age group. While the findings suggest that in 2001, immigrants in the age group 25-34 years are 1.66% more likely to be in others category than the 15-24 years age group, in 2006, they are 4.1% more likely to be in others category. While the immigrants in age groups 35-49 and 50-65 years are less likely to be unemployed than the base category, we witnessed an opposite result for those aged 25-34 years. We assumed, while other immigrants joined any type of job to earn, immigrants aged 25 to 34 years are those who completed their graduation recently and waits for job that suits their educational background and skill level (Baert et al., 2013).

As geography plays a key role in immigrants labour market outcome, we take Europe as our base outcome. Immigrants from Africa and the Middle East are 3.47% and 5.93% less likely to be employed in both cohorts, respectively. However, they are 3.35% and 2.17% more likely to be students than the immigrants from Europe. A similar result can be found for all other region except the immigrants from the United States. This could be the result of discrimination, lower quality of education, or more difficulty for credential approval. In addition to that, compared to Europe, all other immigrants are less likely to be self-employed. While in 2006, except for immigrants from South and Central America, compared to Europe, all other immigrants are less likely to be unemployed. Immigrants who know only English among the two official languages, they are more likely to be employed than the immigrants who know only French. It is well reported in the previous literature that knowledge of English helps immigrants to integrate in to labour market faster. Solati et al (2021) reported that Immigrants who could communicate "well" or "very well" in English had a 4% higher chance of finding work six months after arrival in Canada than those who could communicate "fairly well," "poorly," or "not at all." They (immigrants who know English only) are also more likely to be employed than the immigrants who know both the official language. Immigrants who know neither English nor French are more likely to be self-employed in Cohort 2001 than the immigrants who know only English. The finding align with the

previous literature where we studied that immigrant enclaves can stimulate self-employment and living in ethnolinguistic enclaves' limits the learning of host nation language (Isphording, 2015).

Base Province for our study is New Brunswick. Immigrants landing in New Brunswick are more likely to be employed than in other provinces in both cohorts. Except for Prince Edward Island in 2006 and Nova Scotia in 2001, immigrants in New Brunswick are less likely to be a student. Immigrants in New Brunswick for cohort 2006 are 1.68% more likely to be unemployed than the immigrants in Newfoundland and Labrador. A similar result can be found for Nova scotia for both cohorts where immigrants of Nova Scotia are less likely to be unemployed than immigrants of New Brunswick. While immigrants in New Brunswick are 1.44% less likely to be in others category than the immigrants of Newfoundland and Labrador in 2001, it's 2.65% more likely for immigrants of Nova scotia in the same year.

**Table-11: Marginal effects of multinomial logistic model for Cohort 2001 and 2006**

Variable	Cohort 2001	Cohort 2006
<b>Sex: Female (Base Outcome)</b>		
Sex: Male		
Employed	0.04***	0.0159**
Student	-0.0004	-0.0093**
Self employed	0.054***	0.0582***
Unemployed	-0.0086*	-0.0119***
Others	-0.088***	-0.0528***
<b>Marital Status: Married (Base Outcome)</b>		
Marital Status: Single		
Employed	0.0066	0.0587***
Student	0.0421***	0.0608***
Self employed	-0.005	-0.0480***
Unemployed	0.0327***	0.00157

Others	-0.077***	-0.0731***
<b>Immigration Class: Economic Class (Base Outcome)</b>		
Immigration Class: Family class		
Employed	0.0043	0.0349***
Student	-0.0135**	0.0001
Self employed	-0.0058	-0.0244***
Unemployed	0.0779***	0.0323***
Others	-0.0629***	-0.0429***
Immigration Class: Refugee and others		
Employed	0.0991***	0.0767***
Student	-0.0115*	-0.0339***
Self employed	-0.0761***	-0.0202**
Unemployed	0.0512***	0.0367***
Others	-0.0627***	-0.0594***
<b>Education Level: Highschool or less (Base Outcome)</b>		
Education Level: Some college or diploma		
Employed	0.0041	0.0269**
Student	0.0253***	0.0111*
Self employed	-0.0014	0.0064
Unemployed	0.0101	0.00055
Others	-0.0381***	-0.0450***
Education Level: University		
Employed	-0.0171	0.0083
Student	0.0458***	0.0070
Self employed	0.0236***	0.0132

Unemployed	0.0002	-0.0210***
Others	-0.0524***	-0.0076
<b>Landing Age Group: 15-24y (Base Outcome)</b>		
Landing Age Group: 25-34y		
Employed	0.0079	0.1168***
Student	-0.0356***	-0.1091***
Self employed	0.0107	0.0031
Unemployed	0.0004	0.0301***
Others	0.0166**	-0.0410***
Landing Age Group: 35-49y		
Employed	0.0504***	0.1233***
Student	-0.0753***	-0.1568***
Self employed	0.0321***	0.0279***
Unemployed	-0.0237***	-0.0135**
Others	0.0165**	0.0191**
Landing Age Group: 50-65y		
Employed	0.1214***	0.1238***
Student	-0.1153***	-0.1961***
Self employed	0.0308**	0.0292***
Unemployed	-0.0973***	-0.0261***
Others	0.0603***	0.0692***
<b>World Area of Birth: Europe (Base Outcome)</b>		
World Area of Birth: Africa and the Middle East		
Employed	-0.0347***	-0.0593***
Student	0.0335***	0.0217***
Self employed	-0.0218***	-0.0205**



Unemployed	-0.0248***	-0.0380***
Others	0.0478***	0.0962***
World Area of Birth: Southern		
Asia		
Employed	0.0309***	0.0140
Student	0.0169**	0.0246***
Self employed	-0.0498***	-0.0454***
Unemployed	-0.0253**	-0.0057
Others	0.0273***	0.0125
World Area of Birth: Eastern		
Asia		
Employed	0.0285*	0.0081
Student	0.0606***	0.0437***
Self employed	-0.0633***	-0.0509***
Unemployed	0.0038	-0.0467***
Others	-0.0295***	0.0459***
World Area of Birth: Oceania and other Asia		
Employed	0.0081	-0.0616***
Student	0.0132*	0.0181**
Self employed	-0.0192	0.0410***
Unemployed	0.0076	-0.0295***
Others	-0.0097	0.03195***
World Area of Birth: South and Central America		
Employed	0.0366**	0.0278*
Student	0.0209***	0.0182*

Self employed	-0.0498***	-0.0715***
Unemployed	0.0095	0.0047
Others	-0.0172*	0.0208
<hr/>		
World Area of Birth: United		
States or others		
Employed	0.0690***	0.0020
Student	-0.0108	-0.0036
Self employed	-0.0363***	-0.0030
Unemployed	-0.0005	-0.0077
Others	-0.0214**	0.0122
<hr/>		
<b>Official Language: Only English (Base Outcome)</b>		
<hr/>		
Official Language: Only French		
Employed	-0.0595**	0.0007
Student	0.0527***	0.0138
Self employed	-0.0047	0.0212
Unemployed	0.0472**	0.0439**
Others	-0.0358***	-0.0796***
<hr/>		
Official Language: Both English		
and French		
Employed	-0.0924***	-0.00004
Student	0.0041	-0.00403
Self employed	0.0227**	0.0271***
Unemployed	0.0592***	-0.0021979
Others	0.0064	-0.0208***
<hr/>		
Official Language: Neither		
English nor French		
Employed	-0.0112	0.0349***
<hr/>		

Student	-0.0103**	-0.0226***
Self employed	0.0247***	0.0094
Unemployed	0.0019	-0.0309***
Others	-0.0051	0.0091
<b>Destination Province: New Brunswick (Base Outcome)</b>		
Destination	Province:	
Newfoundland and Labrador		
Employed	-0.0218*	-0.0835***
Student	0.0054	0.0375***
Self employed	0.0218***	0.0707***
Unemployed	0.0091	-0.0168***
Others	-0.0144*	-0.0079
Destination	Province: Prince	
Edward Island		
Employed	-0.1498***	-0.0136
Student	0.0332***	-0.0132
Self employed	0.0609***	0.0143*
Unemployed	0.0484***	0.0062
Others	0.0073	0.0064
Destination	Province: Nova	
Scotia	-0.0508***	-0.0297***
Employed	-0.0064	0.0167***
Student	0.0451***	0.0217***
Self employed	-0.0143**	-0.0090**
Unemployed	0.0265***	0.0002
Others		

Pseudo R2	0.0606	0.061
Log pseudolikelihood	-18424.888	-27335.904
Sample size	15870	22640
McFadden's Adj R2	0.053	0.056
Wald chi2(84)	95212.03	3264.38

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Notes: \* Significant at 10 percent, \*\* significant at 5 percent, \*\*\* significant at 1 percent

### **Determinants of Labour Market Statuses for Cohort 2011 and Cohort 2016**

Table-12 shows the average marginal effects of multinomial logistic model for cohort 2011 and 2016. Same as cohort 2001 and 2006, immigrant's male is more likely to be employed than immigrant females in both the cohort. Unlike, earlier cohort, for cohort 2016, family class immigrants are 5.22% less likely to be employed than economic class immigrants. Possible reason could be the introduction of Atlantic Immigration Pilot program from 2016 by which a high number of immigrants entered Atlantic Canada as economic class immigrants. The Atlantic Immigration Program provides a path to permanent residency for skilled foreign employees and international graduates from Canadian institutions seeking to work and live in one of Canada's four Atlantic provinces. Even though earlier cohorts showed that immigrants with higher age group than the 15 to 24 years age group are more likely to be employed, for cohort 2011 we found that immigrants of the age group 50 to 65 years are less likely to be employed than immigrants of the age group 15 to 24 years.

For 2016, Immigrant who knows French are 5.61% more likely to be employed than the immigrants who know English while they are 4.75% less likely to be self-employed. Their possibility of being unemployed is also higher in comparison to immigrants who know only English. Though for cohort 2001, we found that, immigrants who know neither English nor French are more likely to be self-employed than the immigrants who know English, for cohort 2011 and 2016 we found that immigrants who know neither English nor French are less likely to be self-employed than the immigrants who

know English. Possible reason for this could be, immigrants leaving in the same ethnic community are more likely to be self employed and less likely to learn official languages. But to support an ethnic business critical mass is needed which might be missing in Atlantic Canada (Raijman, 2001).

Immigrants of Newfoundland and Labrador are more likely to be employed and less likely to be self-employed than the immigrants of New Brunswick. For cohort 2011, immigrants of Prince Edward Island are 2.7% less likely to be employed but for cohort 2016, they are 1.76% more likely to be employed than the immigrants of New Brunswick. Immigrants of Prince Edward Island are more likely to self-employed than immigrants of New Brunswick. These results align with the finding of Akbari & Haider (2018) where they reported that, The majority of recent immigrants to Prince Edward Island are provincial nominees. Businesses and communities can use the provincial nominee programme to nominate immigrants for positions within their organisations.

**Table-12: Marginal effects of multinomial logistic model for Cohort 2011 and 2016**

Variable	Cohort 2011	Cohort 2016
<b>Sex: Female (Base Outcome)</b>		
Sex: Male		
Employed	0.0737***	0.1702***
Self employed	0.023***	0.033***
Unemployed	-0.0222***	-0.024***
Others	-0.0745***	-0.1791***
<b>Marital Status: Married (Base Outcome)</b>		
Marital Status: Single		
Employed	0.0473***	0.1186***
Self employed	0.0001	0.0102**
Unemployed	-0.0006	-0.0111**
Others	-0.0467***	-0.1177***
<b>Immigration Class: Economic Class (Base Outcome)</b>		

Immigration Class: Family class		
Employed	-0.0486***	-0.0522***
Self employed	0.0059	-0.0209***
Unemployed	0.0178***	0.0318***
Others	0.0248***	0.0413***
<hr/>		
Immigration Class: Refugee and others		
Employed	0.0579***	0.0194
Self employed	-0.0613***	-0.0392***
Unemployed	-0.0022	-0.0225***
Others	0.0056	0.0424***
<hr/>		
<b>Education Level: Highschool or less (Base Outcome)</b>		
<hr/>		
Education Level: Some college or diploma		
Employed	0.024***	-0.0024
Self employed	0.0099*	0.0147***
Unemployed	0.0106**	0.0219***
Others	-0.0446***	-0.0342***
<hr/>		
Education Level: University		
Employed	0.0165**	0.0004
Self employed	0.0041	0.0058
Unemployed	0.0032	0.0176***
Others	-0.0239***	-0.0238***
<hr/>		
<b>Landing Age Group: 15-24y (Base Outcome)</b>		
<hr/>		
Landing Age Group: 25-34y		
Employed	0.0324***	0.0411***
Self employed	0.0222***	0.0163***

Unemployed	0.0313***	0.0453***
Others	-0.086***	-0.1029***
<hr/>		
Landing Age Group: 35-49y		
Employed	0.0294**	0.0728***
Self employed	0.0332***	0.0237***
Unemployed	-0.0081	0.0148**
Others	-0.0544***	-0.1114***
<hr/>		
Landing Age Group: 50-65y		
Employed	-0.0279*	0.083***
Self employed	0.0675***	0.0014
Unemployed	-0.0265***	-0.0104
Others	-0.013	-0.074***
<hr/>		
<b>World Area of Birth: Europe (Base Outcome)</b>		
<hr/>		
World Area of Birth: Africa and the Middle East		
Employed	-0.0883***	-0.0453***
Self employed	-0.0081	-0.0368***
Unemployed	-0.0407***	-0.0166**
Others	0.1372***	0.0988***
<hr/>		
World Area of Birth: Southern Asia		
Employed	-0.0023	0.0364***
Self employed	-0.0676***	-0.0539***
Unemployed	-0.0326***	-0.0096
Others	0.1026***	0.0271***
<hr/>		
World Area of Birth: Eastern Asia		
Employed	0.0298***	0.0885***

Employed	-0.0418***	-0.0676***
Self employed	-0.0463***	-0.0333***
Unemployed	0.0583***	0.0123
Others		

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World Area of Birth: Oceania

and other Asia

Employed	0.0474***	0.0802***
Self employed	-0.0506***	-0.0696***
Unemployed	-0.0226***	0.0515***
Others	0.0258***	-0.062***

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World Area of Birth: South and

Central America

Employed	0.0172	0.0775***
Self employed	-0.0328***	-0.0525***
Unemployed	-0.0113	0.0202**
Others	0.027***	-0.0452***

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World Area of Birth: United

States or others

Employed	0.0317**	0.0001
Self employed	-0.0175	0.0318*
Unemployed	-0.0276***	-0.0218**
Others	0.0134	-0.0101

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**Official Language: Only English (Base Outcome)**

Official Language: Only French

Employed	0.0164	0.0561***
Self employed	-0.008	-0.0475***
Unemployed	0.0687***	0.0508***



Others	-0.0771***	-0.0594***
<hr/>		
Official Language: Both English and French		
Employed	0.0246*	-0.0389
Self employed	-0.0259***	-0.0271*
Unemployed	0.016**	0.1107***
Others	-0.0148	-0.0446*
<hr/>		
Official Language: Neither English nor French		
Employed	0.0236***	0.0036
Self employed	-0.0069	-0.0217***
Unemployed	-0.0362***	-0.0156**
Others	0.0195***	0.0337***
<hr/>		
<b>Destination Province: New Brunswick (Base Outcome)</b>		
<hr/>		
Destination Province:		
Newfoundland and Labrador		
Employed	0.0542***	0.0581***
Self employed	-0.0205***	-0.014**
Unemployed	0.0153**	0.0021
Others	-0.049***	-0.0463***
<hr/>		
Destination Province:		
Prince Edward Island		
Employed	-0.027***	0.0176*
Self employed	0.0159***	-0.0016
Unemployed	-0.0072	0.0086
Others	0.0183***	-0.0245***

Destination	Province:	Nova	
Scotia		0.0077	0.0408***
Employed		0.0047	0.0008
Self employed		-0.0034	-0.0082*
Unemployed		-0.009	-0.0334***
Others			
Pseudo R2		0.0536	0.108
Log pseudolikelihood		-22581.075	-18176.194
Sample size		24830	21800
McFadden's Adj R2			0.102
Wald chi2(84)		2363.53	3361.57

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Notes: \* Significant at 10 percent, \*\* significant at 5 percent, \*\*\* significant at 1 percent

## Conclusions

Perhaps this study's most compelling result is that immigrants in Atlantic Canada are far from homogenous. Immigrants of various origins range significantly in educational attainment, age structure, geographical distribution, immigration category, and the province of residence in Atlantic Canada. However, these apparent differences account for just a portion of the variance in economic results. Our analysis highlights significant differences in numerous aspects of the economic behaviour of immigrants in Atlantic Canada and even greater differences between immigrants of different origins even when education, age, and other individual characteristics are considered.

Our findings suggest that immigrants' labour market performance in Atlantic Canada varies based on their country of origin. US immigrants get an advantage in the labour market compared to immigrants from other regions. For Atlantic Canada, immigrants who know French in the recent cohort integrate better into the labour market than an immigrant who only knows English. New Brunswick was found to be better performing in immigrant integration (more likely to be employed) than the other provinces of Atlantic Canada. However, there are differences in the other categories (unemployment, student, self-employment, and others). Therefore, we need more rigorous analysis to detail the labour market integration of immigrants in Atlantic Canada. Family class immigrants are performing better than economic class immigrants. This can be a subject for future study as economic class immigrants are supposed to cover the gaps of skilled immigrants in the labour market (Somerville & Walsworth, 2009). We also found that many immigrants are performing non-economic activities. Accommodating them into economic activity might play a vital role to fill up the labour shortage. Besides, ensuring training, better recognition of previous credentials, improved support services for the economic class immigrants can reduce their likelihood of being unemployed.

Our findings further suggest that immigrants' integration into the labour market is not the same for all the Atlantic provinces. We recommend more province-specific studies to analyze the integration process of immigrants. From the host country's perspective, it's very important to utilize the potential of immigrants. However, based on our report, we observe that many immigrants face varying lengths of unemployment and other

labour market statuses. More specifically, economic immigrants also struggle to ensure employment trajectory, which is a clear loss of economic output. Therefore, we need to devise policies for better integration of immigrants. Although the number of immigrants has been increasing in recent years, in many studies, it's been observed that immigrants' retention depends on having a critical mass of immigrants in a place. This study also infers that the lack of self-employment among immigrants in Atlantic Canada could be attributed to a lack of ethnic community. Therefore, we suggest better policies for attracting more immigrants and ensuring a better labour market integration.

Due to data privacy rules of statistics Canada, some of the results were rounded, and Optimal matching analysis couldn't be possible. However, Optimal matching analysis and the subsequent cluster analysis would give us a more extensive view of the immigrants' labour market. Furthermore, a comparative analysis with native-born can help us understand where immigrants' stand in the labour market compared to the native-born. In addition to that, future studies can consider comparing different field of study as demand of immigrants are not the same for all. Due to lack of information, we were unable to separate part-time employment and full-time employment. This might give an incomplete picture as some immigrants couldn't manage a full-time job and instead select a part-time job to earn their living. Future studies considering the following categories: full-time employed, part-time employed, Only Student, and Student and employed can help us understand the immigrants labour market situation better. In addition, future studies can also add macroeconomic factors, e.g., financial downturn and recession, to observe whether immigrants' labour market statuses are being affected by those. Despite this limitation, our study explained the labour market scenario of immigrants in Atlantic Canada and identified the factors that influence their labour market performance, which will help policymakers to improve the labour market integration for immigrants.

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