

**THE IMPACT OF OFFICIAL
BILINGUALISM ON THE GEOGRAPHIC
MOBILITY OF NEW BRUNSWICKERS:
EVIDENCE FROM 2001 TO 2016**



J. C. Herbert Emery, PhD

Li Wang, MA

Bethany Daigle, MA

PROJECT TITLE

The impact of official bilingualism on the geographic mobility of New Brunswickers: Evidence from 2001 to 2016

PRINCIPAL INVESTIGATORS

J. C. Herbert Emery, Vaughan Chair in Regional Economics,
Department of Economics, University of New Brunswick

RESEARCH TEAM

Li Wang, NB-IRDT Data Analyst
Bethany Daigle, NB-IRDT Research Assistant

PARTNERS

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TABLE OF CONTENTS

LIST OF FIGURES	4
ABSTRACT	6
INTRODUCTION.....	7
LITERATURE REVIEW	9
GEOGRAPHY	13
DEFINING CONTEXT.....	14
DATA.....	16
Sample	16
DESCRIPTIVE STATISTICS.....	17
1. Out-migration from NB.....	17
1.1 Out-Migrants vs Stayers by Proportion	18
1.2 Rates of Out-Migration.....	20
1.3 In-Migration	23
2. Intra-Provincial Migration.....	26
2.1 Intra-Provincial Migrants vs Non-Move/Immigrant Stayers by Proportions.....	26
2.2 Rate of Intra-Provincial Migration	29
3. Rate of Inter- and Intra-Provincial Migration by Origin and Mother Tongue	31
4. Origins and Destinations of Intra-Provincial Movement	32
5. Origins and Destinations of In-Migrants	35
5.1 Out-Migration.....	37
5.2 Intra-Provincial Migration.....	37
MODEL SPECIFICATION	38
1. Logistic Regression Model	38
2. Multinomial Logistic Regression Model	39
RESULTS	40
1. Logistic Regression Analysis Results.....	40
1.1 Out-Migration.....	40
1.2 Intra-Provincial Migration.....	51
2. Multinomial Logistic Regression Analysis Results	61
CONCLUSION	63
Implications	63
Suggestions.....	64
REFERENCES	65

LIST OF FIGURES

Figure 1: Out-Migrants vs Stayers, 2001-2016..... 17

Figure 2 Out-Migrants vs Stayers, proportions by gender, 2001-2016..... 18

Figure 3: Out-Migrants vs Stayers, proportions by age group, 2001-2016..... 18

Figure 4: Out-Migrants vs Stayers, proportions by marital status, 2001-2016 19

Figure 5: Out-Migrants vs Stayers, proportions by education attainment, 2001-2016 19

Figure 6: Out-Migrants vs Stayers, proportions by *linguistic attribute,* 2001-2016..... 20

Figure 7: Rate of Out-Migration, by gender, 2001-2016..... 20

Figure 8: Rate of Out-Migration, by age group, 2001-2016..... 21

Figure 9: Rate of Out-Migration, by marital status, 2001-2016..... 21

Figure 10: Rate of Out-Migration, by education attainment, 2001-2016..... 22

Figure 11: Rate of Out-Migration, by *linguistic attribute,* 2001-2016..... 22

Figure 12: In-Migrants, by gender, 2001-2016 23

Figure 13: In-Migrants, by age, 2001-2016 23

Figure 14: In-Migrants, by marital status, 2001-2016..... 24

Figure 15: In-Migrants, by education, 2001-2016 24

Figure 16: In-Migrants, by language group, 2001-2016..... 25

Figure 17: Intra-Provincial Migrants vs Non-Move/Immigrant Stayers, 2001-2016..... 26

Figure 18: Intra-Provincial Migrants vs Non-Move/Immigrant Stayers, proportions by gender, 2001-2016 26

Figure 19: Intra-Provincial Migrants vs Non-Move/Immigrant Stayers, proportions by age group, 2001-2016 27

Figure 20: Intra-Provincial Migrants vs Non-Move/Immigrant Stayers, proportions by marital status, 2001-2016 27

Figure 21: Intra-Provincial Migrants vs Non-Move/Immigrant Stayers, proportions by education attainment, 2001-2016 28

Figure 22: Intra-Provincial Migrants vs Non-Move/Immigrant Stayers, proportions by *linguistic attribute,* 2001-2016 28

Figure 23: Rate of Intra-Provincial Migration, by gender, 2001-2016 29

Figure 24: Rate of Intra-Provincial Migration, by age group, 2001-2016..... 29

Figure 25: Rate of Intra-Provincial Migration, by marital status, 2001-2016 30

Figure 26: Rate of Intra-Provincial Migration, by education attainment, 2001-2016 30

Figure 27: Rate of Intra-Provincial Migration, by *linguistic attribute* 31

Figure 28: Rate of Inter-Provincial Migration, by *mother tongue* and origin, 2001-2016 31

Figure 29: Rate of Intra-Provincial Migration, by *mother tongue* and origin, 2001-2016 32

Figure 30: Intra-Provincial Movement of Anglophone NBers, by origin and destination, 2001-2016 33

Figure 31: Intra-Provincial Movement of Francophone NBers, by origin and destination, 2001-2016 34

Figure 32: In-Migrants to NB from Other Provinces, by Origin 35

Figure 33: Destination of In-Migrants, by Mother Tongue 36

Figure 34 : Odds-Ratios by Age Group for NB Men (Out-Migration Model Output)	40
Figure 35: Odds-Ratios by Age Groups for NB Women (Out-Migration Model Output)	41
Figure 36: Odds-Ratios by Marital Status for NB Men (Out-Migration Model Output)	42
Figure 37: Odds-Ratios by Marital Status for NB Women (Out-Migration Model Output)	43
Figure 38: Odds-Ratios by Education for NB Men (Out-Migration Model Output)	44
Figure 39: Odds-Ratios by Education for NB Women (Out-Migration Model Output)	45
Figure 40: Odds-Ratios by Origins for NB Men (Out-Migration Model)	46
Figure 41: Odds-Ratios by Origins for NB Women (Out-Migration Model)	47
Figure 42: Odds-Ratios by *Linguistic Attribute* for NB Men (Out-Migration Model)	49
Figure 43: Odds-Ratios by *Linguistic Attribute* for NB Women (Out-Migration Model)	50
Figure 44: Odds-Ratios by Age Group for NB Men (Intra-Provincial Migration Model)	51
Figure 45: Odds-Ratios by Age Group for NB Women (Intra-Provincial Migration Model)	52
Figure 46: Odds-Ratios by Marital Status for NB Men (Intra-Provincial Migration Model)	53
Figure 47: Odds-Ratios by Marital Status for NB Women (Intra-Provincial Migration Model)	54
Figure 48: Odds-Ratios by Education for NB Men (Intra-Provincial Migration Model)	55
Figure 49: Odds-Ratios by Education for NB Women (Intra-Provincial Migration Model)	56
Figure 50: Odds-Ratios by Origin for NB Men (Intra-Provincial Migration Model)	57
Figure 51: Odds-Ratios by Origin for NB Women (Intra-Provincial Migration Model)	58
Figure 52: Odds-Ratios by *Linguistic Attribute* for NB Men (Intra-Provincial Migration Model)	60
Figure 53: Odds-Ratios by *Linguistic Attribute* for NB Women (Intra-Provincial Migration Model)	61

ABSTRACT

How does official bilingualism affect the geographic mobility of New Brunswickers? This is a salient question because New Brunswick (NB) is experiencing high levels of out-migration and intra-provincial migration from rural to urban areas and from north to south; however, little attention has been devoted to finding an answer. We address this question by using multinomial logistic regression models and utilizing data from the 2006 and 2016 Censuses of Population and the 2011 National Household Survey, provided by Statistic Canada and accessed in the New Brunswick Research Data Center at the University of New Brunswick.

We find that out-migration from NB is most likely to occur among New Brunswickers with an English mother tongue. Second official language acquisition has little or no influence on Anglophone out-migration. On the other hand, since 2011, official bilingualism has been an effective policy inducing female bilingual Anglophone NBers to stay in the province. The acquisition of a second official language in the province generally improves labour market efficiency by increasing the geographic mobility of both Anglophones and Francophones.¹

¹ We use the terms Anglophone and Francophone throughout the report to indicate whether the New Brunswickers in question have an English or a French mother tongue.

INTRODUCTION

After New Brunswick (NB) adopted the 1969 Language Act – making both English and French the province's official languages – it became Canada's only officially bilingual province. New Brunswick is also the only province in Canada whose rates of out-migration and intra-provincial migration are higher than the national rates.

This paper considers how the acquisition of a second official language influences New Brunswickers' external and internal geographic mobility for three consecutive intercensal periods between 2001 and 2016.² We pay extra attention to New Brunswickers' geographic mobility within the province by taking not only linguistic factors, but also origin and destination, into consideration.

It is important to determine how official bilingualism affects the geographic mobility of New Brunswickers because NB is suffering from high levels of out-migration from the province and intra-migration from rural to urban areas and from north to south within the province. Moreover, linguistic attributes have not been thoroughly examined in analyses of the migration patterns that NB is experiencing.

This study is unique in determining the effect of official bilingualism on the geographic mobility of New Brunswickers, as the relation of bilingualism and migration has not been clearly addressed by the existing literature. We deem it incredibly important to see whether linguistic attributes play a role in geographic mobility and to identify which language groups are more likely to move externally from NB or internally within the province. Our internal analysis focuses on intra-migrants' origins and destinations to draw a more thorough picture of migration patterns in NB. This information could ultimately be used by provincial policy makers in their public policy decisions regarding official bilingualism and migration.

Our questions regarding the impact of official bilingualism on geographical mobility are answered through logistic regression models in which the dependent variable in each model is a binary indicating migration status. Independent variables are a set of dummies for capturing the definition of "bilingualism," which is classified by four types of speakers: unilingual English speakers, unilingual French speakers, bilingual Francophone speakers, and bilingual Anglophone speakers. Unilingual English speakers are excluded as the reference group to which we can compare the odds-ratios.

Following the existing literature, we use factors that have established relationships with migration decisions as our control variables. These include age, gender, marital status, and education. We do not take income into account, though, as income also has established correlations with the above variables, and adding income variables could potentially make our results biased. One group of people in each control variable has been excluded in our regression analysis to function as the reference group.

We take origins into consideration for our external analysis, and both origins and destinations for our internal analysis, by using a set of dummies aiming to show 1) whether the origins of examined NBers significantly impact their migration decisions and 2) where they are most likely to go – intra-provincially – based on their origins. We do not take destinations into account for the external analysis because, once NBers leave, they are no longer part of the province and thus no longer our primary focus.

² 2001-2006, 2006-2011, and 2011-2016

We further apply a multinomial logistic regression (MLR) model in which the dependent variable is categorical, indicating the mobility status of out-migrant, intra-migrant, or non-movement stayer to validate our simple logistic regression outputs. These models aim to show the direct impacts of official bilingualism on the choices of both external and internal migration facing New Brunswickers, after accounting for the characteristics of NBers, as well as their origins.

We find that out-migration from NB is most likely to occur among New Brunswickers with an English mother tongue. Second official language acquisition has little or no influence on Anglophone out-migration. On the other hand, since 2011, official bilingualism has been an effective policy inducing female bilingual Anglophone NBers to stay in the province. The acquisition of a second official language in the province generally improves labour market efficiency by increasing the geographic mobility of both Anglophones and Francophones.

LITERATURE REVIEW

Literature on geographic mobility, also referred as migration, is extensive and can commonly be categorized into two dimensions: external and internal. Most researchers and policy analysts would refer to external migration as movement across national borders and to internal migration as movement within a country. We apply these definitions on a provincial level. Haley (2017) points out that it is crucial to empirically define and operationalize movement as the first step for any geographic mobility study because decisions on operationalizing movement have implications for the statistical outcomes, as different methods of defining and operationalizing 'geographical mobility' produce entirely different results.

For instance, Niedomysl and Fransson (2014) have summarized geographic movements as commonly operationalized in terms of distance (e.g., kilometers or miles moved), crossing administrative boundaries (e.g., municipalities, counties, provinces, countries), and functional regions (e.g., metropolitan areas, economic regions), regardless of the underlying purpose(s) of the movement (e.g., for education, employment, marriage, retirement).

These different defining mechanisms challenge researchers and policy analysts in their studies of internal movements within a country or a specific region. Decisions regarding the definitions of movements could ultimately lead to misinformed policies and regional planning due to the varying outcomes produced (Haley, 2017). Meanwhile, the identification of external movement across boundaries seems to face fewer challenges when operationalizing movement.

We strongly agree with Haley (2017) that context is crucial when conducting geographic mobility studies, and movements need to be defined and operationalized according to their context. Thus, depending on context, existing external migration studies focus on groups of people moving across a boundary, and internal migration studies concentrate on groups of people relocating within a boundary.

Research on geographic mobility for different purposes has been well developed around the world, and existing theories have proven that an individual's characteristics shape every stage of his or her migration decisions (Birchall, 2016). For example, men are more mobile compared to women. For instance, men would move internationally if the right opportunity came, while women tend to move locally. Aging significantly decreases geographic mobility, and a lower education is associated with less geographic mobility. Finally, those who are not attached to a relationship are more mobile. Depending on context, economic prospects are often seen as the main motivation for migration decisions (Sioufi & Borhis, 2018).

The Bank of Canada published a report conducted by Amirault et al. (2013) thoroughly explaining Canada's recent inter- and intra-provincial migration patterns. Amirault et al. (2013) first note that the rate of inter-provincial migration in Canada has remained unchanged at 3% for two consecutive intercensal periods between 1991 and 2001, and the rate dropped to 2.7% in the intercensal period between 2001 and 2006. The rate of intra-provincial migration – defined as movement within the province to a different economic region – remained steady at 5.7% for the two consecutive intercensal periods between 1991 and 2001, and the rate dropped to 5.3% for the intercensal period between 2001 and 2006.

Amirault et al. (2013) suggest that the rate of intra-provincial migration exceeds that of inter-provincial migration because distance is considered one of the main barriers to moving, and distances within provinces are significantly shorter, on average, than distances between provinces. Amirault et al. (2013) also suspect language differences may play an important role in explaining recent migration in Canada since Quebec, which is a primarily French-speaking

province, has seen a much larger rate of intra-provincial migrants. This suggests that language differences act as a barrier to inter-provincial migration in and out of Quebec.

Another reason for these large intra-provincial migration flows is that labour market conditions in different regions of a province can vary widely; thus, any additional benefit from out-migration from one province to another may be relatively small due to the costs associated with province-to-province migration (Amirault et al., 2013).

Several studies take language attributes into consideration when conducting economic and sociological analyses of internal mobility in Canada. The studies investigating the impact of bilingualism on geographic mobility in Canada mostly focus on migration into and out from Quebec in relation to the rest of Canada. Most researchers find that bilingual attributes play an important role when Canadians make decisions on inter-provincial migration, and a few researchers have shown that the geographic mobility of Canadians is associated with earnings mobility.

Bilingual attributes are typically measured in terms of mother tongue and knowledge of a second language, though some researchers use language tensions and language transfers as their predictors. Amit-Talai (1993) points out that in measuring proficiency in Canada's official languages, the Canadian Census simply asks whether the respondents can carry on a conversation in one or both languages: English and/or French. Although this measure has been criticized by Veltman (1986) as inadequate, since those who can barely converse in a language can still respond affirmatively to the question, the measure is still often used in Canadian research.

Grenier (1987) finds that between 1976 and 1981, bilingual male Francophones were less likely to stay in Quebec, but the net difference in the probability of staying between unilingual and bilingual Francophones was small. On the contrary, being bilingual made Anglophones more likely to stay in Quebec, and the net difference in the probability of staying between bilingual and unilingual Anglophones was much larger. Those who spoke only English were less likely to stay in Quebec than any other language group. Grenier (1987) notes that in addition to knowledge of a second language, the language spoken at home – i.e., the mother tongue – was related to the probability of staying in Quebec. The effect of language transfer was particularly important for bilingual Anglophone speakers, while it did not seem to matter for other types of speakers (Grenier, 1987).

Amit-Talai (1993) examined Grade 11 students enrolled in English and French schools in Quebec by administering a survey with questions about relocation intentions. English mother tongue students in the English schools were more likely to leave Quebec than French mother tongue students in the French schools. Amit-Talai (1993) further states that the major distinction between prospective inter- and intra-provincial migrants lay in their perceptions of where educational and employment prospects are likely to be pursued, rather than in their primary motivations for relocation.

Sioufi and Borhis (2017) recently pointed out that longitudinal data are needed to check whether willingness to leave Quebec is matched by actual movement after finding that Quebec Anglophones were more inclined than Quebec Francophones to move to the rest of Canada. The use of linguistic tension factors by Sioufi and Borhis (2017) to predict Quebec Francophones' and Anglophones' willingness to migrate out of province frames linguistic tensions as important factors when predicting Quebec Anglophones' willingness to emigrate. However, this factor does not significantly predict Quebec Francophones' intention to emigrate. The sample size is relatively small for Quebec bilingual speakers, and the measures of linguistic tensions are ethical, rather than descriptive, in definitions of "bilingualism."

Other researchers interested in mobility and bilingualism have shown economic returns to internal migration in Canada or the acquisition of a second language (English or French) in Canada. In an earlier study conducted by Grant and Vanderkamp (1980), evidence suggests that it is very difficult to detect a significant positive effect of migration on income within a five-year time horizon. The immediate payoffs after relocation within Canada appear to be negative, and married women experienced strong negative payoffs from long distance moves between 1965 and 1971. Married or single men and individuals in the lower half of the income distribution saw positive payoffs a few years after relocation in Canada (Grant & Vanderkamp, 1980).

Grenier (1987) later notes a relationship between the geographical mobility and earnings mobility of Quebec men in the period during 1976 to 1981. The unilingual stayers in Quebec appear to be those who had relatively high earnings.

Brown and Newbold (2012) observe net inflows of young adults in large metro-areas in Canada, as large cities like Toronto attract knowledge-professionals and degree-holders in particular. Those who migrate to large areas in Canada are associated with an immediate income premium, and this premium is greater for those who move to Toronto (Brown & Newbold, 2012).

In terms of economic returns to bilingualism in Canada, Nadeau (2010) finds no evidence consistent with language-based wage premiums in either public or private sectors outside Quebec between 1970 and 2000. The previous wage premium for Anglophones in Quebec had vanished in both sectors in and outside Quebec. Nadeau notes that a premium emerged for Francophones in the private sector in Quebec, and it is unclear if acquiring a second language brought this wage premium.

In contrast, Shapiro and Stelcner (1997) find wage gaps between Francophones and Anglophones in Quebec between 1970 and 1990. They find these gaps are mostly driven by gender and work status (part-time versus full-time), rather than language variables.

Emery et al. (2017) have been focusing on the economic returns to bilingualism in New Brunswick, and they find that Francophones have higher economic gains associated with acquiring English than Anglophones acquiring French in NB. Emery et al. (2017) suggest that the returns to bilingualism in NB result from the economic assimilation of Francophones into the English-speaking labour market.

Bilingualism and migration have always been popular topics in NB – possibly because NB is the only officially bilingual province and the only province with a net out-flow of population in Canada (Statistics Canada [StatCan], 2017). Bérard-Chagnon and Lepage (2016) notice that intra-provincial migrants in NB are younger and more educated than the non-migrants in the province. They also indicate that a significant portion of intra-provincial migrants from the northern part of NB is very likely to go to Moncton for educational purposes.

Further, these movements have negatively impacted the literacy proficiency levels of Francophones in the north, although a portion of them may return. Bérard-Chagnon and Lepage (2016) find that the patterns of Francophone intra-provincial migration are similar to those of inter-provincial migration. For instance, the northern part of the province lost more than 1,500 Francophones while the southeast gained closed to 375 Francophones through inter-provincial migration. Thus, the authors claim that the northern part of NB faces challenges in retaining Francophones and attracting Francophones from rest of the country.

Language plays a more significant role in the migration decisions of New Brunswickers than in the decisions of other Canadians. However, depending on context, the regressions outputs of

existing literature vary widely, and most migration analyses conducted in Canada focus on descriptive statistics rather than specifically designed models.

GEOGRAPHY

We first look at the geography of New Brunswick in preparation to define and operationalize the geographic movements of New Brunswickers.

New Brunswick is one of four Atlantic Provinces on the east coast of Canada, positioned beside the American state of Maine. According to Statistics Canada (2017), New Brunswick is the third smallest province in Canada. It covers just 72,908 square kilometres (km²), accounting for only 0.7% of all Canadian provinces and territories.

Based on the 2016 Census of Population, New Brunswick is the only Canadian province that saw a population decline in the intercensal period between 2011 and 2016. It experienced a population decrease of 0.54% – down from 751,171 in 2011 to 747,101 in 2016 – while Canada experienced population growth at a national rate of 5.0% during the same period.

New Brunswickers reside in two Census Metropolitan Areas (CMAs): Moncton and Saint John; five Census Agglomerations (CAs): Fredericton, Bathurst, Miramichi, Edmundston, and Campbellton; and the rest of province (non-CMA/CA areas) (StatCan, 2017). A CMA or CA is formed by one or more adjacent municipalities on a population centre (known as the core). A CMA has a total population of at least 100,000, with 50,000 or more living in the population centre (core). A CA has a core population of at least 10,000.

Statistics Canada (2017) reports that 62.6% of the population of NB lives inside a CMA or CA, while 37.4% lives outside a CMA/CA. It further indicates that the rate of the population living in a CMA/CA in NB is lower than the national rate of 83.2%, while the rate of the population living in a non-CMA/CA in NB is higher than the national rate of 16.8%.

As mentioned above, NB is the only province that saw a population decrease between 2011 and 2016. Moncton (CMA) and Fredericton (CA) were the only areas in NB to see population growth during this intercensal period, with growth rates of 4.0% and 3.5%, respectively.

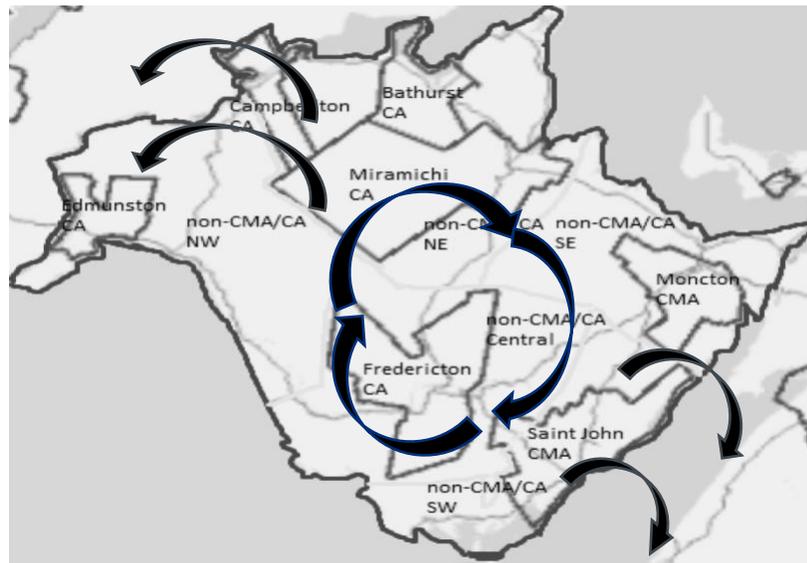
DEFINING CONTEXT

Since context is of central importance to geographic mobility analyses (Haley, 2017), and we wanted to identify movers (inter-provincially from NB and intra-provincially within NB), we obtained data that could be manipulated into samples consisting of NBers in the beginning to see who left NB and who stayed during the intercensal period. We are also interested in seeing whether the NBers who decided to stay in the province had geographic movements within the province.

The out-migrants from NB are fairly easy to identify because they reside elsewhere in Canada on the Census date in question, whereas previous Census data shows them residing in NB. It is a greater challenge to define and operationalize intra-provincial movements within NB, since there are numerous available boundaries for defining geographic movements within the province (e.g., block to block, Census Subdivisions [CSD], Census Divisions [CD], municipalities, CMA/CAs or non-CMA/CAs, economic regions, by distance, etc.).

First, we consider NB as comprised of two CMAs, five CAs, and the rest of province (non-CMA/CAs). Next, we divide the rest of province (non-CMA/CAs) by five parts according to the economic regions of NB: central, southwest, southeast, northwest, and northeast. Then, we operationalize intra-provincial movement within NB by recognizing movements across the two CMAs, five CAs, and five parts of the non-CMA/CAs (rest of province) after accounting for the fact that NB is relatively small in terms of geographic area (km²).

This defining mechanism not only allows us to distinguish between intra-provincial movements but also gives us the ability to identify movements across non-CMA/CAs and CMA/CAs, as well as direction of movement (e.g., north to south or vice versa). Based on our defining mechanism, the external and internal geographic movements of NB are illustrated as follows:



Note that this illustration is based on maps of NB CMAs and CAs (StatCan, 2017), where the center of NB consists of the Fredericton CA and non-CMA/CAs. The Saint John CMA, which is located in the southwest, is the only CMA in NB that includes multiple parts of different economic regions. The Moncton CMA, which has the largest population in NB, is located in the southeast. The

Edmundston CA is the only CA in the northwest, whereas the northeast has three CAs: Campbellton CA, Bathurst CA, and Miramichi CA.

DATA

The 2006 Census of Population, 2011 National Household Survey (NHS), and 2016 Census of Population, provided by Statistics Canada, were accessed in the New Brunswick Research Data Center (UNB Fredericton) and examined for our analysis.

These surveys record respondents' mobility statuses, which help us identify out-migrants and stayers during a prior intercensal period and enable us to further recognize intra-provincial migrants among those who stayed in New Brunswick.

These surveys also ask respondents about their linguistic attributes. This is necessary information for our analysis, as our goal is to see how people in different language groups made decisions to move from or stay in NB and relocate intra-provincially. Mobility statuses, linguistic attributes, and the characteristics of survey respondents are the most important variables in our geographical analysis.

The strengths of these datasets are the inclusiveness of important information for our study, as well as their abundant observations, which make our study more representative compared to smaller numbers of observations. These datasets are also consecutive and up to date. The main drawback is that they are cross-sectional; therefore, we cannot draw inferences and declare causality.

Sample

We are interested in the effects of bilingualism on the geographic mobility of New Brunswickers both inter- and intra-provincially. Our samples consist of those who are reported as residing in NB five years prior to the Census date(s) of interest. Only New Brunswickers between the ages of 18 and 64 are studied, as we want to focus on individuals in their prime working ages. We exclude NBers who speak neither English nor French, along with those who speak both English and French but whose mother tongues are not identified as English or French.

First, we label the "stayers": those in NB on the Census date in question with a mobility status identified as non-interprovincial movement compared to five years prior.

We further divide NB stayers into "non-movement stayers" – those who stayed in the same CMA/CA or non-CMA/CA as five years prior – and "intra-provincial migrants," who are reported to have been living in NB five years prior to the Census date but as residing in a different CMA/CA or non-CMA/CA in NB on the Census date.

"Out-migrants" are those with the mobility status of inter-provincial mover and who are reported to have lived in New Brunswick five years prior to the Census date.

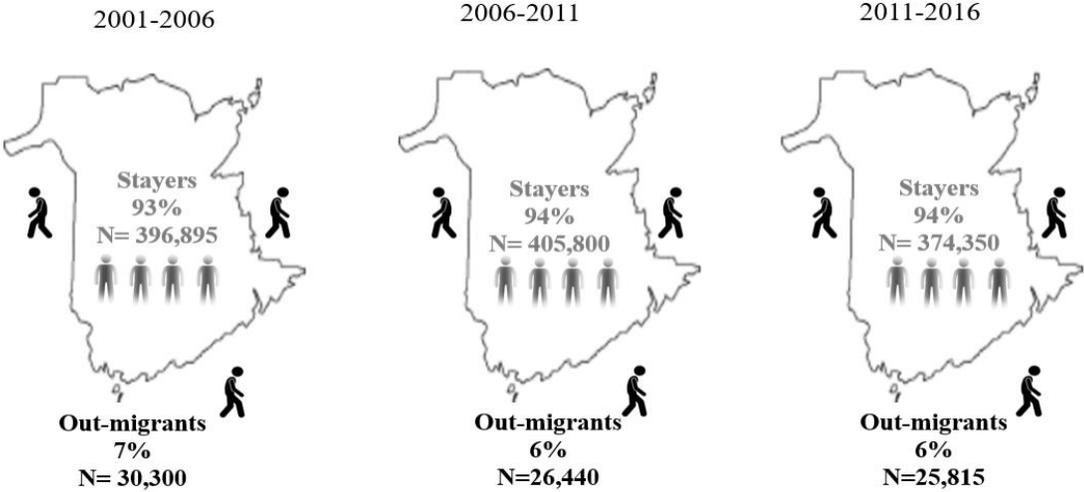
We also account for non-immigrant movement both inter- and intra-provincially and consider those with the status of non-immigrant mover as "stayers" in the context of out-migration and intra-provincial migration, since the movements of those who were associated with the status of non-immigrant movement are temporary (e.g., visiting, studying, short-term working contract, etc.).

DESCRIPTIVE STATISTICS

In this section, we use descriptive statistics to investigate 'who' the out-migrants from NB were, 'who' the intra-provincial migrants within NB were, and 'who' were more probable to move both inter- and intra-provincially for the three intercensal periods from 2001 to 2016.

1. Out-migration from NB

Figure 1: Out-Migrants vs Stayers, 2001-2016



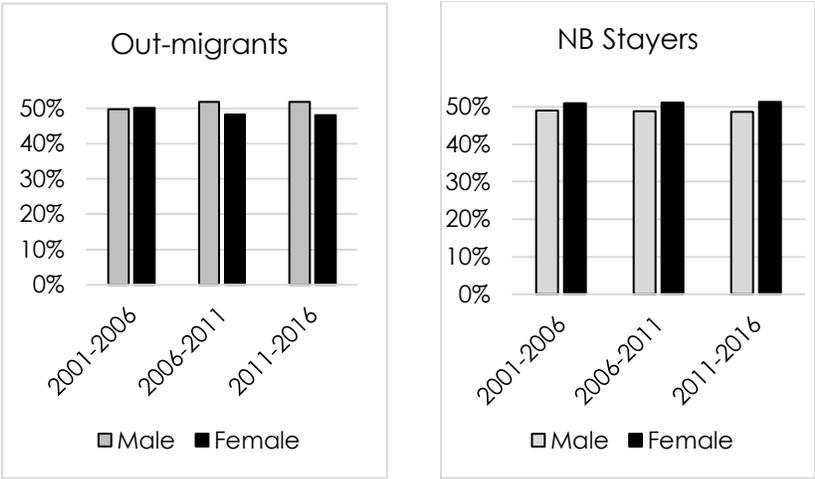
(Source: Statistics Canada)

In our three samples for the investigated period between 2001 and 2016, there are 427,195 (2001-2006), 432,240 (2006-2011), and 400,165 (2011-2016) weighted observations, respectively. These weighted observations could well represent more than half the population of NB.

The weighted observation of out-migrants declined from 30,300 during 2001-2006 to 26,440 during 2006-2011 and to 25,815 during 2011-2016. Accordingly, the rate of out-migration dropped from 7% for the intercensal period between 2001 and 2006 to 6% in the period between 2006 and 2011, and it remained at 6% between 2011 to 2016.

1.1 Out-Migrants vs Stayers by Proportion

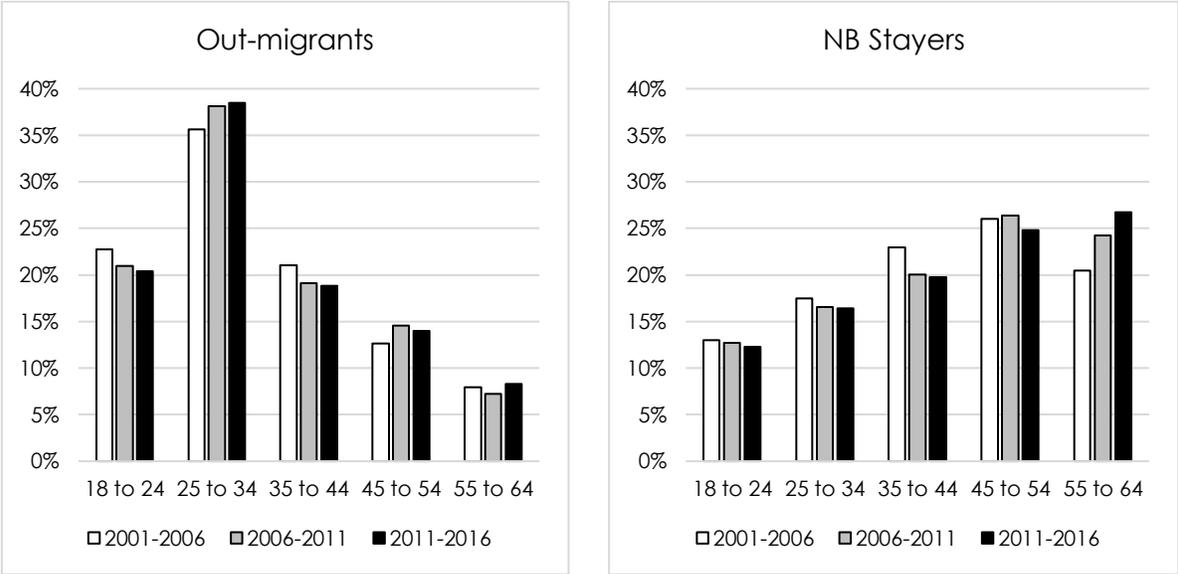
Figure 2 Out-Migrants vs Stayers, proportions by gender, 2001-2016



(Source: Statistics Canada)

There was no significant difference in the proportion of males and females who left New Brunswick. However, slightly more females left the province between 2001 and 2006, and there were more male out-migrants from NB between 2006-2016.

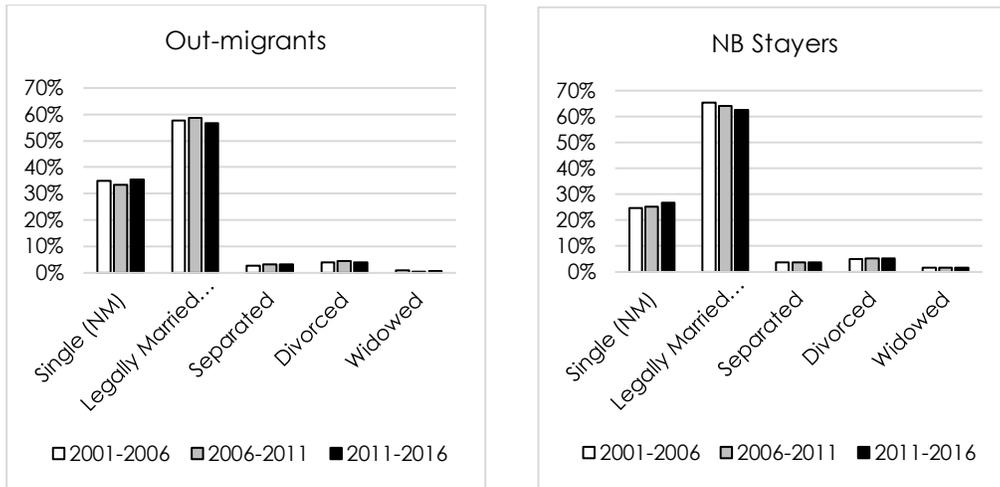
Figure 3: Out-Migrants vs Stayers, proportions by age group, 2001-2016



(Source: Statistics Canada)

More than 75% of out-migrants from NB were between 18 and 44 years old. The proportion between 25 and 34 years old increased between 2001 and 2016, while the number between 18 to 24 and 35 to 44 decreased. The majority of those who stayed were between the ages of 35 and 64, while the number aged 55 to 64 increased, and the number aged 18 to 54 decreased.

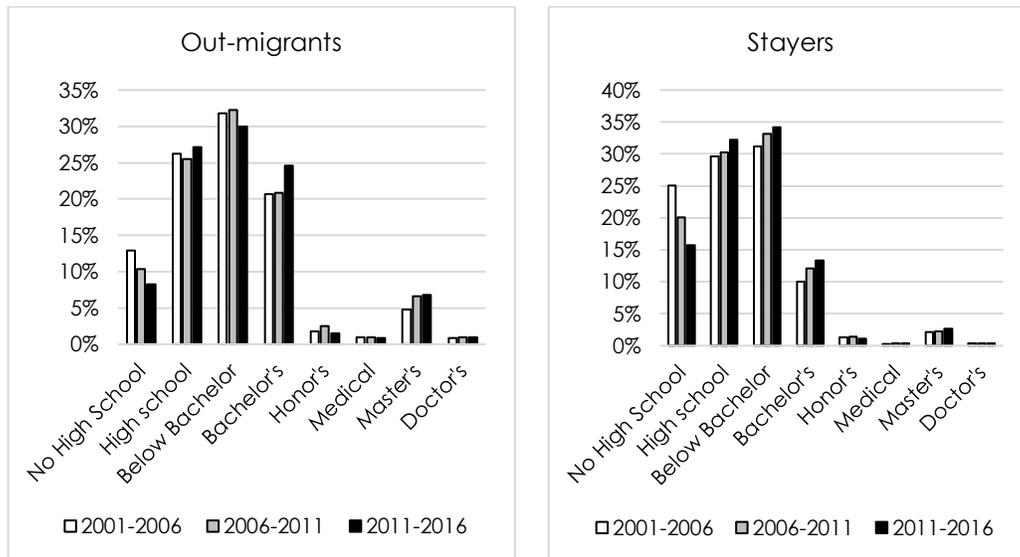
Figure 4: Out-Migrants vs Stayers, proportions by marital status, 2001-2016



(Source: Statistics Canada)

Figure 4 suggests that out-migrants from NB were mostly legally married or living common-law, or single and never married, whereas only a few out-migrants were either separated, divorced, or widowed.

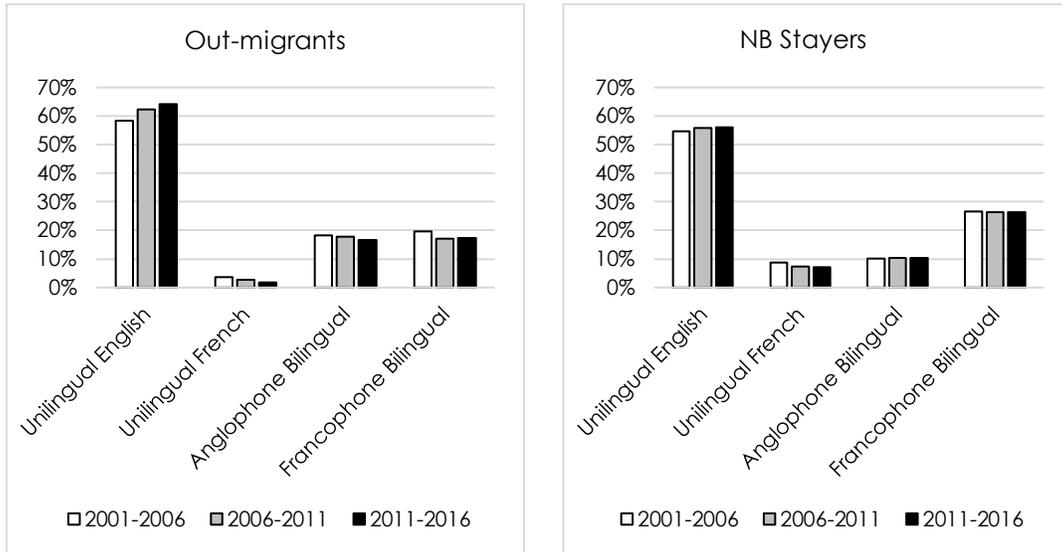
Figure 5: Out-Migrants vs Stayers, proportions by education attainment, 2001-2016



(Source: Statistics Canada)

Figure 5 reveals that NBers generally became more educated during the investigated timespan between 2001 and 2016, since the number of NBers who held no high school diploma decreased over time, and the number of NBers who held high school, college, or university diplomas increased. Most out-migrants from NB held below a Bachelor's degree.

Figure 6: Out-Migrants vs Stayers, proportions by *linguistic attribute,* 2001-2016

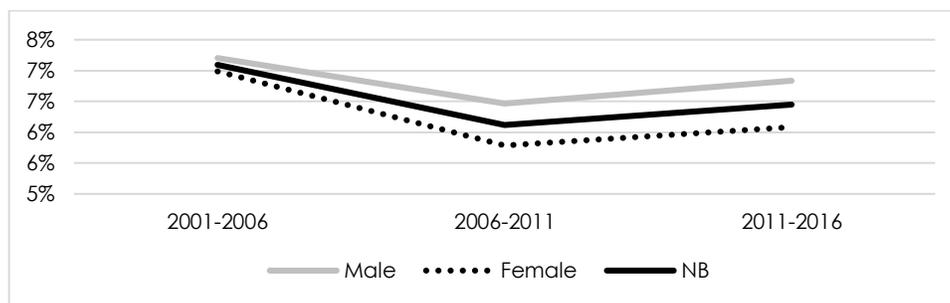


(Source: Statistics Canada)

Figure 6 shows that most NBers were unilingual English speakers, and the number of bilingual speakers accounts for about 40% of our weighted observations. Increasingly more out-migrants were unilingual English speakers. Unilingual French speakers were the minority in NB, and increasingly fewer unilingual French NBers moved out of the province between 2011 and 2016.

1.2 Rates of Out-Migration

Figure 7: Rate of Out-Migration, by gender, 2001-2016



(Source: Statistics Canada)

The rate of out-migration by gender in Figure 7 shows that NB males had higher rates of moving out of the province than the provincial rate, while females show lower rates of leaving the province. This indicates that NB males were more likely to leave the province than females.

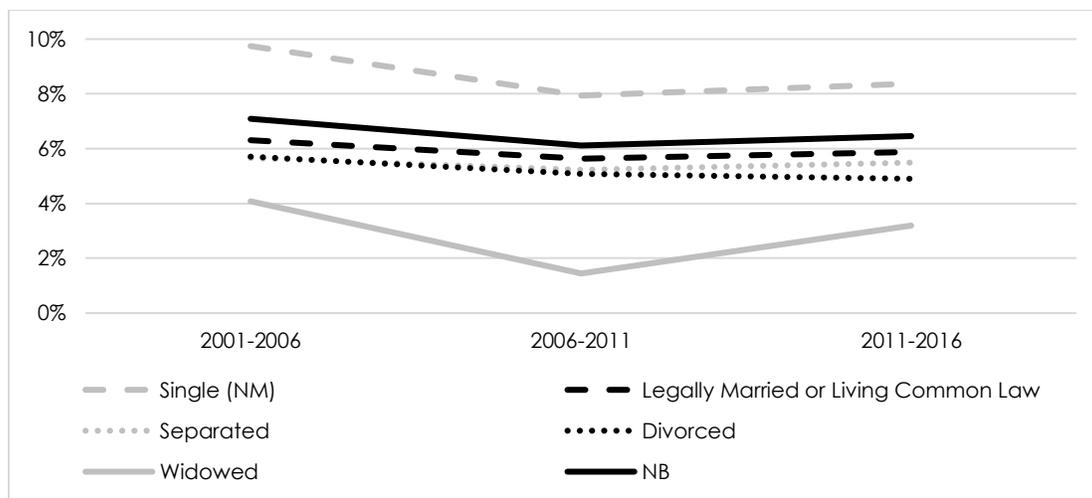
Figure 8: Rate of Out-Migration, by age group, 2001-2016



(Source: Statistics Canada)

The rate of out-migration by age group in Figure 8 reveals that more NBers aged 18 to 34 – especially young adults aged 25 to 34 – tend to move out of the province than those aged 35 and above, while seniors aged 55 to 64 are the least likely to leave the province. The rate of out-migration by age group also tells us that the older NBers get, the less probable it is that they will leave the province.

Figure 9: Rate of Out-Migration, by marital status, 2001-2016

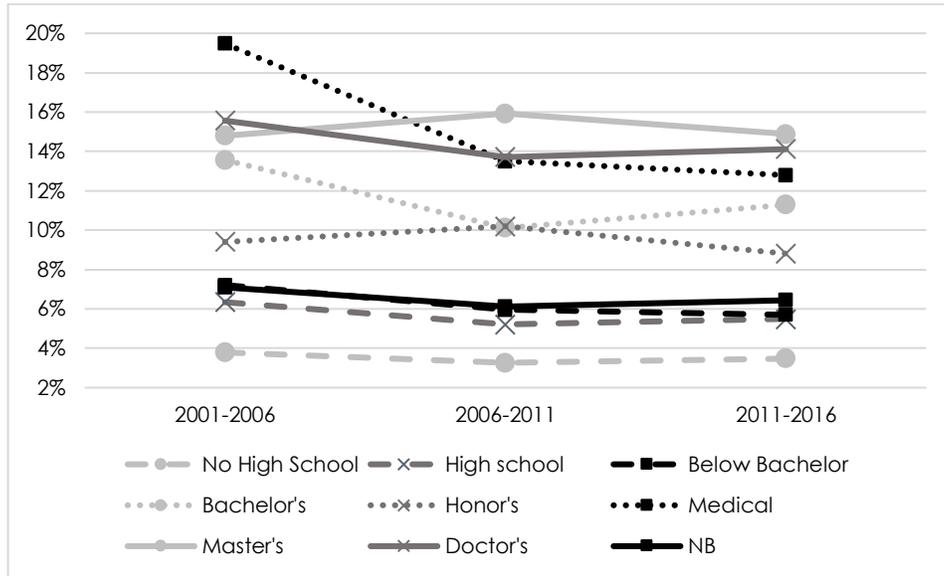


(Source: Statistics Canada)

Single (never married) NBers are the most likely to leave NB; however, their rate of out-migration dropped from 10% between the intercensal period of 2001-2006 to 8% between 2006 and 2016.

Legally married NBers have a stable rate of out-migration at 6%, and separated, divorced, and widowed NBers have a rate of out-migration lower than the average rate – especially widowed NBers, who are the least likely to leave the province.

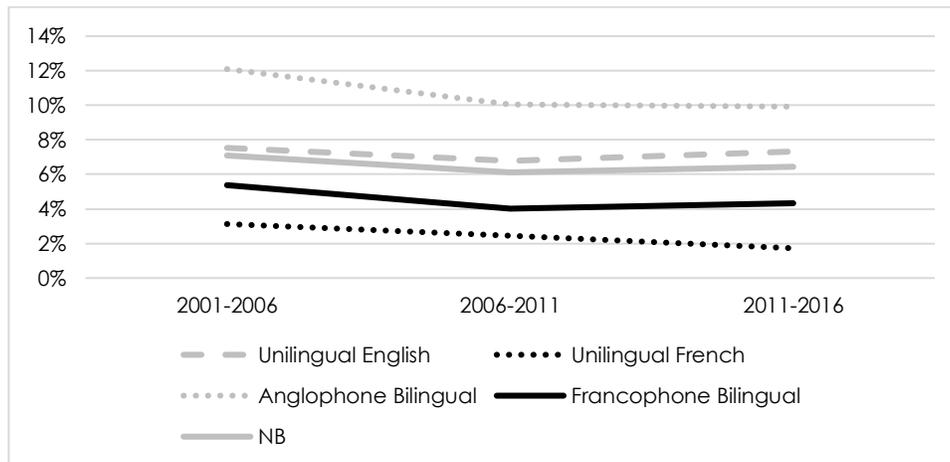
Figure 10: Rate of Out-Migration, by education attainment, 2001-2016



(Source: Statistics Canada)

The rate of out-migration by education attainment (Figure 10) shows that NBers who obtained a Bachelor's degree or higher are the most likely to leave the province – especially those who went on to pursue further study after obtaining a Bachelor's degree. These rates also show that the less educated a NBer is, the more probable it is that he or she will stay in the province.

Figure 11: Rate of Out-Migration, by *linguistic attribute,* 2001-2016



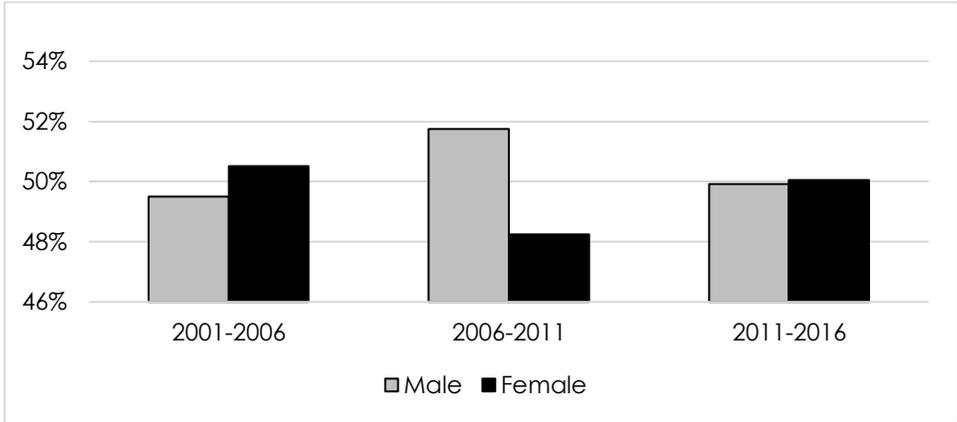
(Source: Statistics Canada)

The rate of out-migration by linguistic attribute (Figure 11) reveals that both unilingual and bilingual Anglophones have higher rates of out-migration than the provincial rate. Bilingual Anglophones in particular have rates almost double the provincial rate. In general, both unilingual and bilingual Anglophone NBers are the most likely to leave NB, whereas both unilingual and bilingual Francophones are the least likely to leave – especially unilingual French NBers.

1.3 In-Migration

We notice that there were fewer weighted observations of in-migrants who moved to NB from other provinces in Canada than of those who left the province, which confirms that NB has had a problem of out-migration. The following figures present the characteristics of in-migrants to NB.

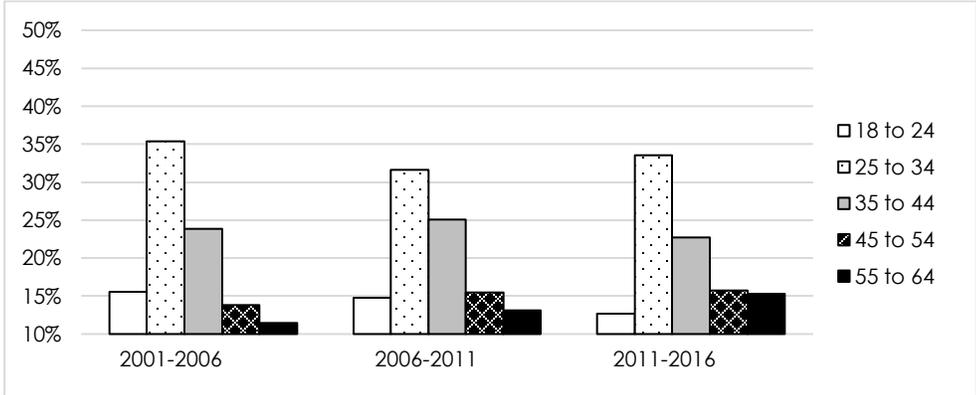
Figure 112: In-Migrants, by gender, 2001-2016



(Source: Statistics Canada)

Overall, there was no significant difference in the number of male and female in-migrants between 2001 and 2016.

Figure 13: In-Migrants, by age, 2001-2016

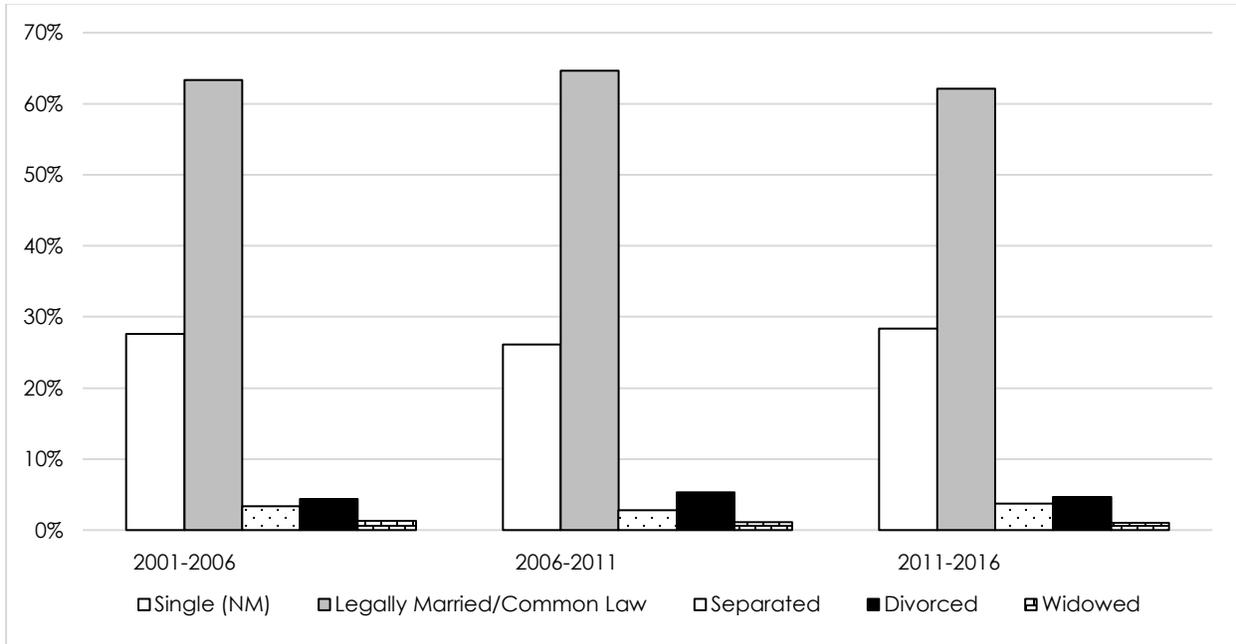


(Source: Statistics Canada)

The vast majority of migrants coming to NB from other provinces were between the ages of 25 and 44. However, that age group declined from representing 59% of all in-migrants between 2001 and 2006 to 57% between 2006 and 2011 and then to 56% between 2011 and 2016. The number of in-migrants aged 18 to 24 also decreased, shrinking from 16% of all in-migrants between 2001 and 2006 to 15% between 2006 and 2011 and to 13% between 2011 and 2016.

The numbers between the ages of 45 and 54, and 55 and 64, both increased. Altogether, these groups accounted for 25% of all in-migrants between 2001 and 2006, 29% between 2006 and 2011, and eventually 31% between 2011 and 2016.

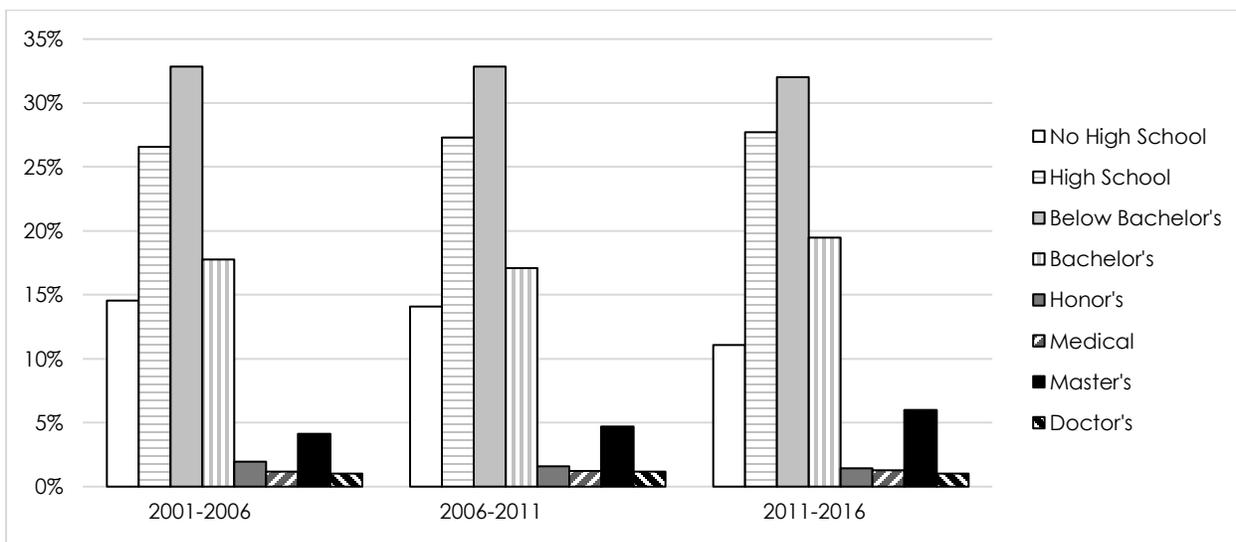
Figure 14: In-Migrants, by marital status, 2001-2016



(Source: Statistics Canada)

Over the 2001-2016 study period, most in-migrants coming to NB from other provinces were either single and never married or legally married or living common-law. Less than 10% of in-migrants were separated, divorced, or widowed.

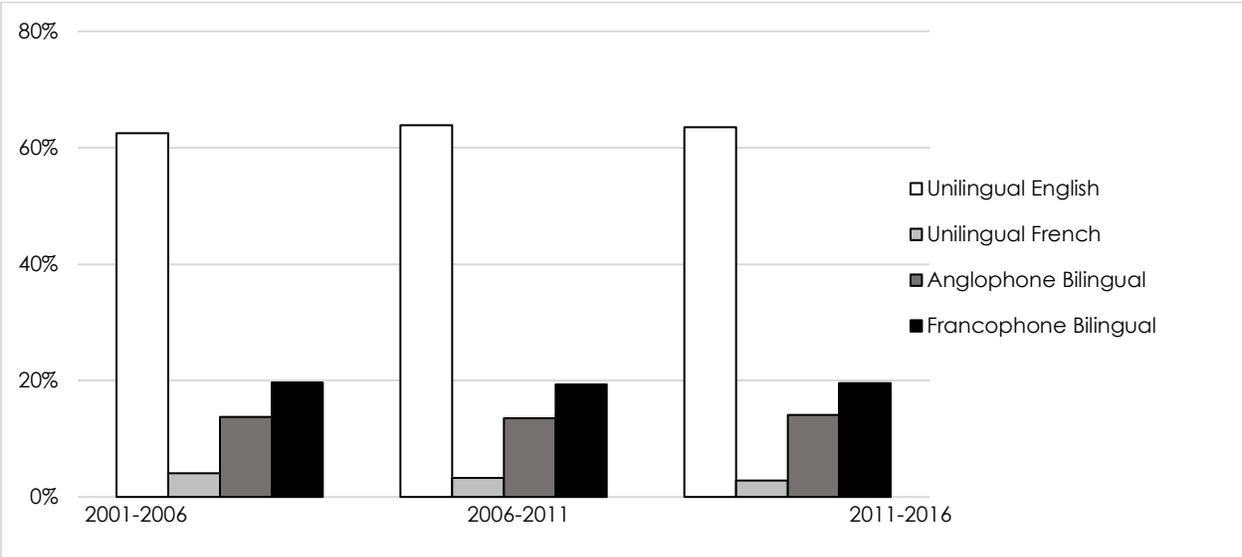
Figure 15: In-Migrants, by education, 2001-2016



(Source: Statistics Canada)

More than 90% of in-migrants coming to NB from other provinces between 2001 and 2016 had an education level of a Bachelor's degree or less. Meanwhile, the number of in-migrants without a high school education decreased from 15% to 11%. Simultaneously, the number with a Bachelor's degree increased from 18% to 20%.

Figure 16: In-Migrants, by language group, 2001-2016



(Source: Statistics Canada)

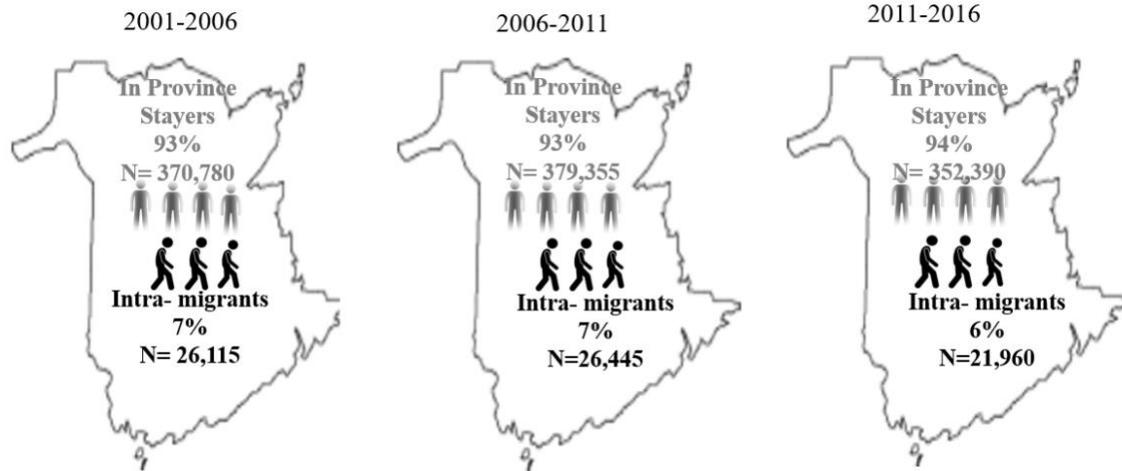
The proportion of in-migrants classified by language group remained steady over the three intercensal periods. About 63% of in-migrants were unilingual English speakers, 14% were bilingual Anglophone speakers, and 19% were bilingual Francophone speakers. The number of unilingual French in-migrants accounted for less than 5% of all in-migrants, and this number decreased to 4% between 2001 and 2006 and to 3% between 2006 and 2016.

2. Intra-Provincial Migration

Next, we examine Nbers who moved intra-provincially compared to non-movement stayers.

2.1 Intra-Provincial Migrants vs Non-Move/Immigrant Stayers by Proportions

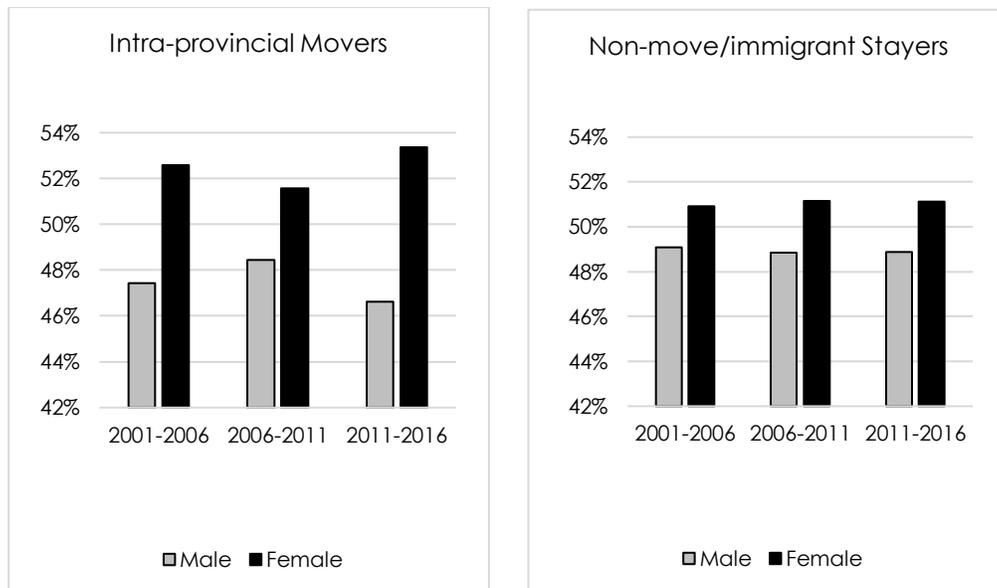
Figure 17: Intra-Provincial Migrants vs Non-Move/Immigrant Stayers, 2001-2016



(Source: Statistics Canada)

The rate of intra-provincial migration dropped from 7% in the intercensal periods of 2001-2006 and 2006-2011 to 6% between 2011 and 2016.

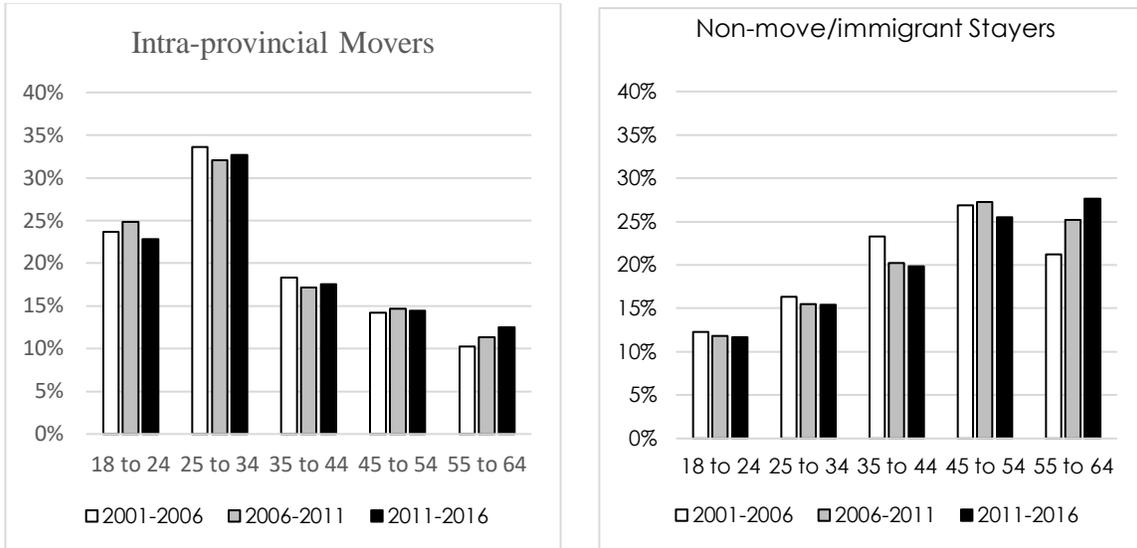
Figure 18: Intra-Provincial Migrants vs Non-Move/Immigrant Stayers, proportions by gender, 2001-2016



(Source: Statistics Canada)

Figure 18 shows that there were more females who moved intra-provincially than males.

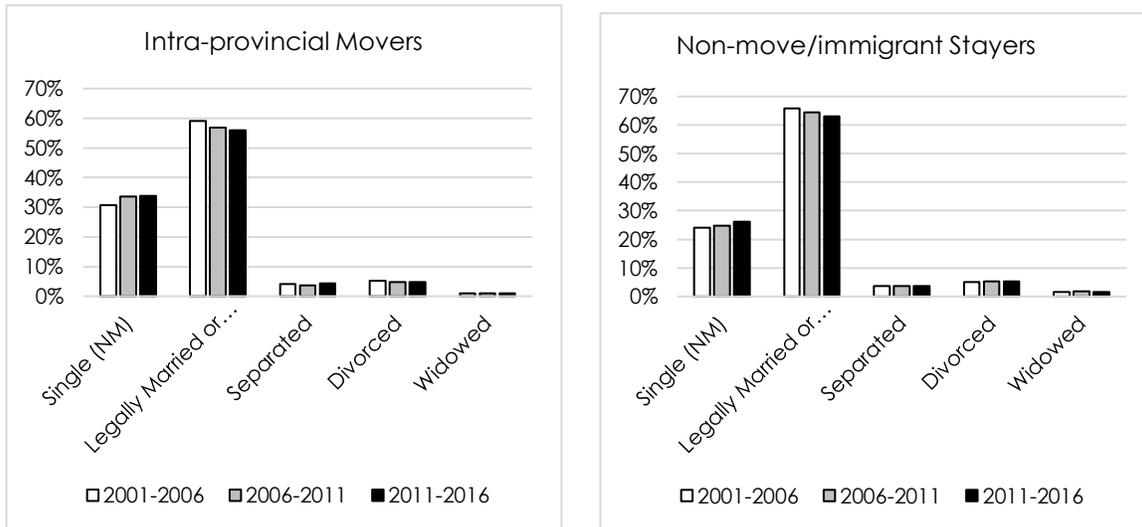
Figure 19: Intra-Provincial Migrants vs Non-Move/Immigrant Stayers, proportions by age group, 2001-2016



(Source: Statistics Canada)

Figure 19 shows that most intra-provincial movers were between 18 and 34 years old, while more than half of the non-move/immigrant stayers in NB were between 45 to 64. It also suggests that the number of seniors (aged 55-64) in the province increased between 2001 and 2016.

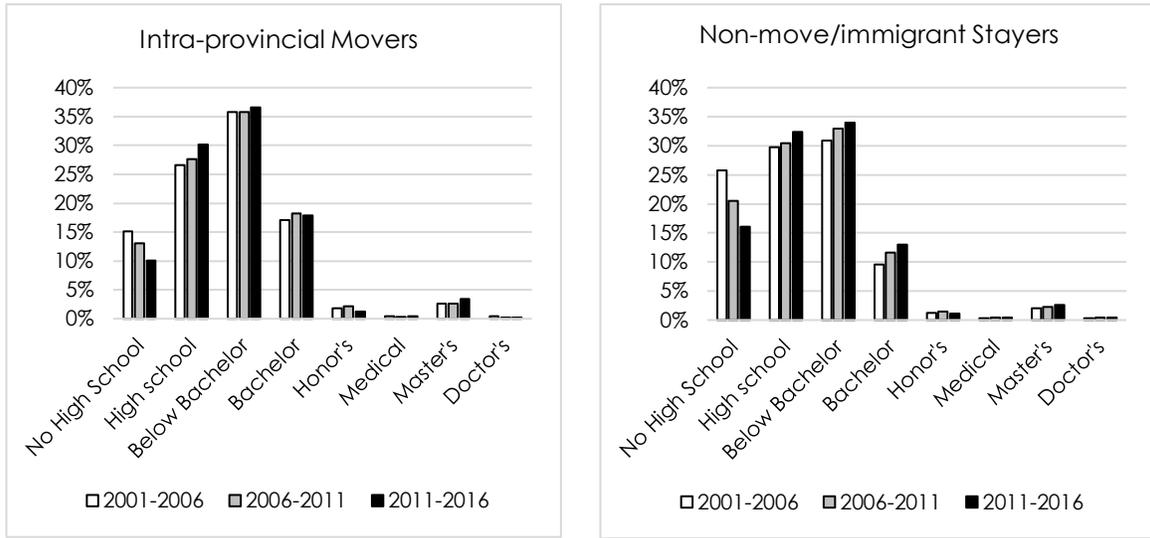
Figure 20: Intra-Provincial Migrants vs Non-Move/Immigrant Stayers, proportions by marital status, 2001-2016



(Source: Statistics Canada)

Figure 20 shows that most intra-provincial movers in NB were single (never married) and legally married or living common-law, whereas only a few were separated, divorced, or widowed.

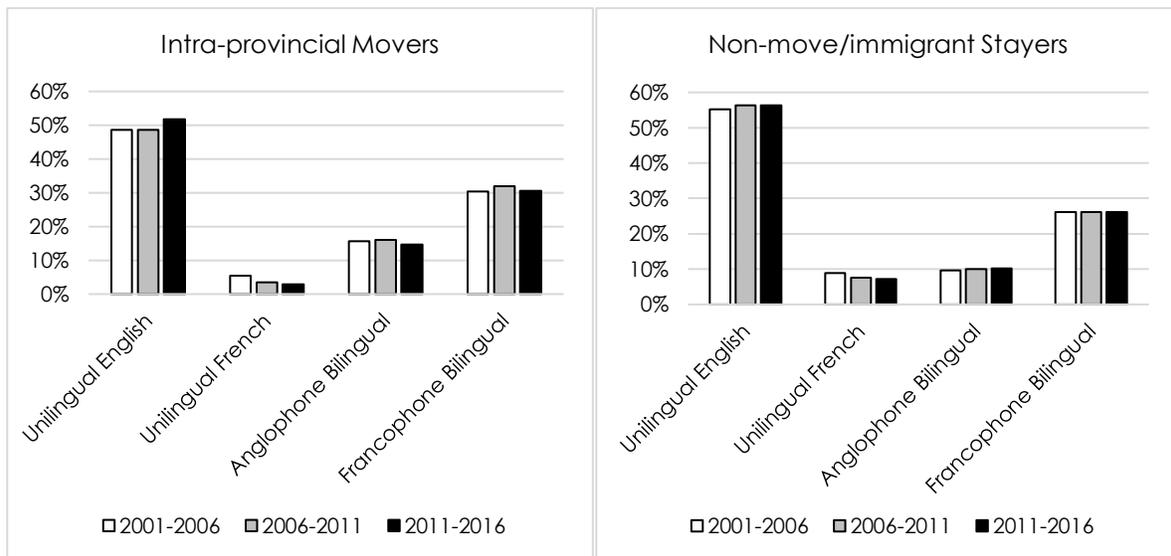
Figure 21: Intra-Provincial Migrants vs Non-Move/Immigrant Stayers, proportions by education attainment, 2001-2016



(Source: Statistics Canada)

Figure 21 reveals that NBERs have become more educated, since the number of NBERs without a high school diploma has been decreasing over time, while the number of NBERs holding higher educational degrees has been increasing. Most intra-provincial movers held below a Bachelor's degree, while the number of intra-provincial movers who held a high school diploma increased, and the number of those who held no high school diploma decreased.

Figure 22: Intra-Provincial Migrants vs Non-Move/Immigrant Stayers, proportions by *linguistic attribute,* 2001-2016



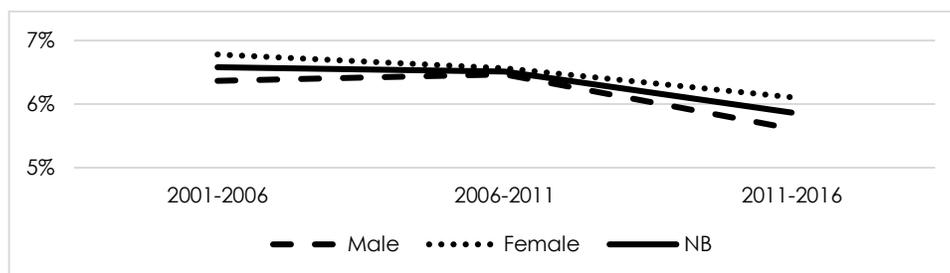
(Source: Statistics Canada)

Figure 22 shows that most NBERs who decided to stay in the province were unilingual English, and few were unilingual French. The number of bilingual Francophone stayers is higher than that of bilingual Anglophone NBERs. Most intra-provincial movers were unilingual English, whereas only a

few were unilingual French. The number of bilingual Francophone movers is higher than that of bilingual Anglophone NBers.

2.2 Rate of Intra-Provincial Migration

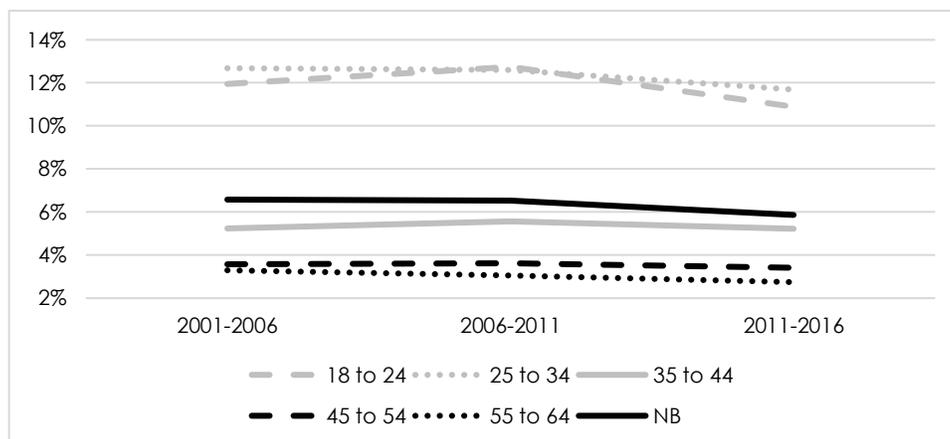
Figure 23: Rate of Intra-Provincial Migration, by gender, 2001-2016



(Source: Statistics Canada)

The rate of intra-provincial migration by gender (Figure 23) reveals that female NBers were more likely to move intra-provincially in NB, whereas male NBers were less likely to do so.

Figure 24: Rate of Intra-Provincial Migration, by age group, 2001-2016



(Source: Statistics Canada)

The rate of intra-provincial migration by age group (Figure 24) indicates that young NBers aged between 18 and 34 are the most likely to relocate within the province – especially young adults between 25 to 34 years old.

The rates for those aged between 18 and 24 and between 25 to 34 have almost doubled the average rate of intra-provincial migration in NB, suggesting that young NBers are twice as likely as an average NBer to relocate within the province. The rates for older NBers aged between 35 and 64 years old suggest that aging decreases the intra-provincial mobility of NBers.

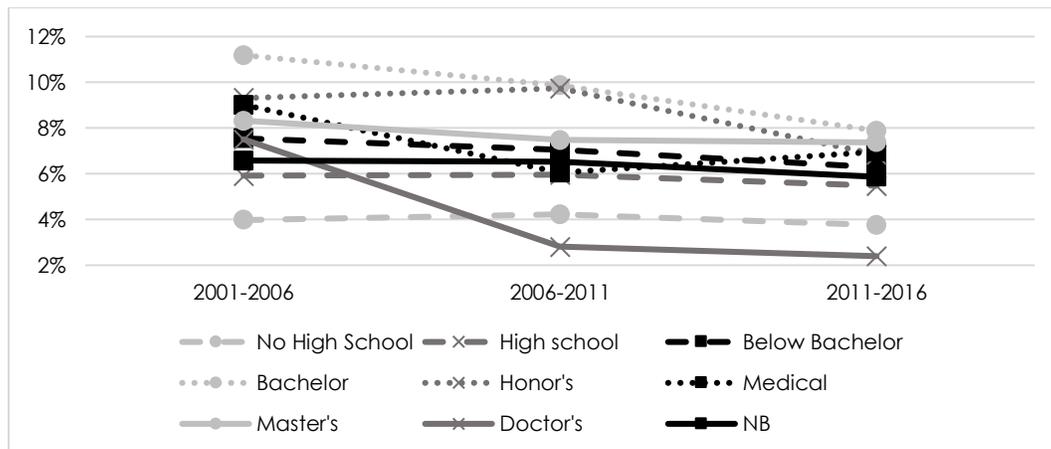
Figure 25: Rate of Intra-Provincial Migration, by marital status, 2001-2016



(Source: Statistics Canada)

The rate of intra-provincial migration by marital status (Figure 25) shows that single (never married) and separated NBers are more likely to relocate within the province than other NBers. Those who were legally married and living common-law, or divorced or widowed, are less likely to relocate in the province. Widowed NBers in particular show the least probability of relocating in the province.

Figure 26: Rate of Intra-Provincial Migration, by education attainment, 2001-2016

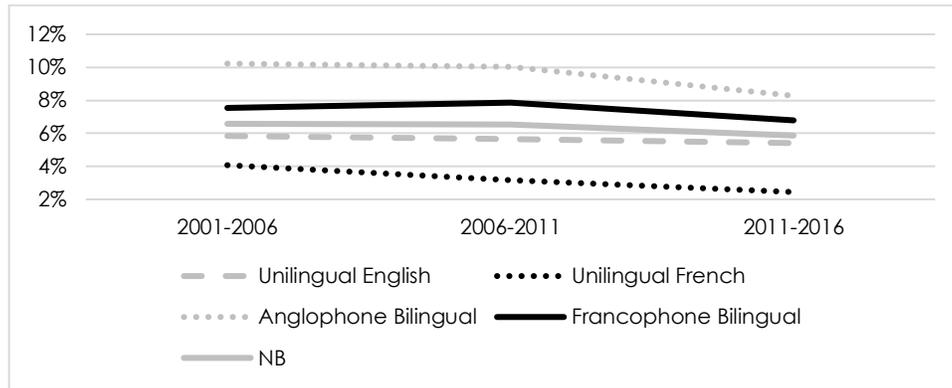


(Source: Statistics Canada)

Figure 26 shows that more highly educated NBers have higher rates of intra-provincial migration than the average – especially those who obtained a Bachelor's degree. Those who had earned a PhD were more likely to relocate within NB between 2001 and 2006, but they became the least immobile education group within the province between 2006 and 2016.

Those with a high school education or lower are less likely to relocate within the province, especially those with no high school diploma.

Figure 27: Rate of Intra-Provincial Migration, by *linguistic attribute*



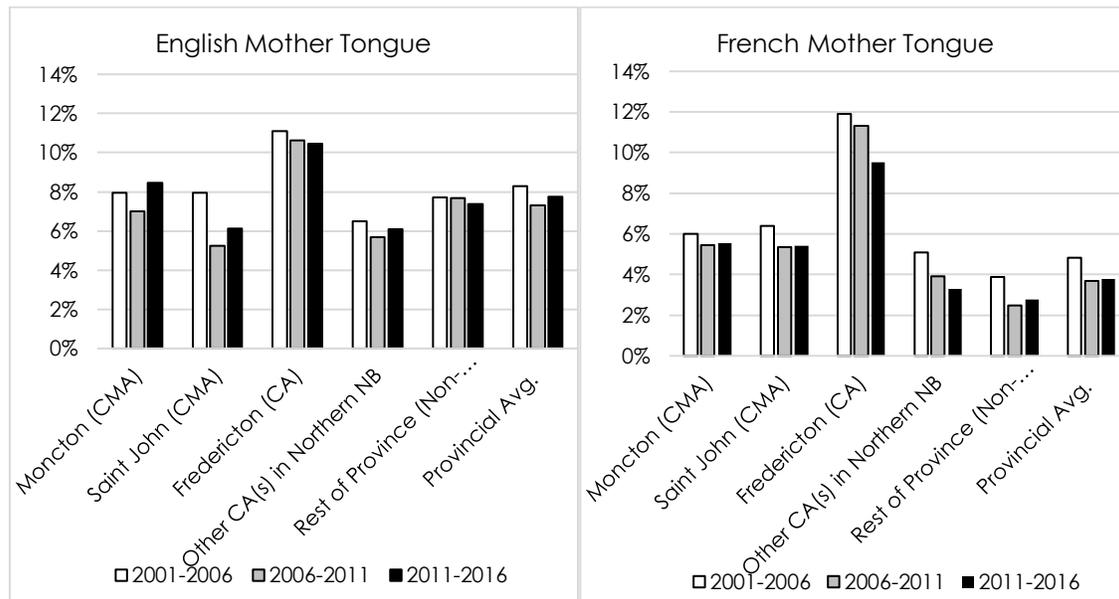
(Source: Statistics Canada)

The rate of intra-provincial migration by language group reveals that bilingual Anglophone and bilingual Francophone NBers are the most likely to relocate within NB. Unilingual NBers (especially French-only speakers) are less likely to relocate within NB.

3. Rate of Inter- and Intra-Provincial Migration by Origin and Mother Tongue

In this section, we illustrate rates of out-migration and intra-provincial migration by origin and mother tongue. We focus on these variables because linguistic attributes are a central focus in our analysis, and we want to pay extra attention to the origins of movers in explaining the migration patterns of New Brunswickers between 2001 and 2016.

Figure 28: Rate of Inter-Provincial Migration, by *mother tongue* and origin, 2001-2016

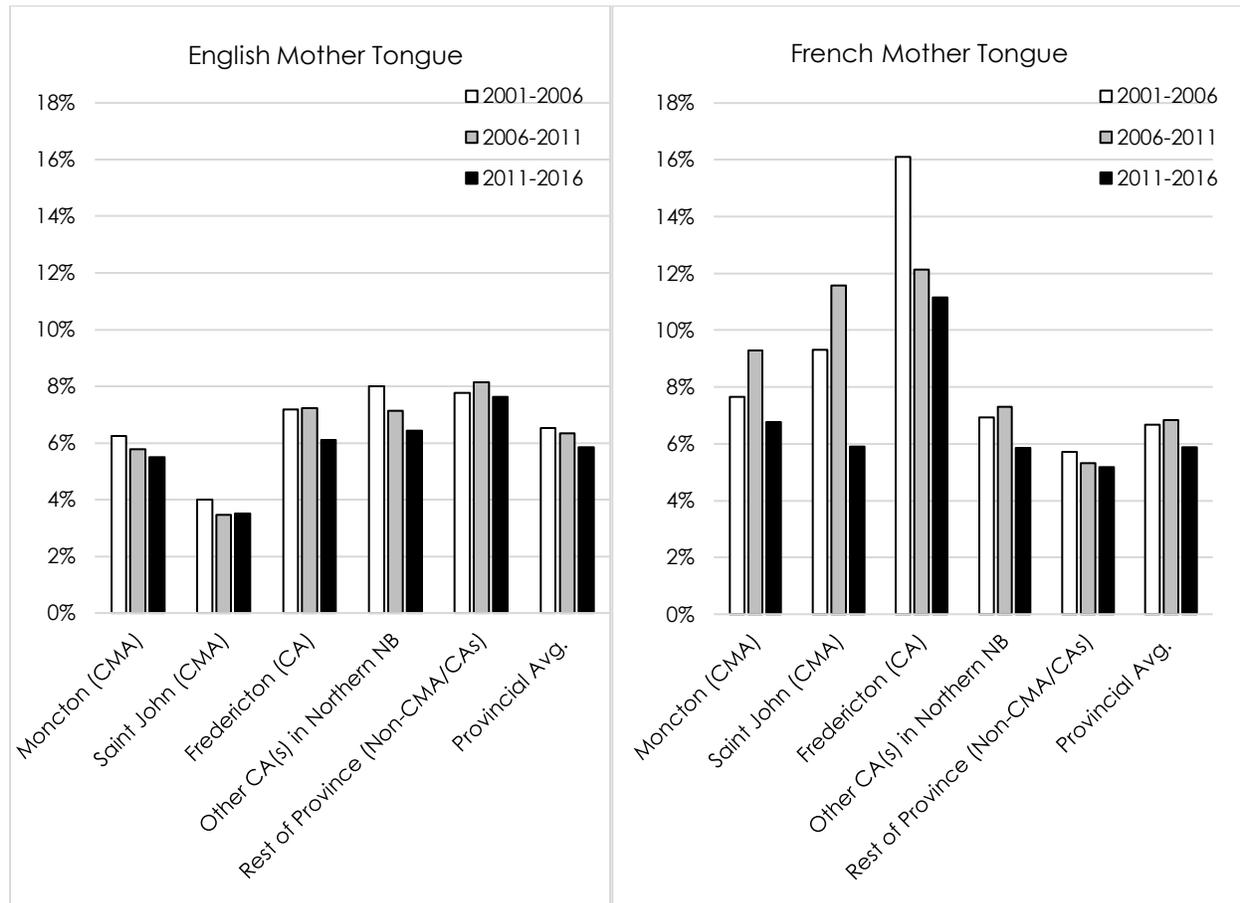


(Source: Statistics Canada)

In general, New Brunswickers with an English mother tongue are twice as likely as NBers with a French mother tongue to leave the province (see Figure 28). NBers who are either unilingual English or bilingual Anglophone speakers and reside in the Fredericton CA are more likely to leave NB.

Meanwhile, NBers with an English mother tongue, residing in other parts of NB, are less likely to emigrate from the province. NBers who are either unilingual French or bilingual Francophone speakers and reside in any of the three largest Census Areas in the province – Moncton CMA, Saint John CMA, and Fredericton CA – are more likely to leave NB. NBers with a French mother tongue who reside in other parts of NB are less likely to leave the province.

Figure 29: Rate of Intra-Provincial Migration, by *mother tongue* and origin, 2001-2016



(Source: Statistics Canada)

NBers with a French mother tongue are as likely as those with an English mother tongue to relocate intra-provincially. Unilingual and bilingual Anglophones residing in Fredericton CA, other CAs in Northern NB, and non-CMA/CAs are more likely to relocate intra-provincially, whereas those with an English mother tongue living in Moncton CMA and Saint John CMA are less likely to relocate in NB. Unilingual and bilingual Francophones residing in CMAs or CAs in the province are more likely to relocate intra-provincially, whereas those with a French mother tongue residing in non-CMA/CAs are less likely to do so.

4. Origins and Destinations of Intra-Provincial Movement

We were able to tabulate a picture of where intra-provincial movers are from, where they went, and what their mother tongue is, to explain intra-provincial migration patterns more thoroughly.

Figure 30: Intra-Provincial Movement of Anglophone NBERs, by origin and destination, 2001-2016

2001-2006				
Origins	Out-flow	* Destinations*		
		Most Popular	2nd Most Popular	3rd Most Popular
Moncton (CMA)	2,605	SE non-CMA/CA 1,070	Fredericton 540	Saint John 280
Saint John (CMA)	2,530	Fredericton 735	SW non-CMA/CA 675	Moncton 575
Fredericton (CA)	2,970	Central non-CMA/CA 1,005	Saint John 655	Moncton 460
Other CA(s) in Northern NB	1,710	Moncton 550	Fredericton 415	NE non-CMA/CA 315
Rest of Province (Non-CMA/CAs)	6,970	Fredericton 2,415	Moncton 1,585	Saint John 1,305
Total 16,790				
2006-2011				
Origins	Out-flow	* Destinations*		
		Most Popular	2nd Most Popular	3rd Most Popular
Moncton (CMA)	2,650	SE non-CMA/CA 1,100	Fredericton 510	Saint John 305
Saint John (CMA)	2,290	SW non-CMA/CA 720	Fredericton 690	Moncton 410
Fredericton (CA)	3,290	Saint John 845	Central non-CMA/CA 765	Moncton 730
Other CA(s) in Northern NB	1,745	Moncton 780	Fredericton 455	NE non-CMA/CA 150
Rest of Province (Non-CMA/CAs)	7,105	Fredericton 2,570	Saint John 1,495	Moncton 1,220
Total 17,080				
2011-2016				
Origins	Out-flow	*Destinations*		
		Most Popular	2nd Most Popular	3rd Most Popular
Moncton (CMA)	2,460	SE non-CMA/CA 830	Fredericton 520	Saint John 320
Saint John (CMA)	2,170	Fredericton 670	SW non-CMA/CA 545	Moncton 540
Fredericton (CA)	2,760	Central non-CMA/CA 760	Saint John 590	Moncton 435
Other CA(s) in Northern NB	1,315	Fredericton 360	Moncton 330	NE non-CMA/CA 225
Rest of Province (Non-CMA/CAs)	5,890	Fredericton 2,420	Moncton 1,425	Saint John 880
Total 14,595				

(Source: Statistics Canada)

Figure 31: Intra-Provincial Movement of Francophone NBers, by origin and destination, 2001-2016

2001-2006				
Origins	Out-flow	*Destinations*		
		Most Popular	2nd Most Popular	3rd Most Popular
Moncton (CMA)	1,910	SE non-CMA/CA 970	NE non-CMA/CA 280	NE CA(s) 250
Saint John (CMA)	300	Moncton 150	SE non-CMA/CA 50	Fredericton 35
Fredericton (CA)	595	Moncton 220	Central non-CMA/CA 85	NE CA(s) 65
Other CA(s) in Northern NB	2,170	Moncton 850	NE non-CMA/CA 400	NW non-CMA/CA 325
Rest of Province (Non-CMA/CAs)	4,355	Moncton 2,370	NE CA(s) 665	NW CA 400
Total 9,330				
2006-2011				
Origins	Out-flow	*Destinations*		
		Most Popular	2nd Most Popular	3rd Most Popular
Moncton (CMA)	2,455	SE non-CMA/CA 1,280	NE CA(s) 260	NE non-CMA/CA(s) 225
Saint John (CMA)	370	Fredericton 140	Fredericton 30	SE non-CMA/CA 30
Fredericton (CA)	400	Saint John 115	SE non-CMA/CA 80	NE CA(s) 50
Other CA(s) in Northern NB	2,285	Moncton 915	NE non-CMA/CA 410	NW non-CMA/CA 245
Rest of Province (Non-CMA/CAs)	3,850	Fredericton 2,060	NE CA(s) 485	Fredericton 255
Total 7,365				
2011-2016				
Origins	Out-flow	*Destinations*		
		Most Popular	2nd Most Popular	3rd Most Popular
Moncton (CMA)	1,805	SE non-CMA/CA 880	NE CA(s) 260	NE non-CMA/CA 225
Saint John (CMA)	155	Moncton 40	Fredericton 30	SE non-CMA/CA 30
Fredericton (CA)	455	Moncton 190	SE non-CMA/CA 80	NE CA(s) 50
Other CA(s) in Northern NB	1,635	Moncton 590	NE non-CMA/CA 410	NW non-CMA/CA 245
Rest of Province (Non-CMA/CAs)	3,315	Moncton 1,745	NE CA(s) 485	Fredericton 255
Total 7,365				

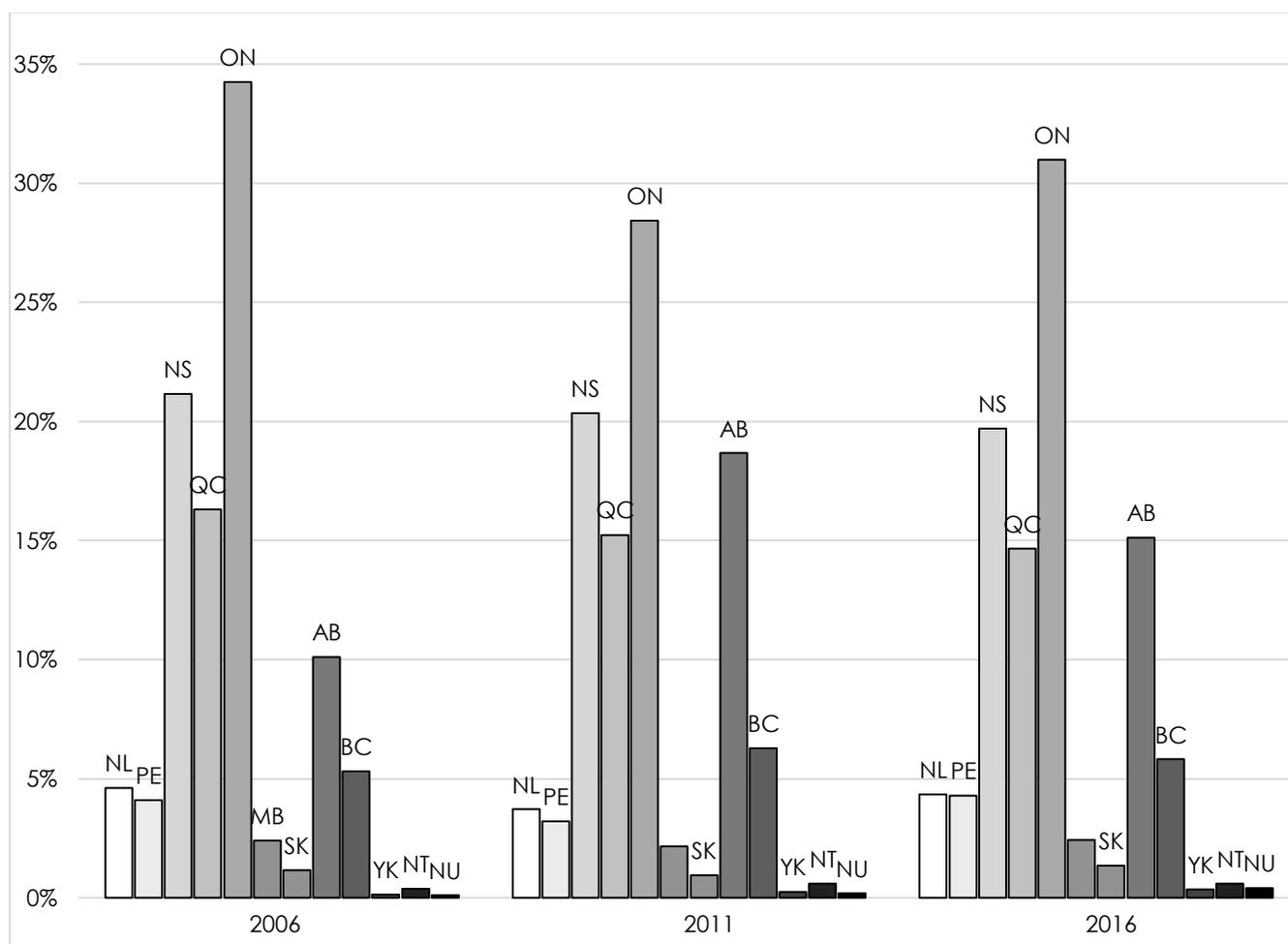
(Source: Statistics Canada)

Figure 30 shows that Anglophone migrants from the three largest Census Areas tend to move to a non-CMA/CA area nearby or to the capital of the province (Fredericton). Anglophone intra-provincial migrants from other CAs in the north or non-CMA/CAs tend to move to the three largest Census Areas – primarily to Fredericton CA and Moncton CMA – or to the non-CMA/CAs in northeast.

In Figure 31, the intra-provincial migration pattern for unilingual and bilingual Francophones in NB between 2001 and 2016 is quite clear as well. Francophone migrants who originated from Moncton CMA tend to move to a non-CMA/CA area nearby in southeast NB. Francophone intra-provincial migrants from other Census Areas in NB tend to primarily move to Moncton.

5. Origins and Destinations of In-Migrants

Figure 32: In-Migrants to NB from Other Provinces, by Origin

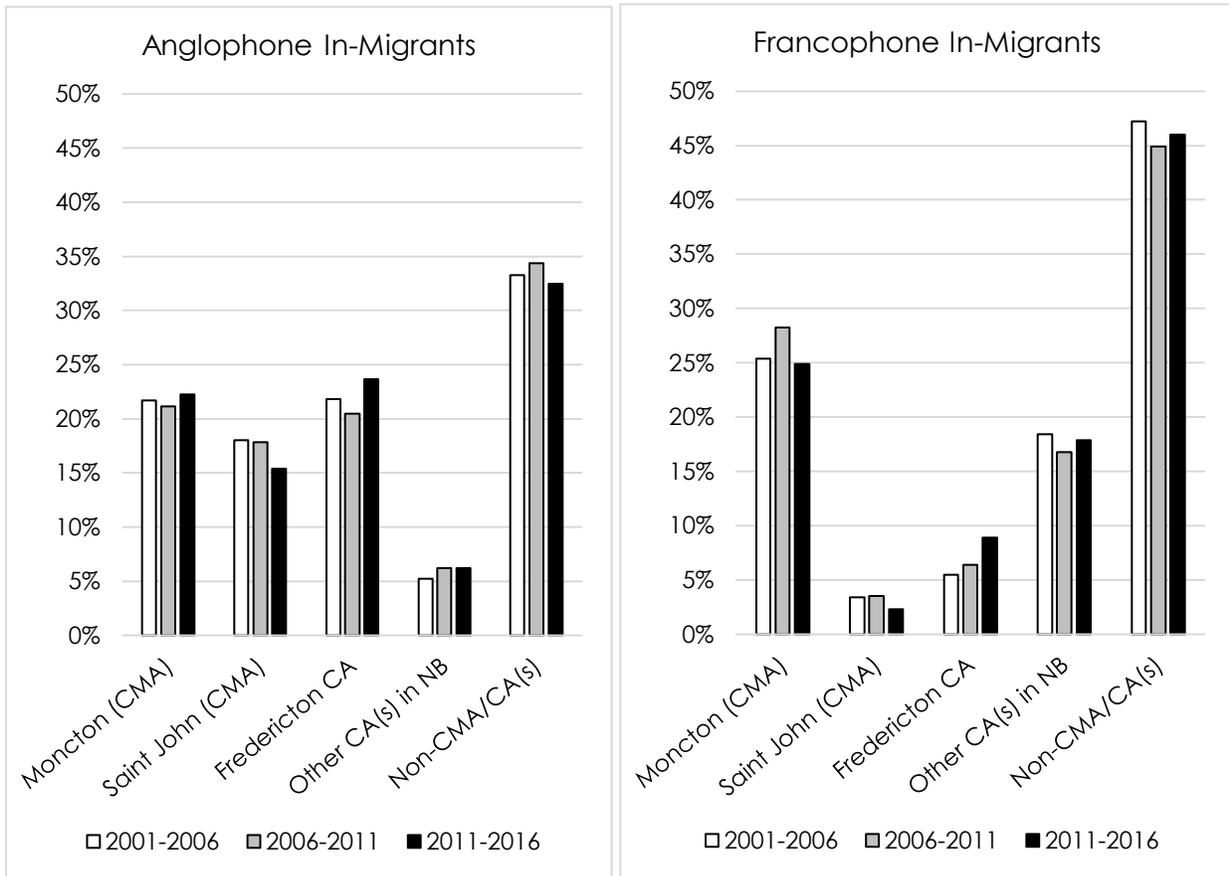


(Source: Statistics Canada)

In-migrants to NB were mainly from Ontario, Nova Scotia, Quebec, and Alberta, in descending order of proportions. More than 80% of in-migrants came from these four provinces through the three intercensal periods of 2001-2016.

Only the number of in-migrants originating from Alberta increased, whereas the number of in-migrants from the other three main sources decreased over the examined periods.

Figure 33: Destination of In-Migrants, by Mother Tongue



(Source: Statistics Canada)

Overall, around 64% of all in-migrants and more than 65% of Anglophone in-migrants chose to settle down in a Census Metropolitan Area (CMA) or Census Agglomeration (CA), whereas around 36% of all in-migrants chose to settle in non-CMA/CA areas in NB. The Anglophone in-migrants who chose to settle down in CMA/CAs primarily went to Moncton CMA, Saint John CMA, and Fredericton CA.

Around 55% of Francophone in-migrants chose to settle down in CMA/CAs in NB, and Moncton CMA was their primary destination. The rest of them largely went to CAs located in the northern part of the province. This generally reveals that Francophone in-migrants seemed to be indifferent in terms of moving to CMA/CAs or non-CMA/CAs in NB, and if they relocated to CMA/CAs, the 'French' places such as Moncton CMA and other CAs in the north were their primary destinations, whereas Anglophones tend to move to the biggest three Census Areas in the province.

The above descriptive statistics help us answer questions regarding the patterns of the inter- and intra-provincial migrations of New Brunswickers between 2001 and 2016.

5.1 Out-Migration

Who were the Out-Migrants from NB?

The above descriptive statistics suggest that the same amount of males and females left NB between 2001 and 2006, though there were more male out-migrants than female out-migrants between 2006 and 2016. Most out-migrants from NB were among the 18 to 44-year-old age group. The number of out-migrants aged between 25 and 34 increased, whereas the number of out-migrants between the ages of 18 and 24, and 35 and 44, decreased over the investigated timespan.

Most out-migrants from NB were single and never married, or they were legally married or living common-law. Most out-migrants held an education level below a Bachelor's degree. Finally, most out-migrants from NB were unilingual English speakers, and the number of unilingual English out-migrants increased, while the number of both bilingual Anglophone and bilingual Francophone speakers diminished between 2001 and 2016.

Who are More Likely to Leave NB?

Our summary statistics over the study period show that NB men are more likely to leave the province, while NB women are less likely to leave. The younger generation aged between 18 and 34 is more likely to leave, while those aged 45+ are less likely to emigrate. Single and never married NBers are the most likely to leave the province.

Having an education higher than a high school diploma is associated with a higher probability of emigration. These statistics confirm Birchall's (2016) migration report, which summarizes that males are more willing to make long distance geographic movements, as are the younger generation, single and never married individuals, and those with higher education. The rate of out-migration from NB by linguistic attribute reveals that both unilingual and bilingual Anglophones are more likely to emigrate from NB, while both unilingual and bilingual Francophones are less likely to leave the province.

The rate of out-migration from NB also confirms that the province experienced high levels of out-migration between the intercensal period of 2001-2006. Amirault et al. (2013) reported that the national rate of out-migration from one province to another in Canada was 2.7%, and the rate of out-migration (7%) from NB has nearly tripled that national rate.

Which Census Area in NB Produced the Most Out-Migrants?

Those who have an English mother tongue and reside in the Fredericton CA are more likely to leave NB. Those who have a French mother tongue and reside in the three largest Census Areas – Moncton CMA, Saint John CMA, and Fredericton CA – are more likely to leave NB.

5.2 Intra-Provincial Migration

Who were the Intra-Provincial Migrants in NB?

More females than males relocated intra-provincially within NB. Most intra-provincial movers were aged between 18 to 34 and were single (never married), legally married, or living common-law. The number of single and never married intra-provincial movers in NB is increasing, while the number of legally married or common-law intra-provincial movers is decreasing.

Most intra-provincial movers in NB held below a Bachelor's degree. The number of intra-provincial movers holding a high school diploma is increasing, while the number of those with no high school diploma is decreasing. Most intra-provincial movers in NB were unilingual English, whereas only a few in-province movers were unilingual French. The number of bilingual Francophone movers is higher than that of bilingual Anglophone NBers.

Who are More Likely to Relocate within NB?

Our summary statistics show that NB females are more likely to relocate within the province but less likely to move inter-provincially. The younger generation aged between 18 and 34 is more likely to relocate within the province, while those aged 35+ are less likely to move intra-provincially.

Single (never married) and separated NBers are more likely to relocate in the province. Education levels higher than high school are also associated with a higher probability of intra-provincial geographic movement. These findings confirm Birchall's (2016) migration report, which summarizes that females are more likely to move locally, as are the younger generation, single and never married folks, and those with higher levels of education.

The rate of intra-provincial migration from NB by linguistic attribute reveals that both bilingual Anglophone and Francophone NBers are more likely to move intra-provincially, while both unilingual English and French NBers are less likely to relocate within the province.

The rates of migration in NB also confirm that the province has experienced high levels of intra-provincial migration, at least between the intercensal period of 2001-2006. Amirault et al. (2013) reported that the national rate of intra-provincial migration within a Canadian province was 5.3%, and the rate of in-province migration (7%) in NB is strictly higher than the national rate.

Which Census Area in NB Produced the Most Intra-Provincial Migrants? Where were Their Destinations in the Province?

Anglophone intra-provincial migrants who originated from Moncton CMA, Saint John CMA, or Fredericton CA tend to move to a non-CMA/CA area nearby, or to the capital of the province (Fredericton). Anglophone intra-provincial migrants originating from other CAs in the north or non-CMA/CAs in NB tend to move to the three largest Census Areas – primarily to Fredericton CA and Moncton CMA – or to the non-CMA/CAs in the northeast.

Francophone intra-provincial migrants who originated from Moncton CMA tend to move to a non-CMA/CA area nearby in the southeast. Francophone intra-provincial migrants who originated from other Census Areas in NB tend to primarily move to Moncton.

MODEL SPECIFICATION

1. Logistic Regression Model

$$\begin{aligned} \text{Probit (Outmigration} = 1) &= \ln\left(\frac{p}{1-p}\right) \\ &= \beta + \delta_i X_i + \zeta_i Y_i + \lambda_1 \text{UniFrench} + \lambda_2 \text{FrancophoneBilingual} + \lambda_3 \text{AnglophoneBilingual} \\ &+ \varepsilon \end{aligned}$$

where the dependent variable “outmigration” is a dummy, the value “1” indicates out-migrants, and “0” indicates stayers. Our explanatory variables include a set of dummies to capture “bilingualism.” Unilingual English speakers are excluded from our model to avoid Perfect

Collinearity but also because they are used as the reference group for comparisons; the group goes to the constant term (β) once it is excluded.

X_i represents the characteristics of the respondent: age, marital status, and education attainment. Those aged between 18 to 24, legally married/living common-law, or obtained only a high school diploma are excluded from our model because they are the reference group for each categorical variable. Y_i represents the origins of each observed NBER. ε is the error term.

Similarly, we run the model when the dependent variable is “intramigration” after excluding those who have left NB, which indicates the intra-provincial migrants or non-movement / immigrant stayers within the category of NB stayers defined in the “outmigration” model:

$$\begin{aligned} \text{Probit (Intramigration} = 1) &= \ln \left(\frac{p}{1-p} \right) \\ &= \beta + \delta_i X_i + \zeta_i Y_i + \lambda_1 \text{UniFrench} + \lambda_2 \text{FrancophoneBilingual} + \lambda_3 \text{AnglophoneBilingual} \\ &+ \varepsilon \end{aligned}$$

2. Multinomial Logistic Regression Model

Further, we have created an outcome variable that is categorical. “0” indicates non-movement stayers, “1” represents out-migrants, and “2” represents intra-migrants.

We use a Multinomial Logistic Regression model to calculate the Relative Risk Ratios (RRRs), which incorporates the additional constraint that all predicted probabilities must add up to 1.

Thus, we can interpret the RRRs as odds ratios conditional on not being in a category other than the baseline (Buis, 2014).

$$\begin{aligned} \text{Probit (Outcome} = i, i = 0,1,2) &= \ln \left(\frac{p = i}{1 - p = i} \right) \\ &= \beta + \delta_i X_i + \zeta_i Y_i + \lambda_1 \text{UniFrench} + \lambda_2 \text{FrancophoneBilingual} + \lambda_3 \text{AnglophoneBilingual} \\ &+ \varepsilon \end{aligned}$$

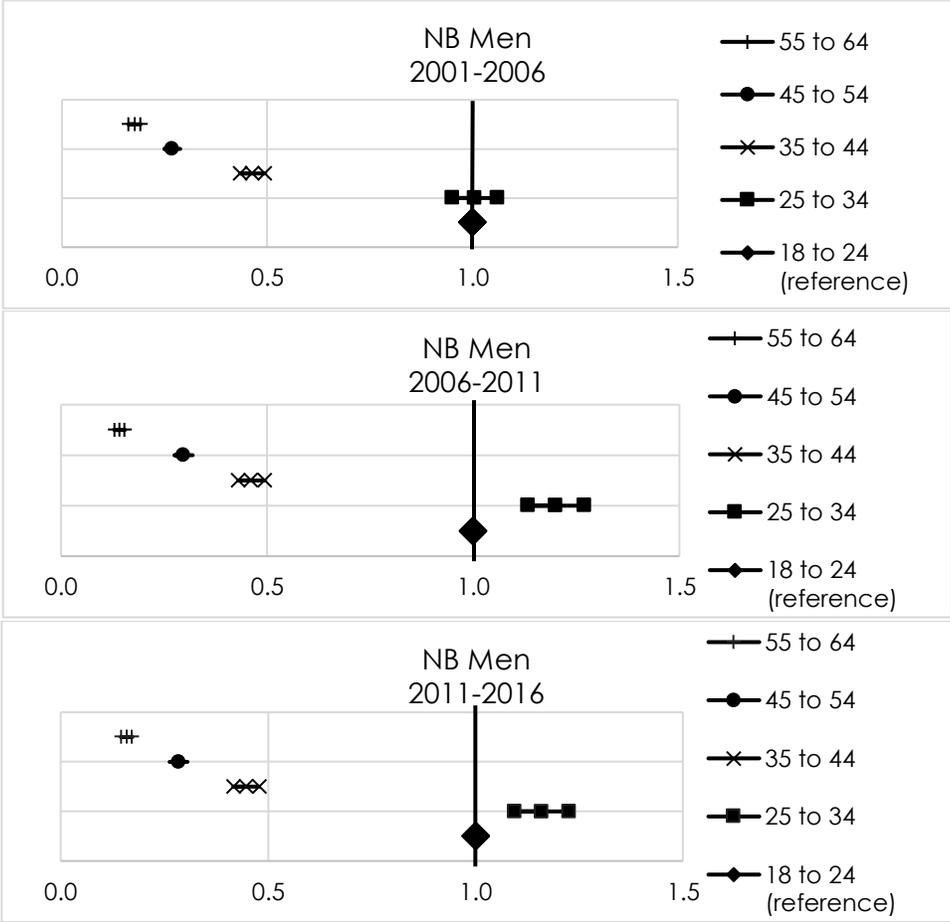
Above all, the odds-ratios and RRRs of the linguistic groups are the ones to help answer our questions regarding who stays and who moves.

RESULTS

1. Logistic Regression Analysis Results

1.1 Out-Migration

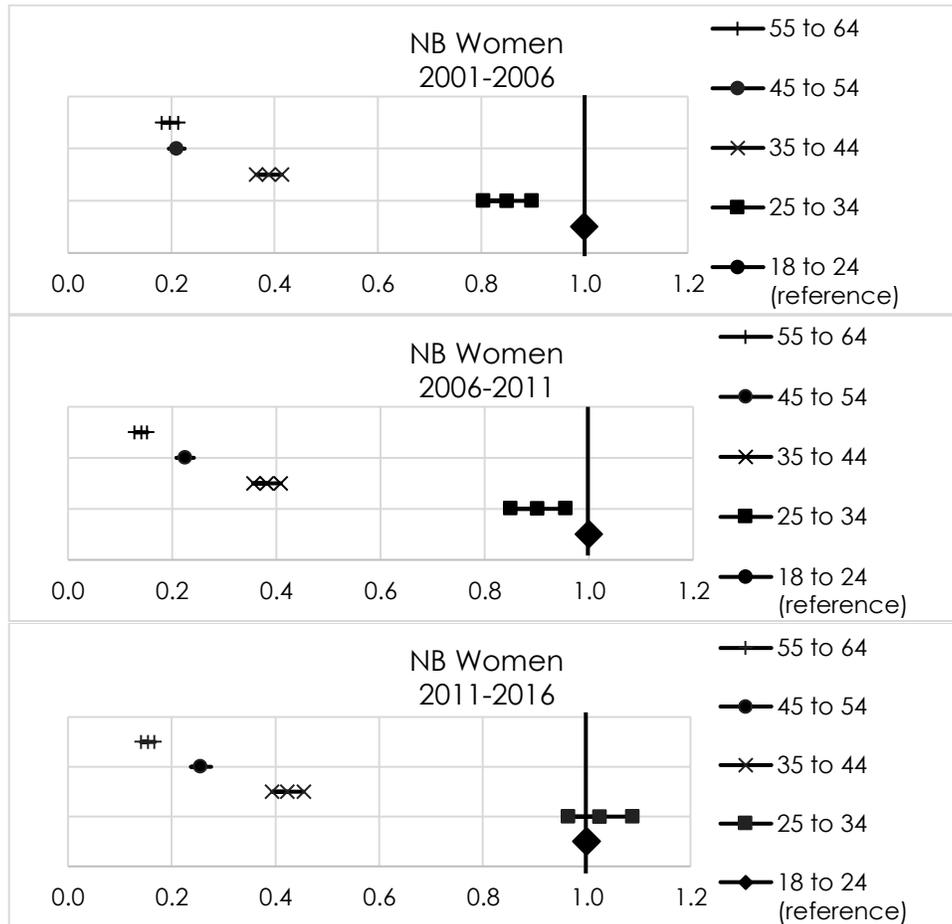
Figure 34 : Odds-Ratios by Age Group for NB Men (Out-Migration Model Output)



The men aged between 25 and 34 were as likely as the men aged between 18 and 24 to move out of NB between 2001 and 2006. Later, NB men aged between 25 and 34 became significantly more likely than those aged 18 to 24 to emigrate from the province.

The men aged 35 and older show a significantly lower probability of emigrating from NB compared to men aged between 18 and 24. Aging is associated with reduced odds of moving out of the province for men, especially for seniors aged between 55 and 64 years between 2001 and 2016.

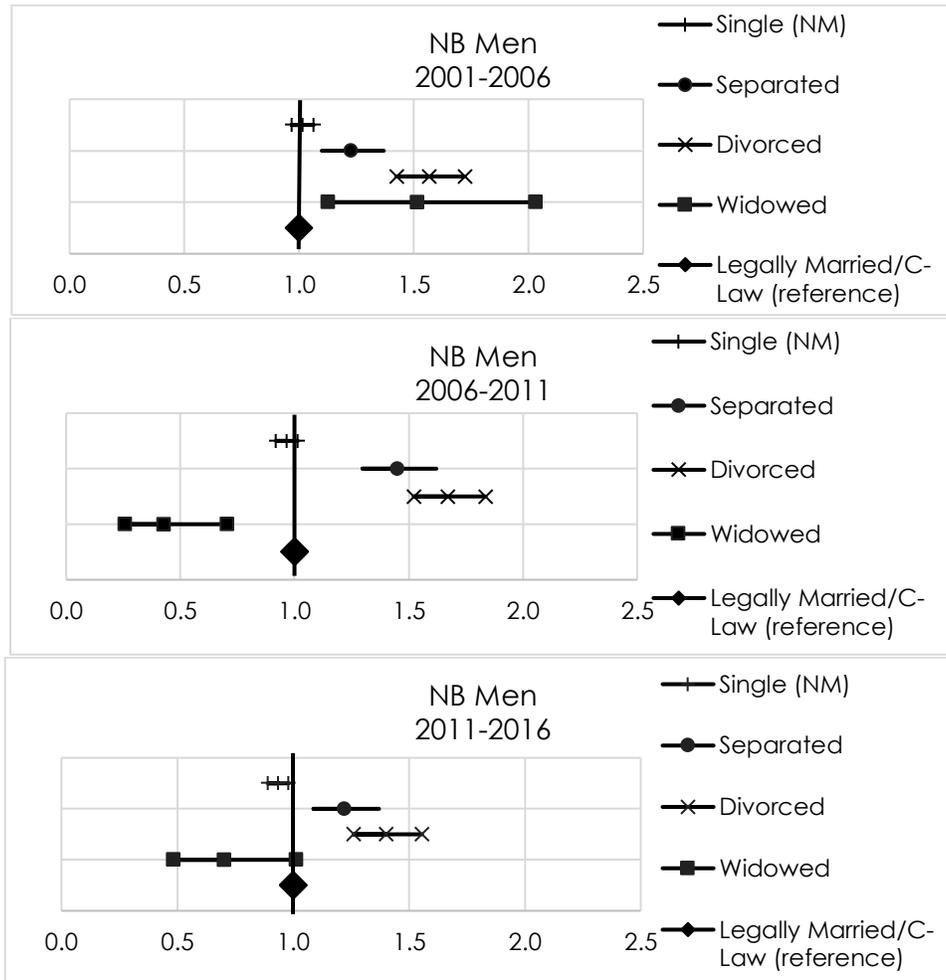
Figure 35: Odds-Ratios by Age Groups for NB Women (Out-Migration Model Output)



Young women between the ages of 18 and 24 were the most likely to emigrate from NB, compared to other age groups of women, between 2001 and 2011. Then, between 2011 and 2016, women between 25 and 34 years old became as likely as the younger women aged 18 to 24 to move out of NB.

Aging significantly influenced the odds of emigration from NB for women. Starting at 35 years of age, the older a NB woman gets, the less likely it is that she will leave the province. This is especially true for seniors between 55 and 64 years of age.

Figure 36: Odds-Ratios by Marital Status for NB Men (Out-Migration Model Output)

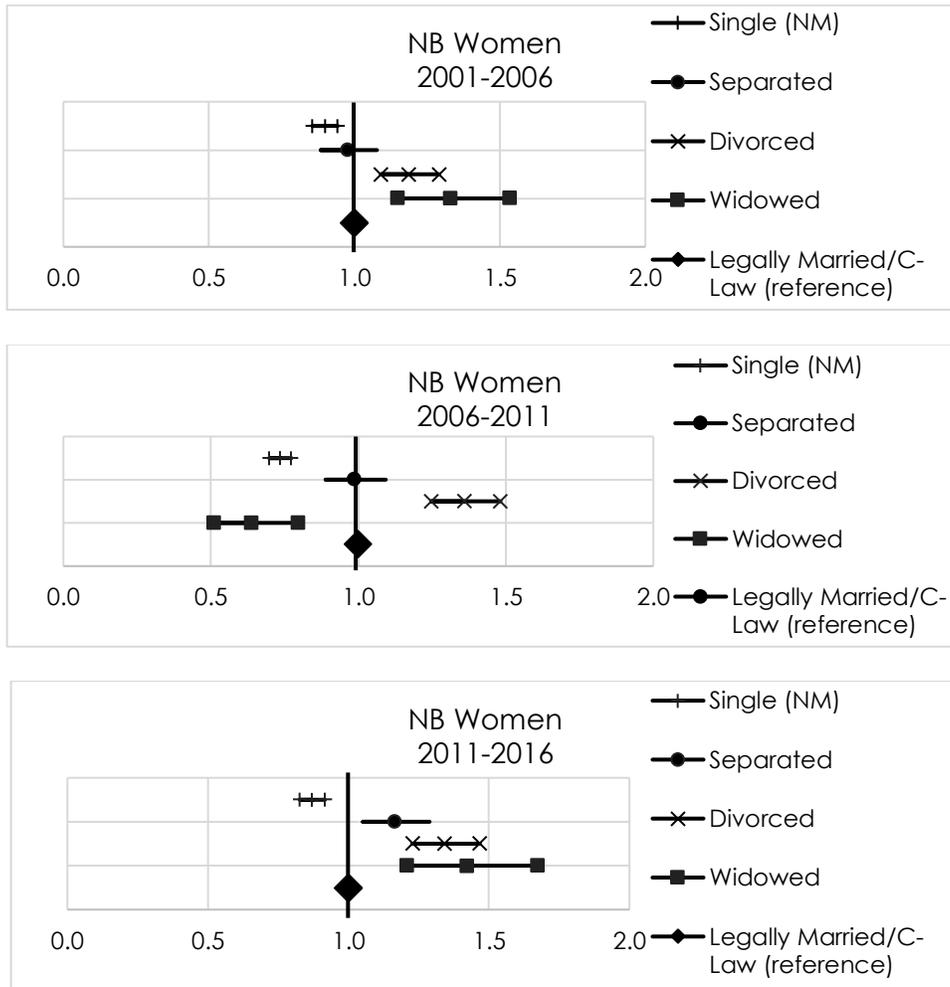


Separated and divorced men were significantly more likely to leave NB between 2001 and 2016 than men who were legally married or living common-law.

Between 2001 and 2011, single and never married men were indifferent in terms of emigration from the province compared to the 'attached men.' However, between 2011 and 2016, the single and never married men became less likely to leave the province than the attached men.

Widowed men were significantly more likely to leave the province than attached men between 2001 and 2006, though they became less likely to do so between 2006 and 2016.

Figure 37: Odds-Ratios by Marital Status for NB Women (Out-Migration Model Output)



Divorced women show a significantly higher likelihood of emigrating from NB than legally married/common-law women throughout the entire investigated timespan (2001-2016). Single (never married) women were significantly less likely to emigrate from NB than attached women. Between 2001 and 2011, separated women were indifferent in terms of leaving the province when compared to the attached women, but they became more likely to leave between 2011 and 2016.

Compared to attached women, widowed women were more likely to leave the province between 2001 and 2006 and between 2011 and 2016, though they were less likely to do so between 2006 and 2011.

Figure 38: Odds-Ratios by Education for NB Men (Out-Migration Model Output)

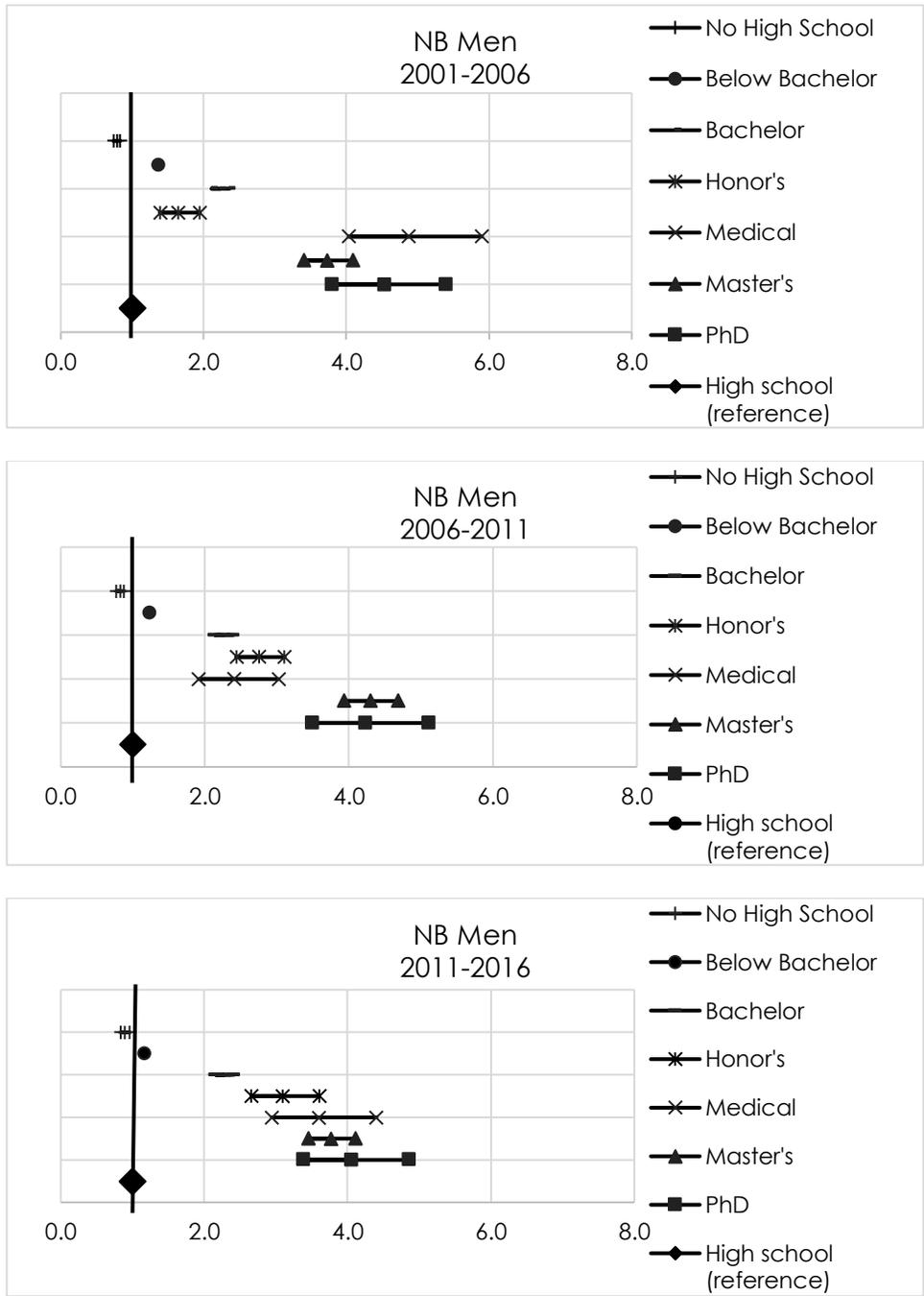
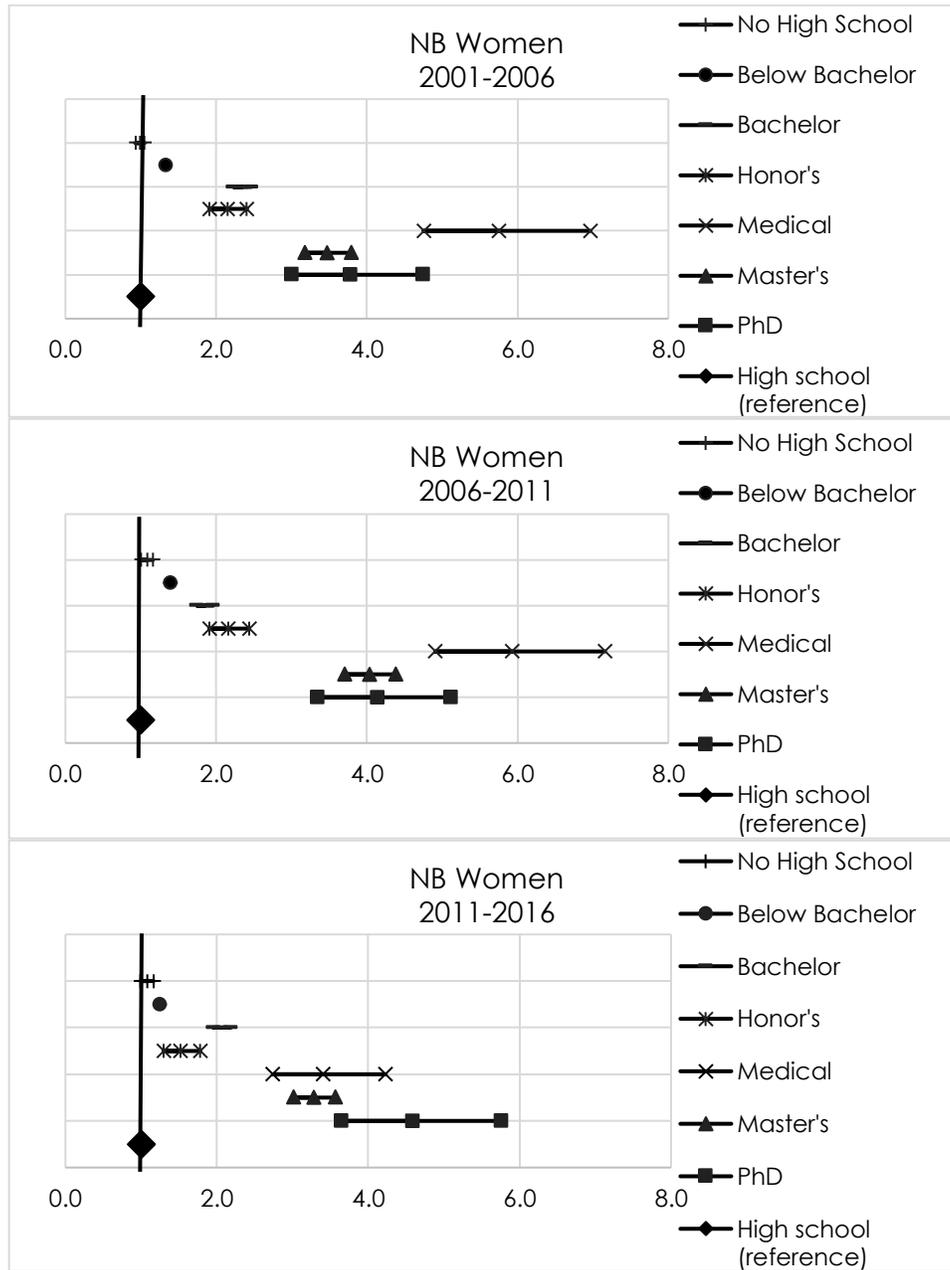


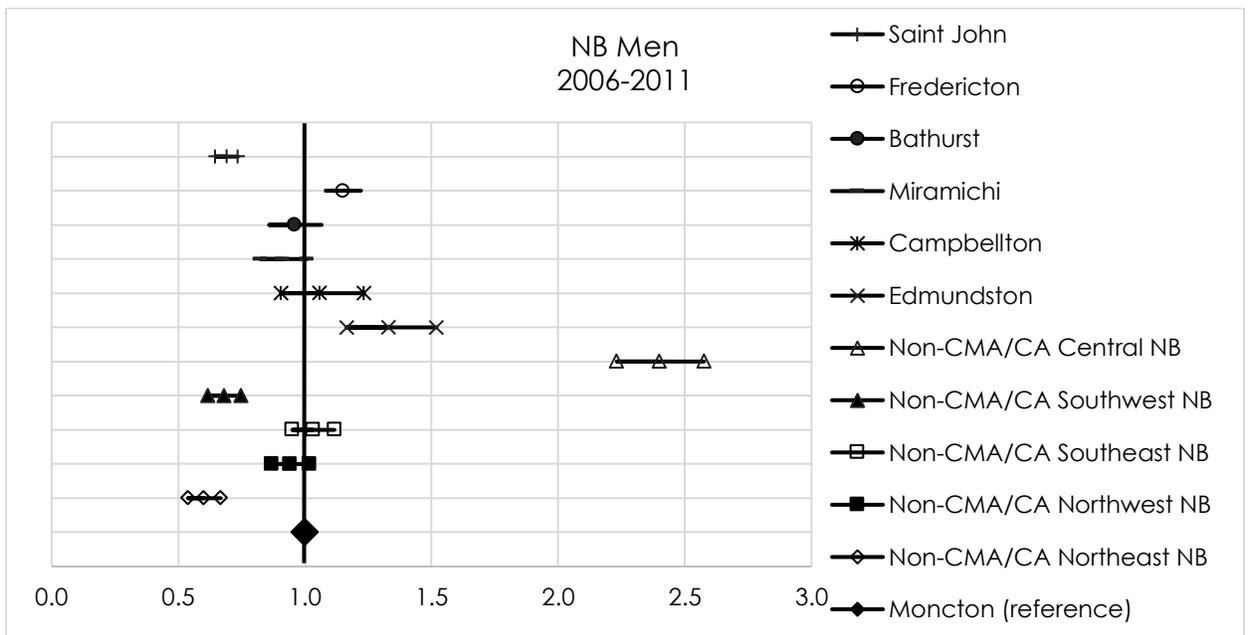
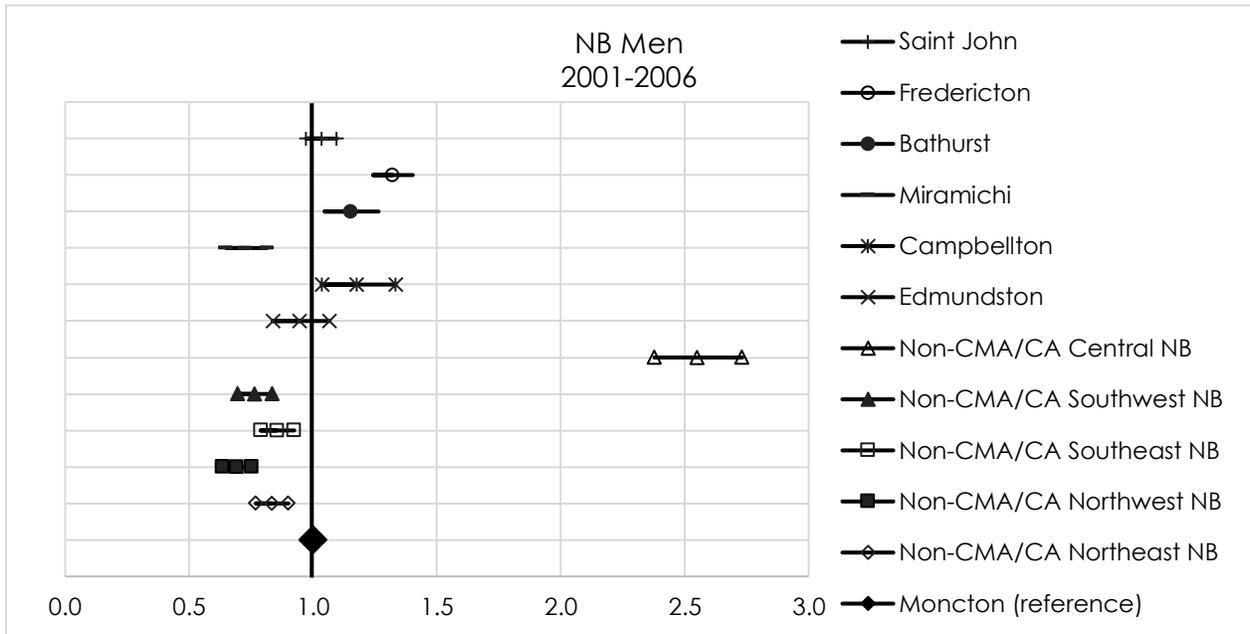
Figure 39: Odds-Ratios by Education for NB Women (Out-Migration Model Output)



For both men and women in NB, the higher the education level they achieved, the more likely they were to leave the province between 2001 and 2016.

Those who had no high school diploma were less likely to emigrate from the province.

Figure 40: Odds-Ratios by Origins for NB Men (Out-Migration Model)



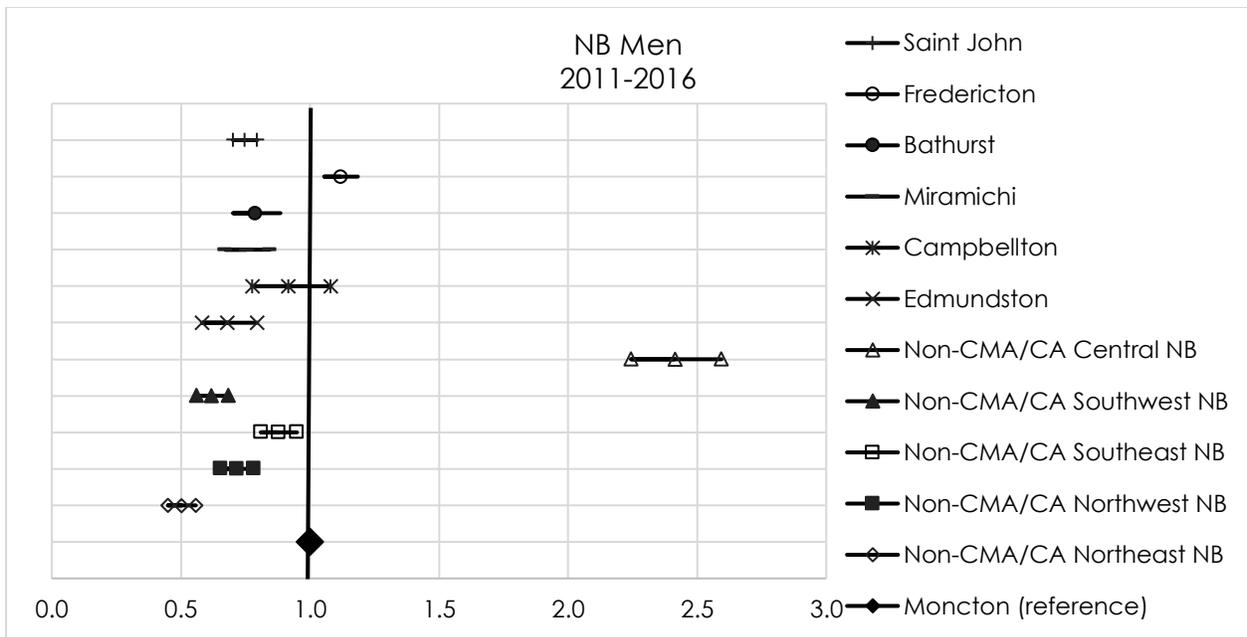
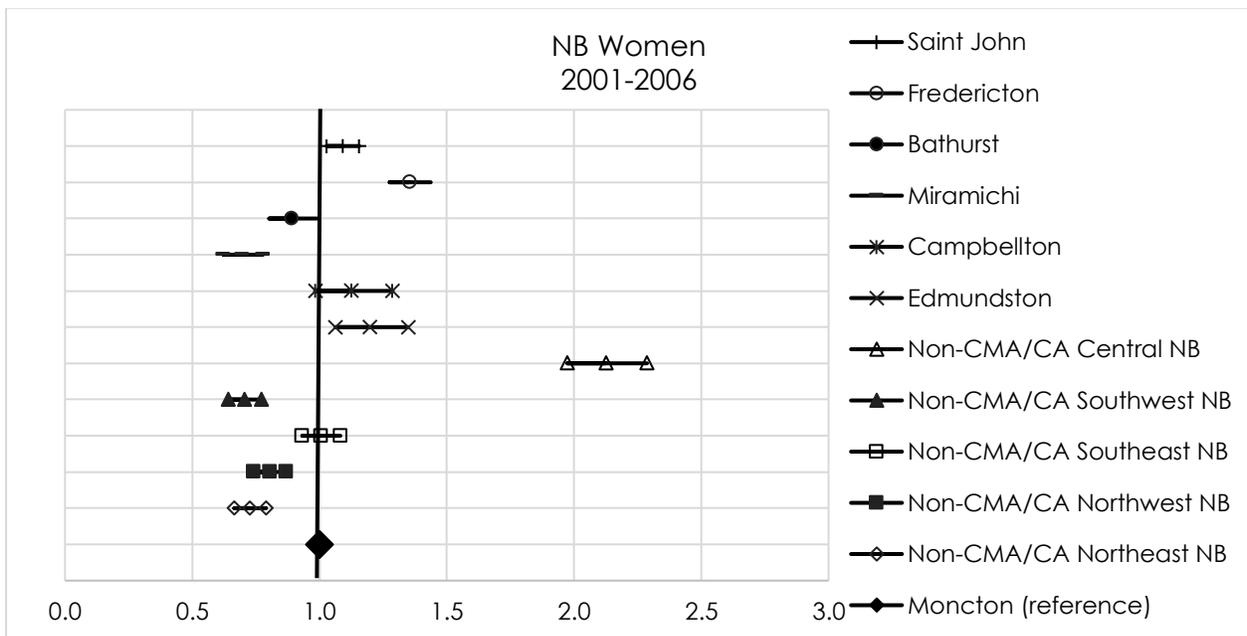
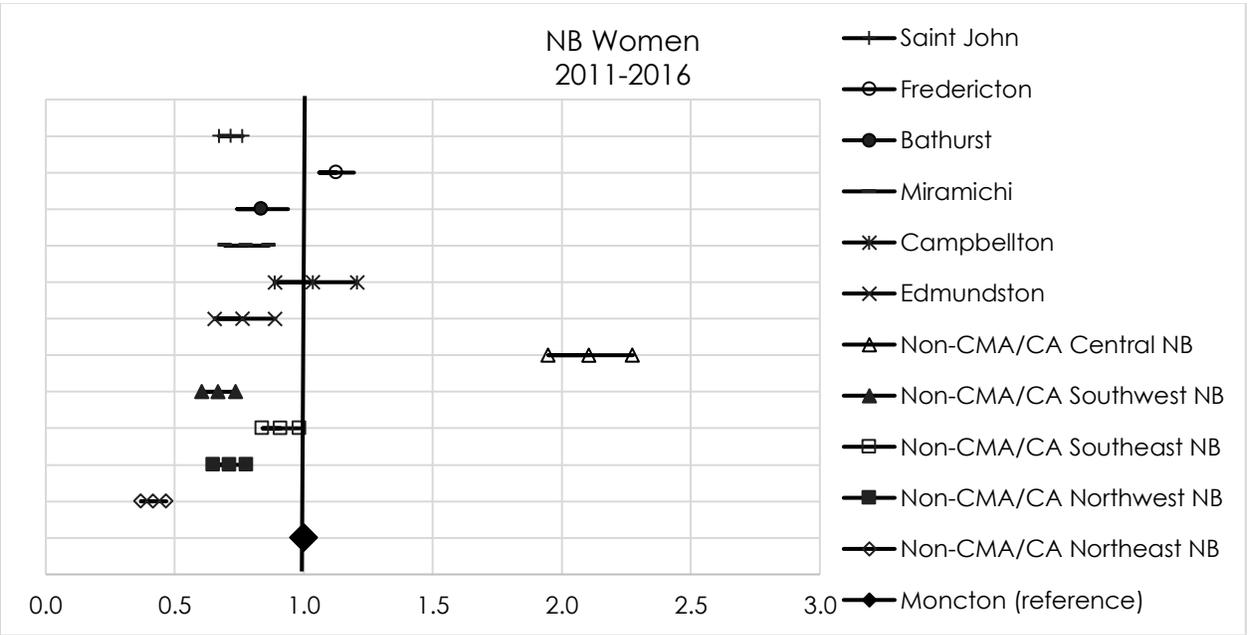
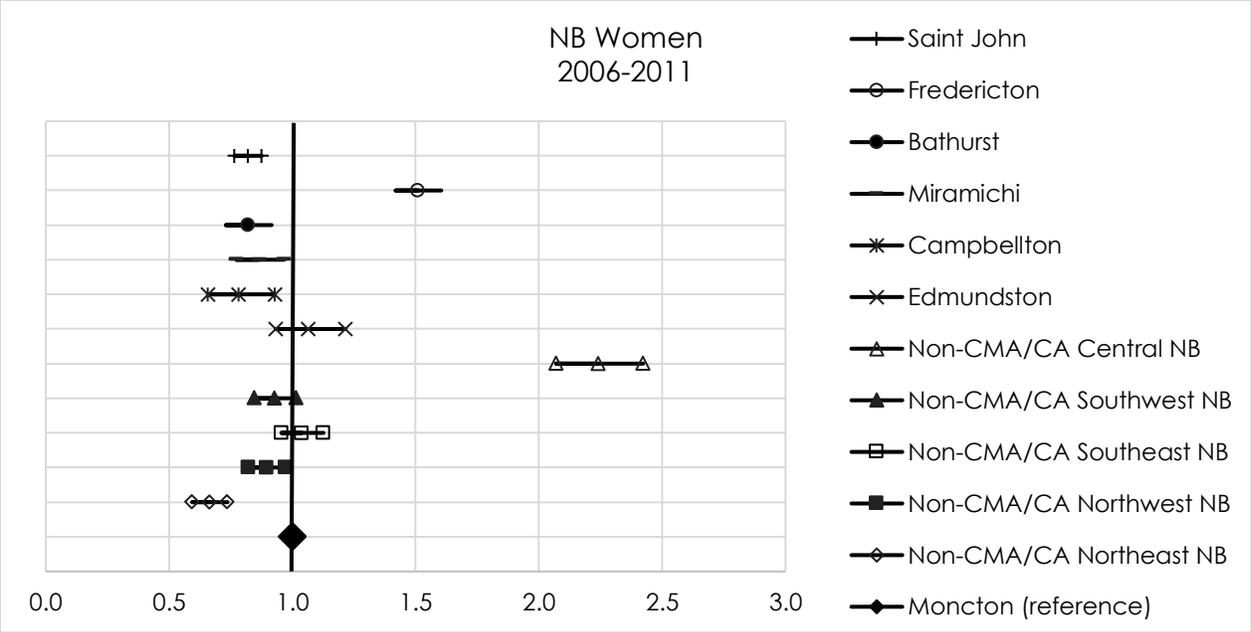


Figure 41: Odds-Ratios by Origins for NB Women (Out-Migration Model)





Both men and women who originated in Fredericton CA and surrounding non-CMA/CAs in central NB show consistently higher odds of emigration from the province between 2001 and 2016 than those who originated from Moncton. Those who originated from non-CMA/CAs in the north and south show a significantly smaller likelihood of leaving. Those who originated from other CAs in the province show either no difference or smaller probability of emigration than those who originated from Moncton.

Figure 42: Odds-Ratios by *Linguistic Attribute* for NB Men (Out-Migration Model)

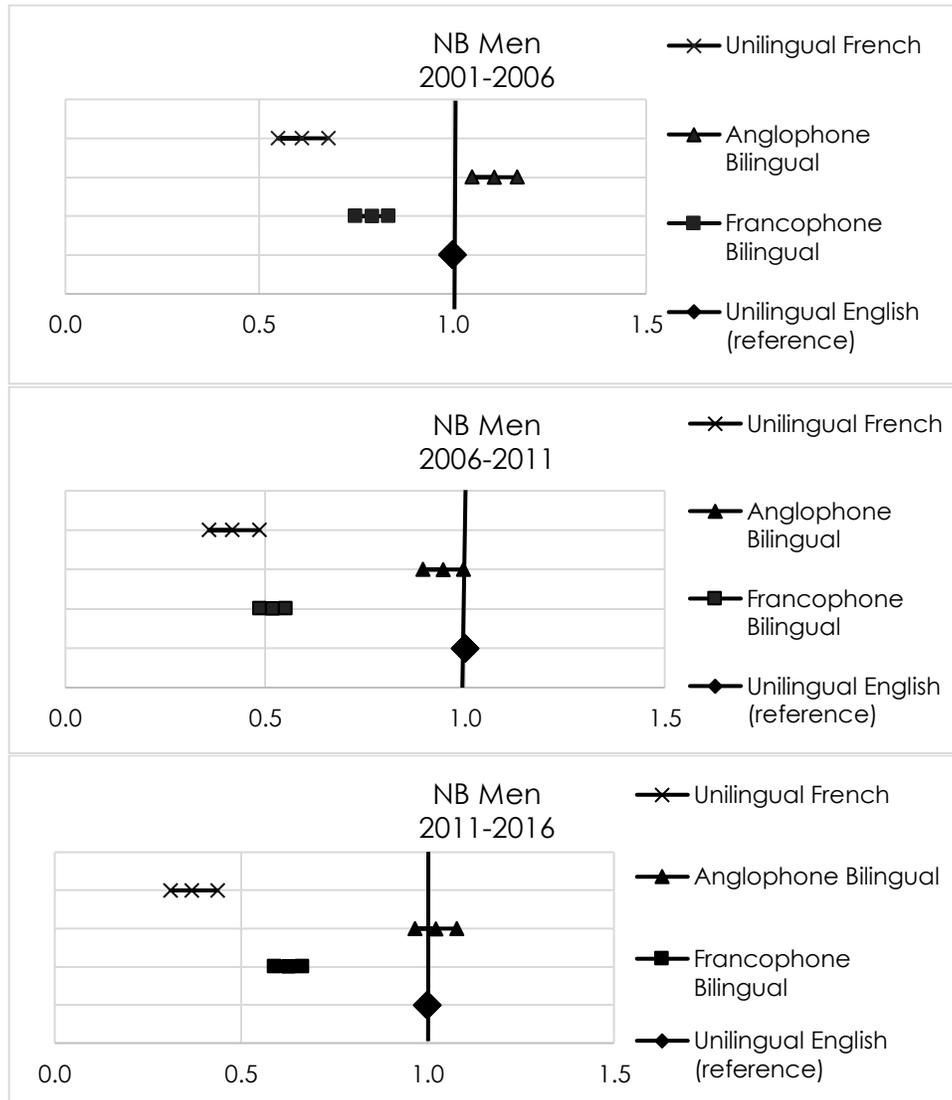
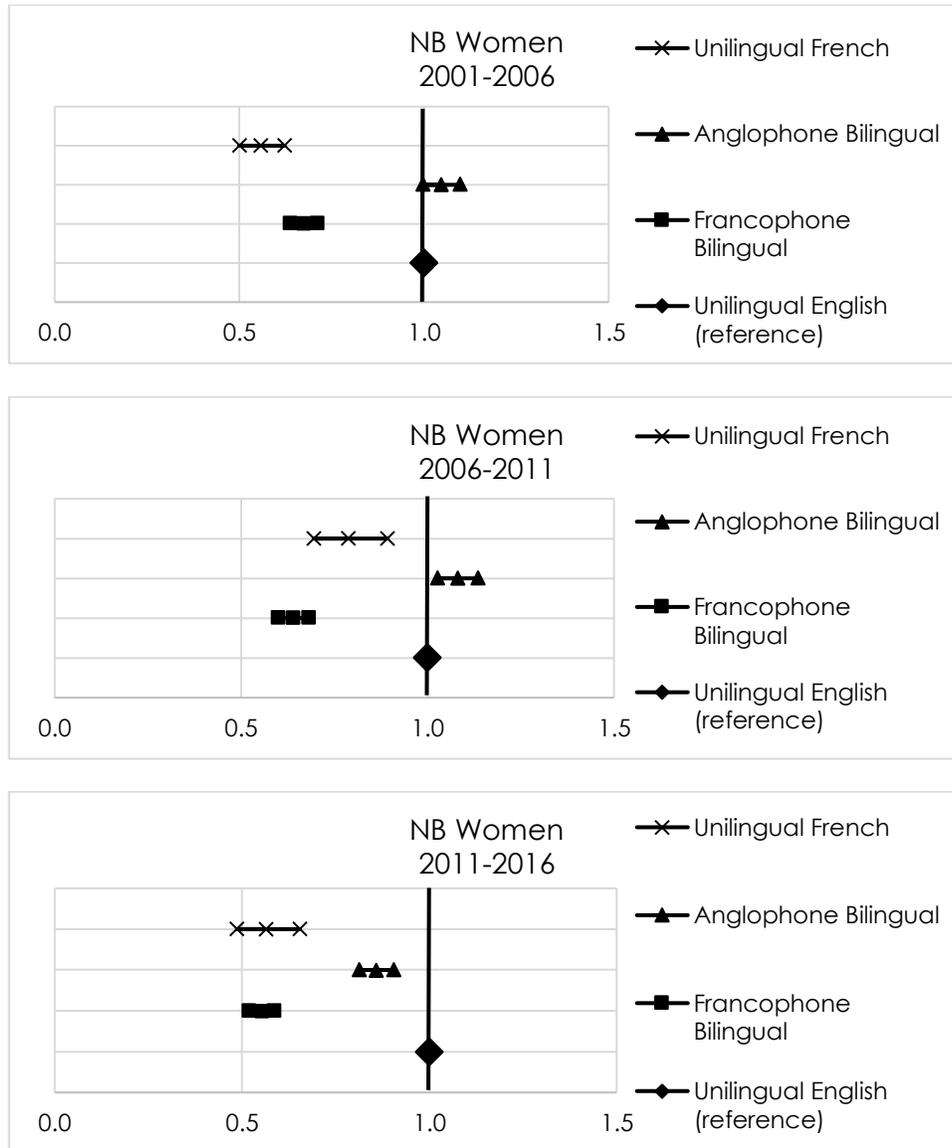


Figure 43: Odds-Ratios by *Linguistic Attribute* for NB Women (Out-Migration Model)



Both unilingual and bilingual Francophone men and women were significantly less likely to emigrate from NB between 2001 and 2016 than unilingual English NBers. Compared to unilingual English men, bilingual Anglophone men were significantly more likely to leave the province between 2001 and 2006; they became significantly less likely to do so between 2006 and 2011; and eventually they became indifferent between 2011 and 2016. Bilingual Anglophone women were slightly more likely to leave NB than unilingual English women between 2001 and 2006, but they became significantly less likely to emigrate between 2011 and 2016.

1.2 Intra-Provincial Migration

Figure 44: Odds-Ratios by Age Group for NB Men (Intra-Provincial Migration Model)

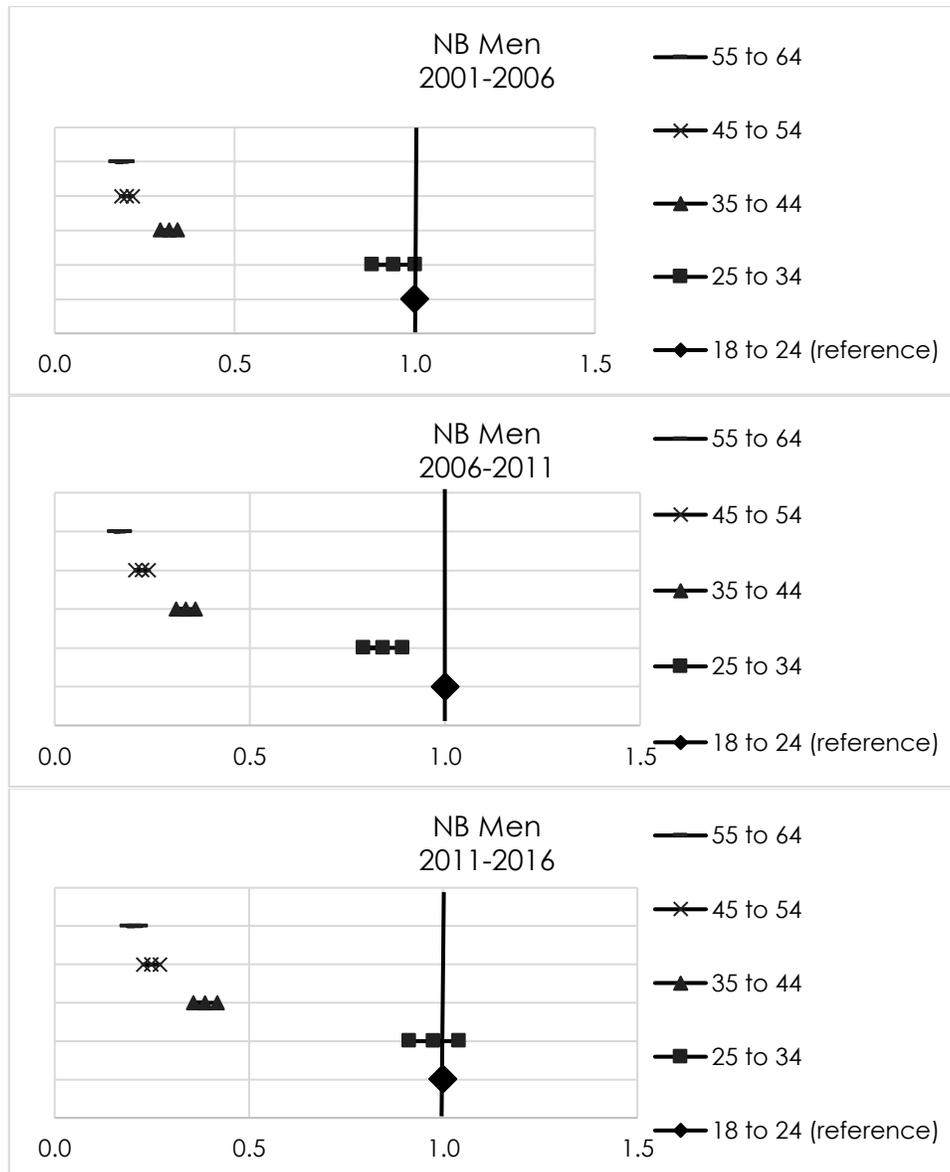
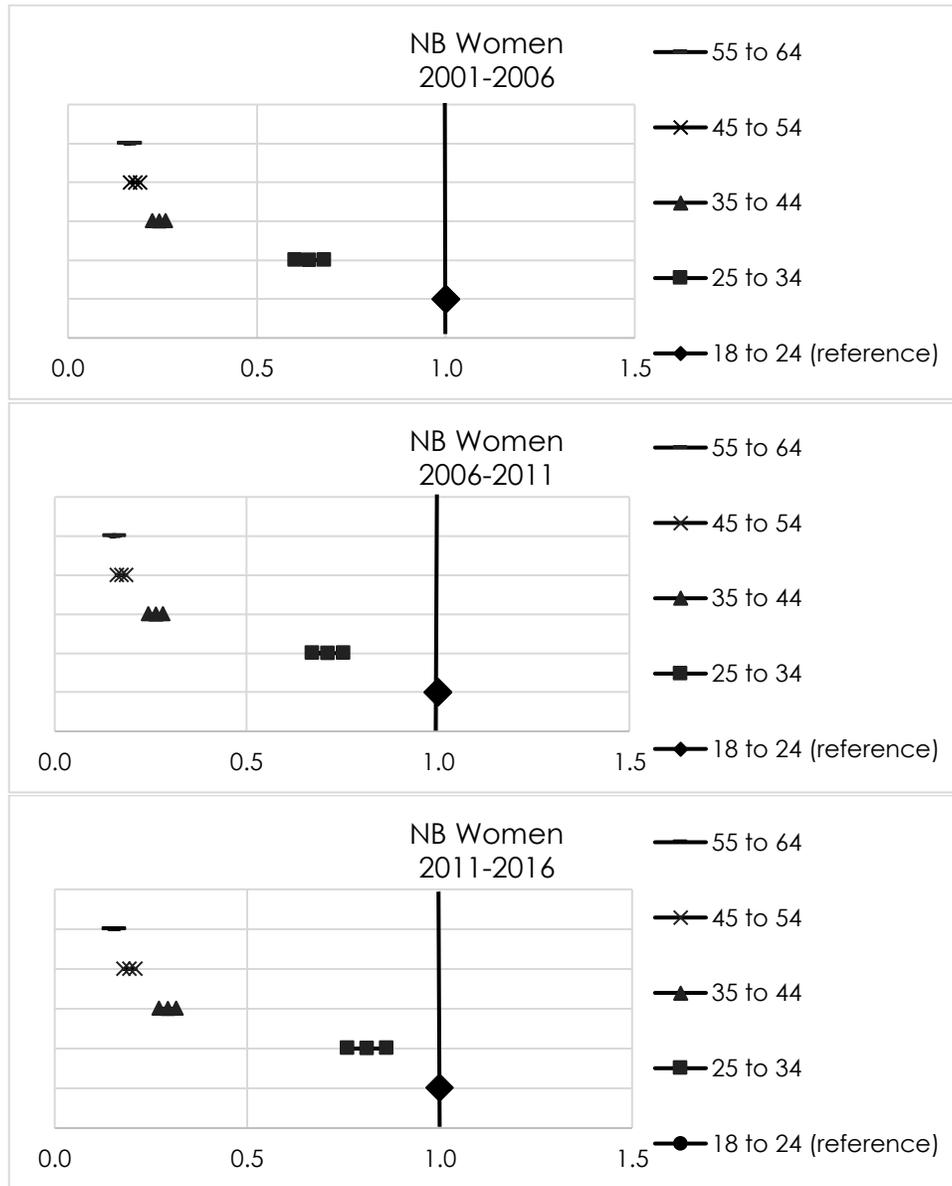


Figure 45: Odds-Ratios by Age Group for NB Women (Intra-Provincial Migration Model)



Over the study period, both young men and women between the ages of 18 and 24 were more likely to relocate within NB, whereas men and women aged 25+ were significantly less likely to relocate in the province compared to the younger age cohort. Aging significantly influences the odds of moving within NB: the older a NBER gets, the less likely he or she is to relocate intra-provincially.

Figure 46: Odds-Ratios by Marital Status for NB Men (Intra-Provincial Migration Model)

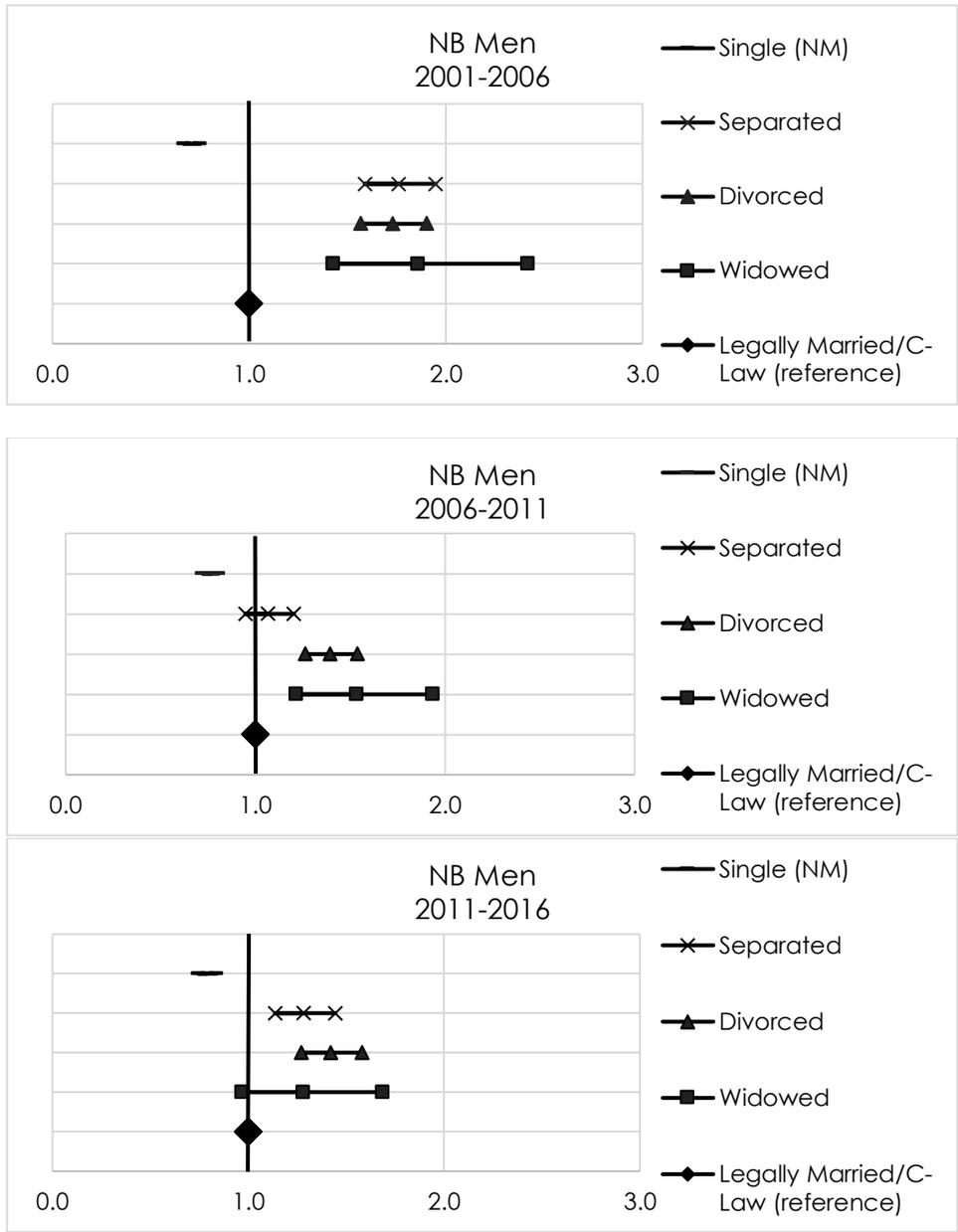
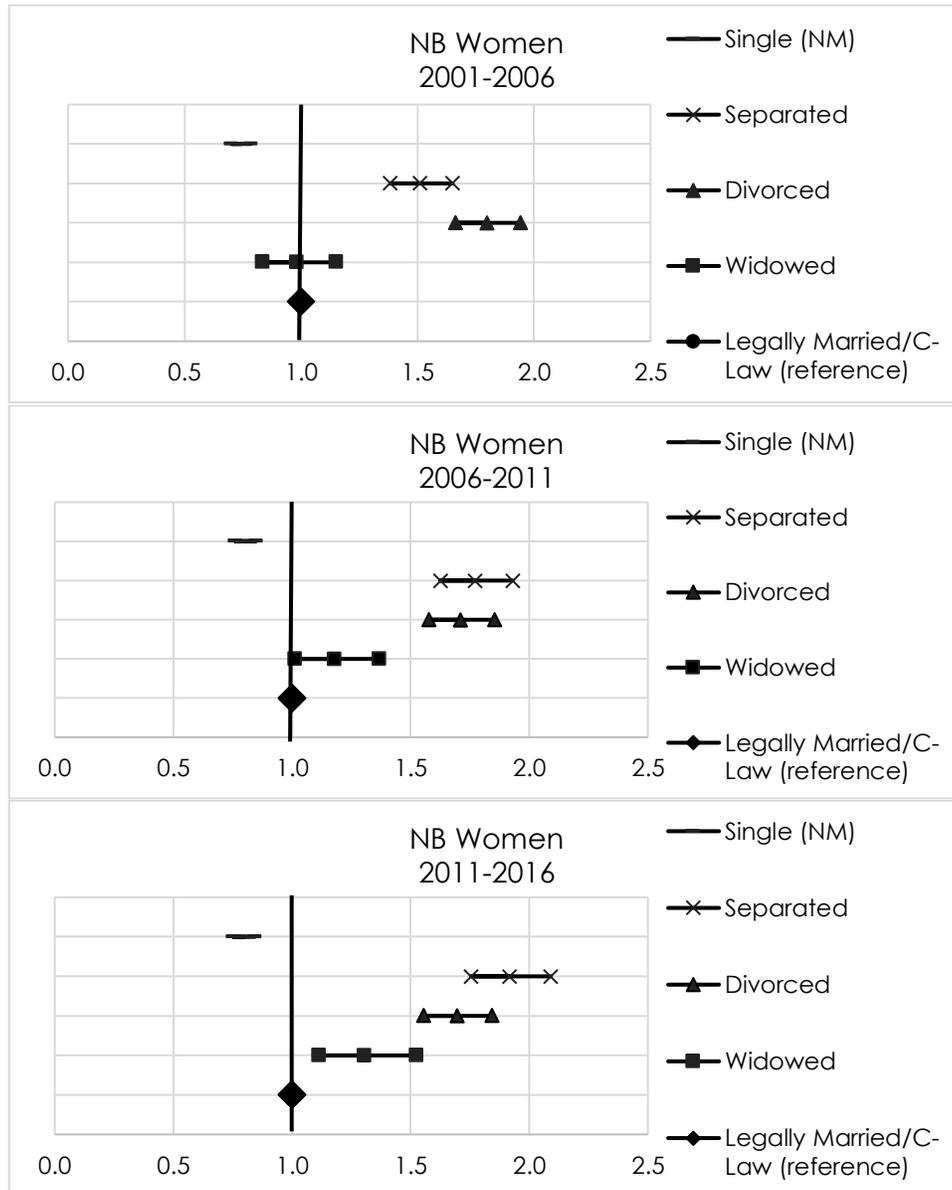


Figure 47: Odds-Ratios by Marital Status for NB Women (Intra-Provincial Migration Model)



Both single (never married) men and women were significantly less likely to relocate within NB, whereas separated, divorced, or widowed Nbers were significantly more likely to move intra-provincially than those legally married or living common-law between 2001 and 2016.

Figure 48: Odds-Ratios by Education for NB Men (Intra-Provincial Migration Model)

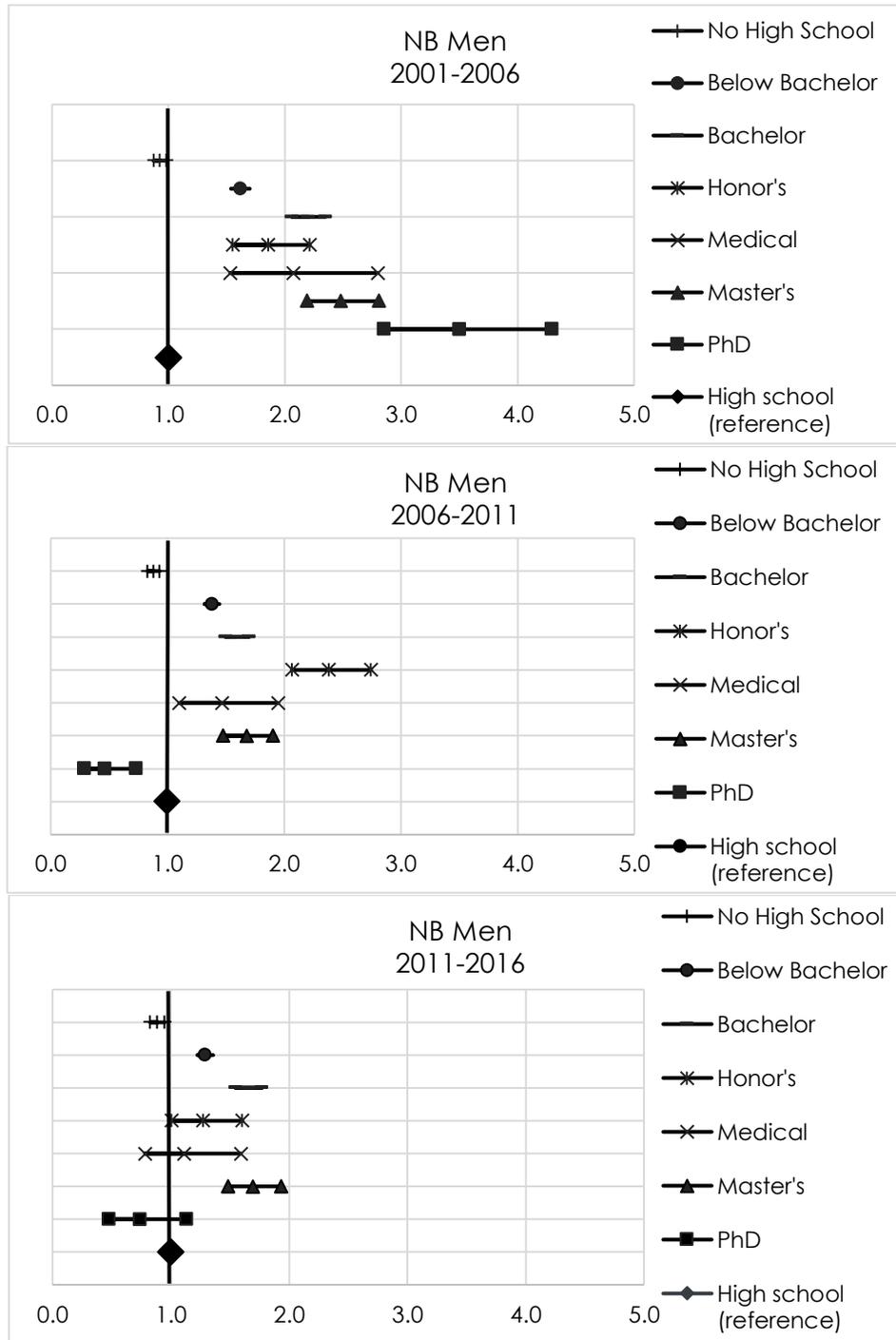
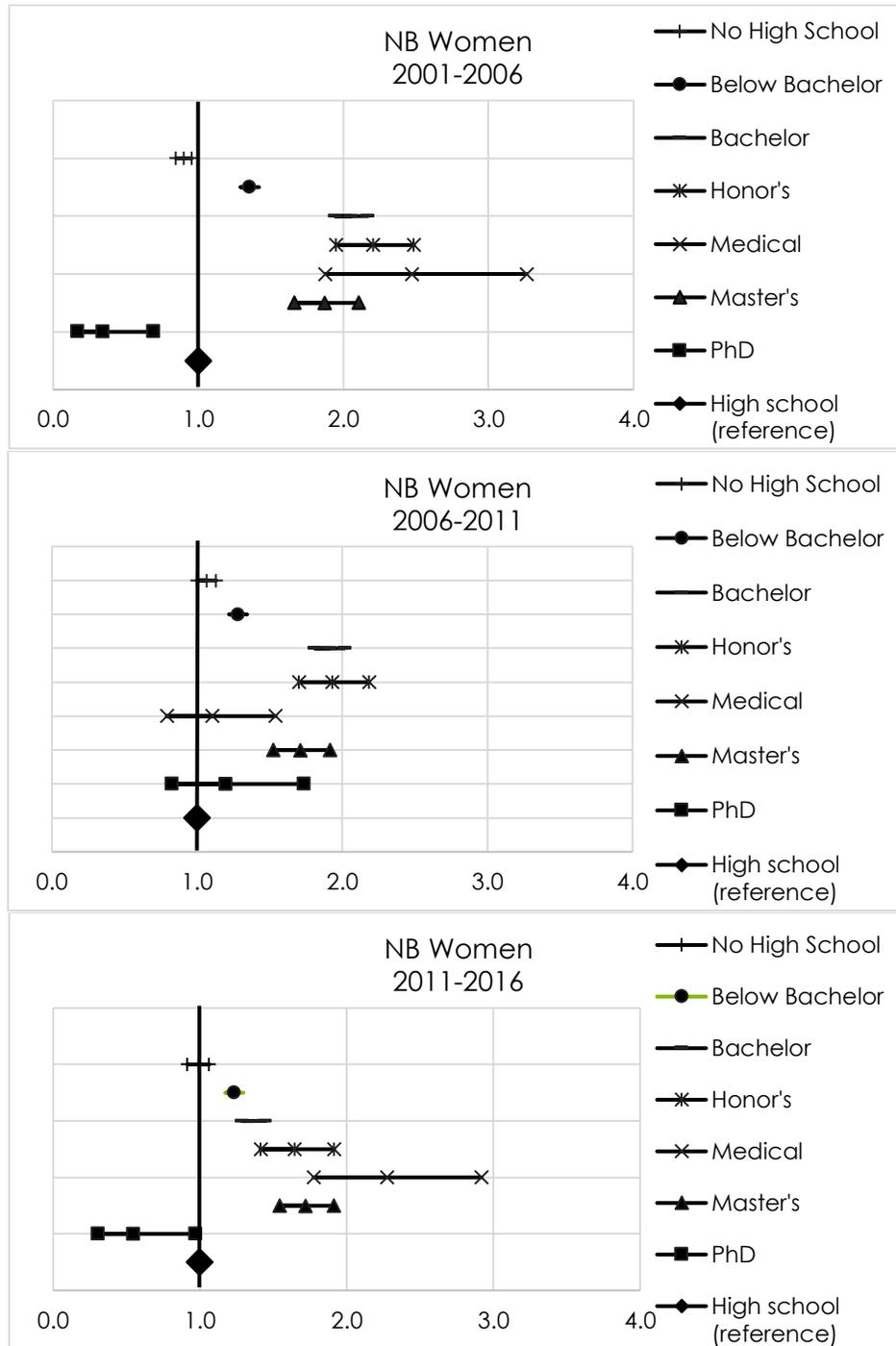


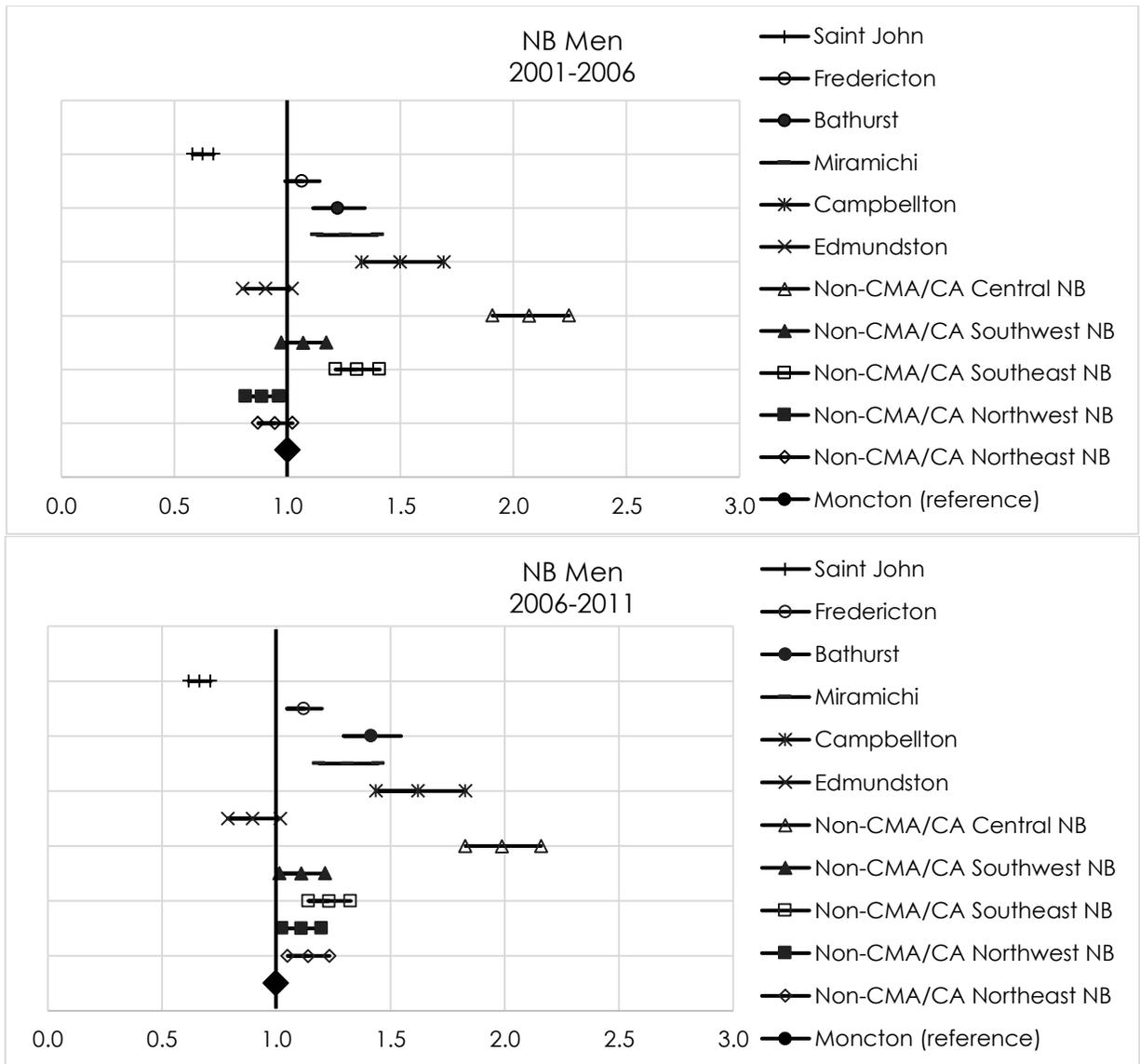
Figure 49: Odds-Ratios by Education for NB Women (Intra-Provincial Migration Model)



Men who held no high school diploma were significantly less likely to relocate intra-provincially in NB between 2001 and 2016 than those who held only a high school diploma. Women who held no high school diploma were indifferent in terms of intra-provincial migration compared to women who held only a high school diploma. Other than that, higher education is associated with a

higher likelihood of relocating within NB for both men and women except for those NBers who had earned PhD titles – they became the group least likely to relocate within NB from 2011 onward.

Figure 50: Odds-Ratios by Origin for NB Men (Intra-Provincial Migration Model)



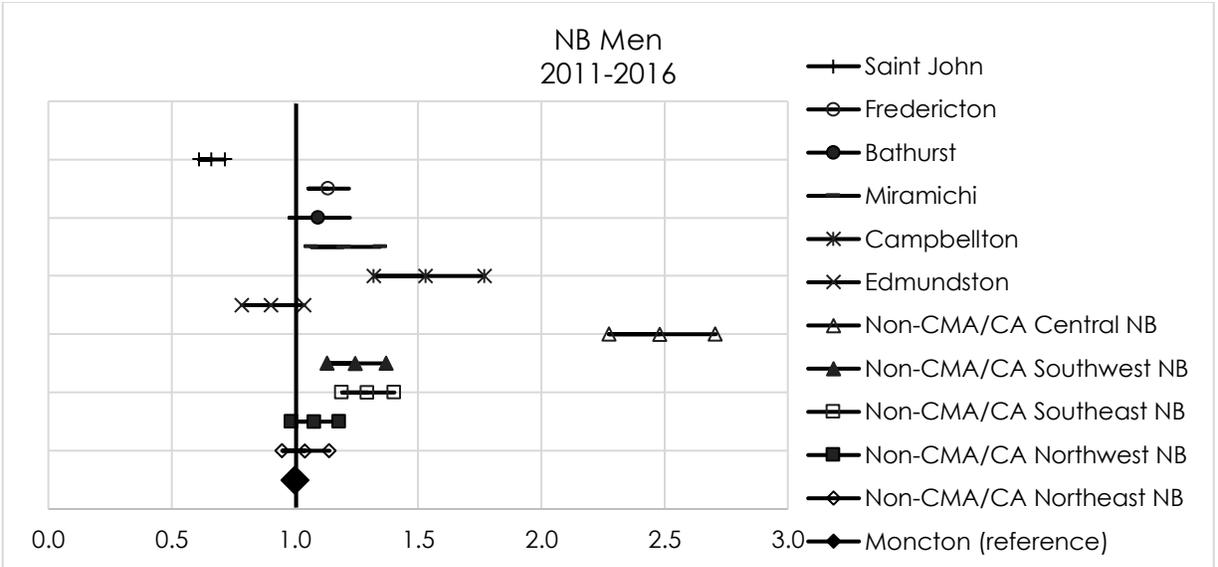
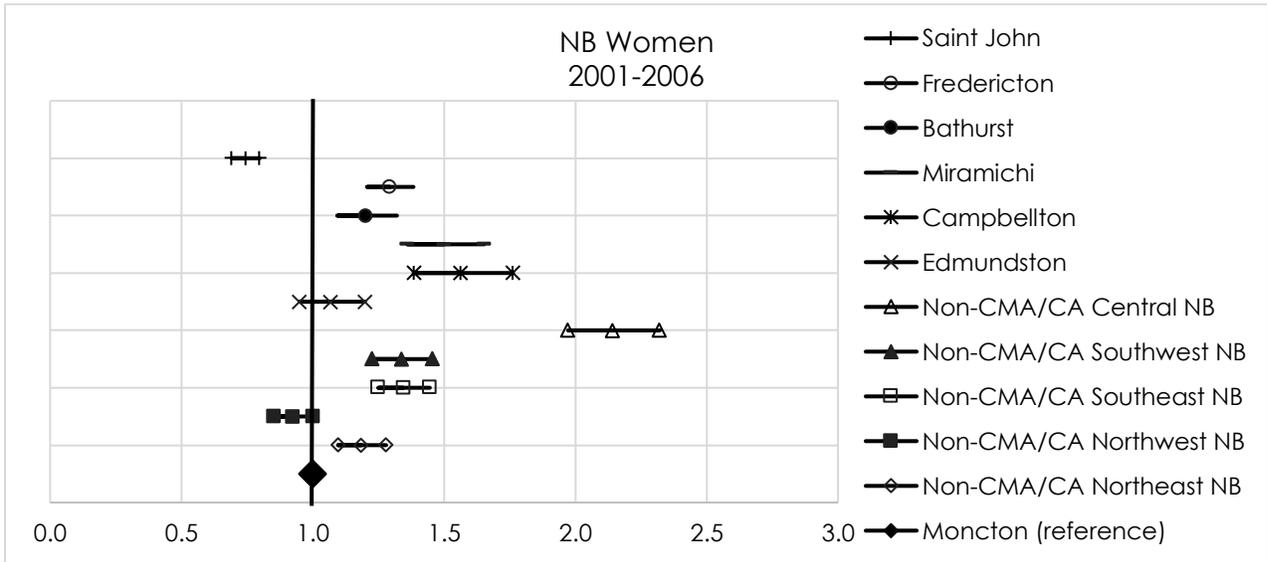
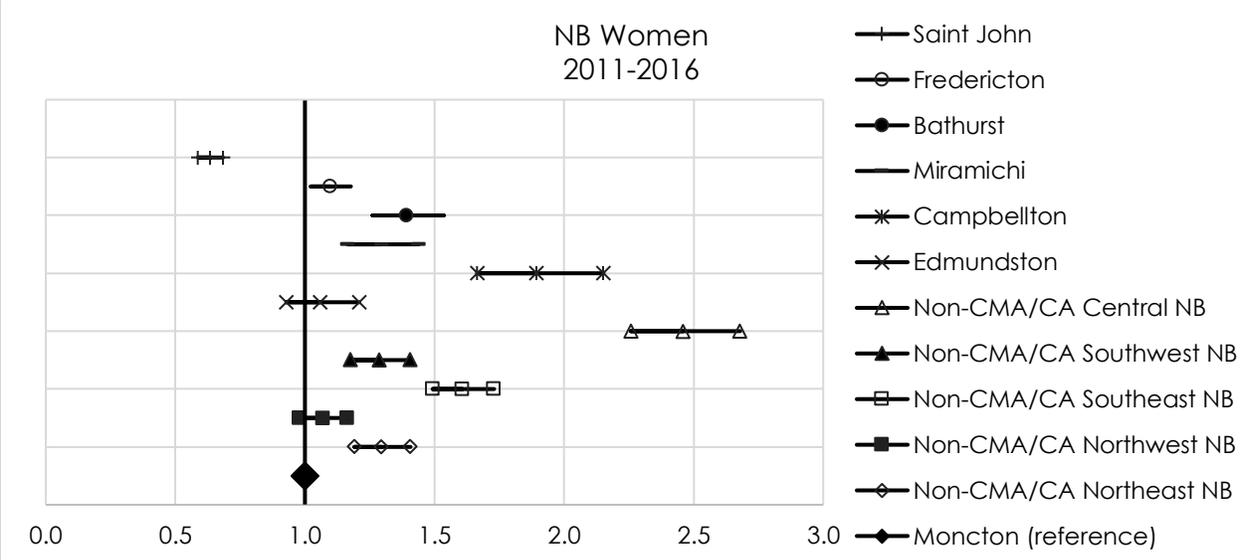
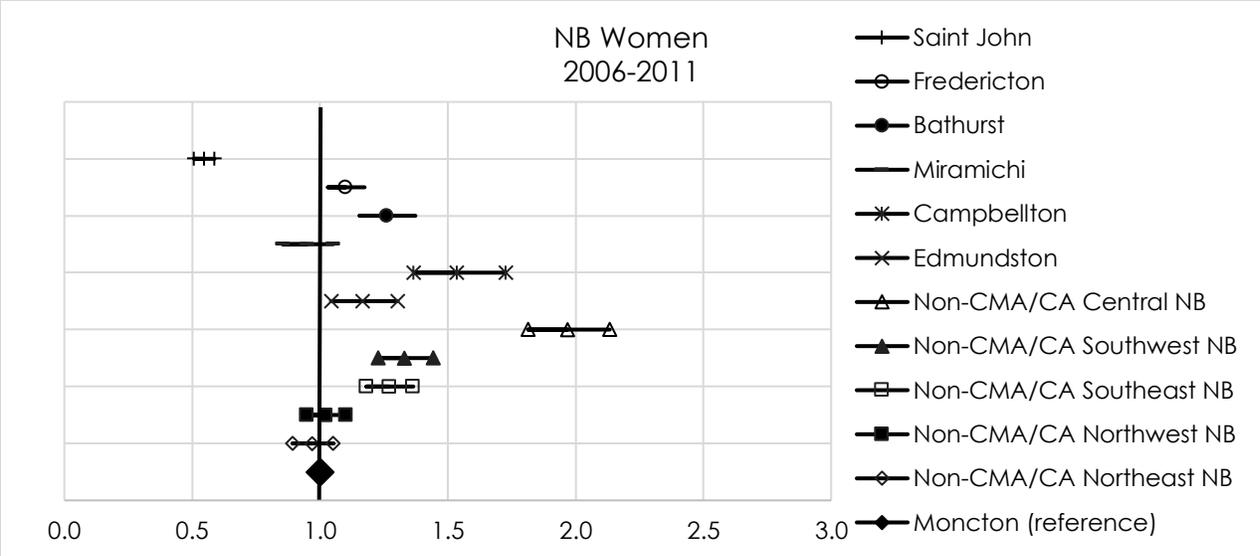


Figure 51: Odds-Ratios by Origin for NB Women (Intra-Provincial Migration Model)





Both men and women who originated from non-CMA/CAs in the central part of NB were the most likely to move intra-provincially throughout the investigated timespan (2001-2016). All other NBers from other CAs or non-CMA/CAs in the province were more likely to relocate compared to those who originated from Moncton CMA; however, those from Saint John CMA are an exception, as they were immobile.

This tells us that almost everyone in NB is more likely than Monctonians to move intra-provincially, suggesting that intra-provincial movers are most likely going to Moncton CMA, confirming our descriptive statistics regarding origins and destinations.

Figure 52: Odds-Ratios by *Linguistic Attribute* for NB Men (Intra-Provincial Migration Model)

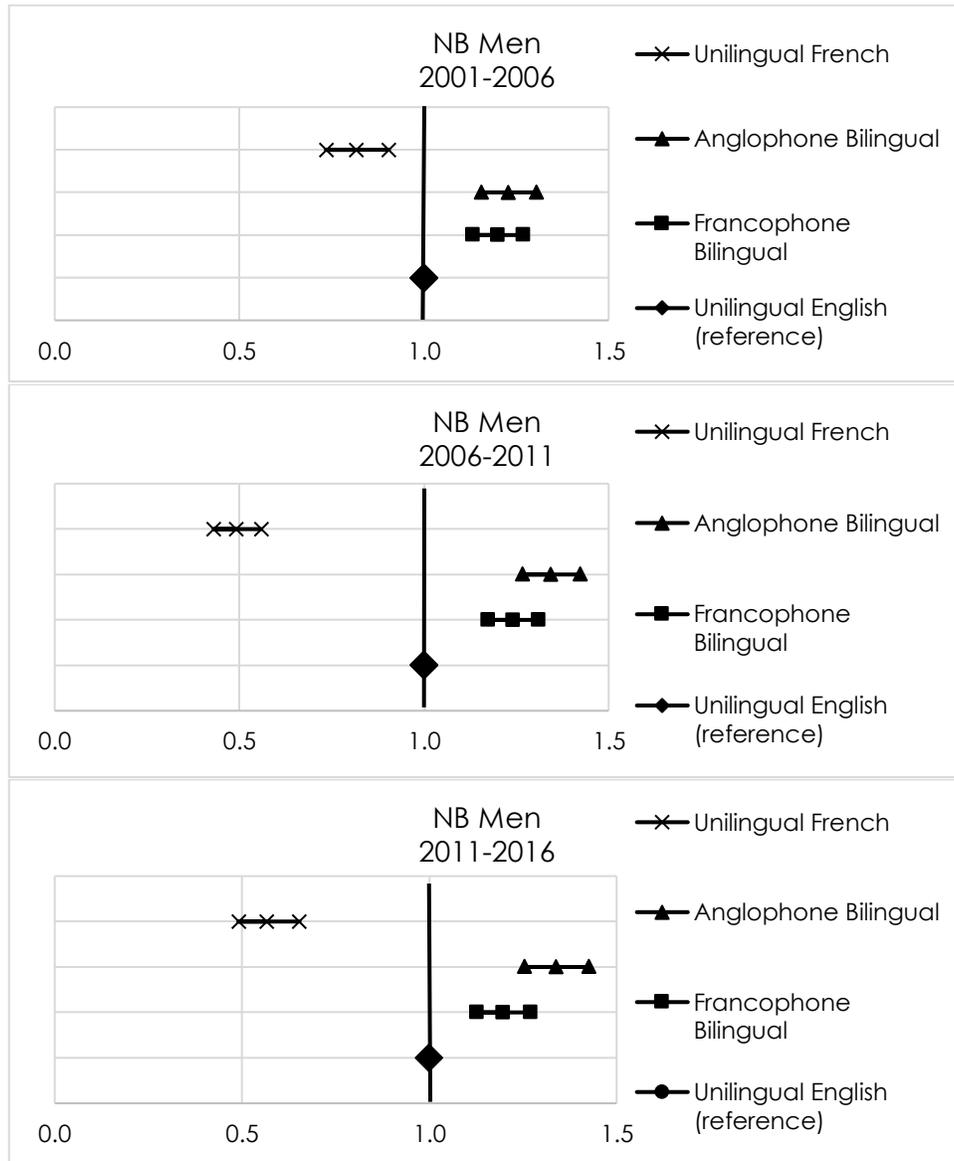
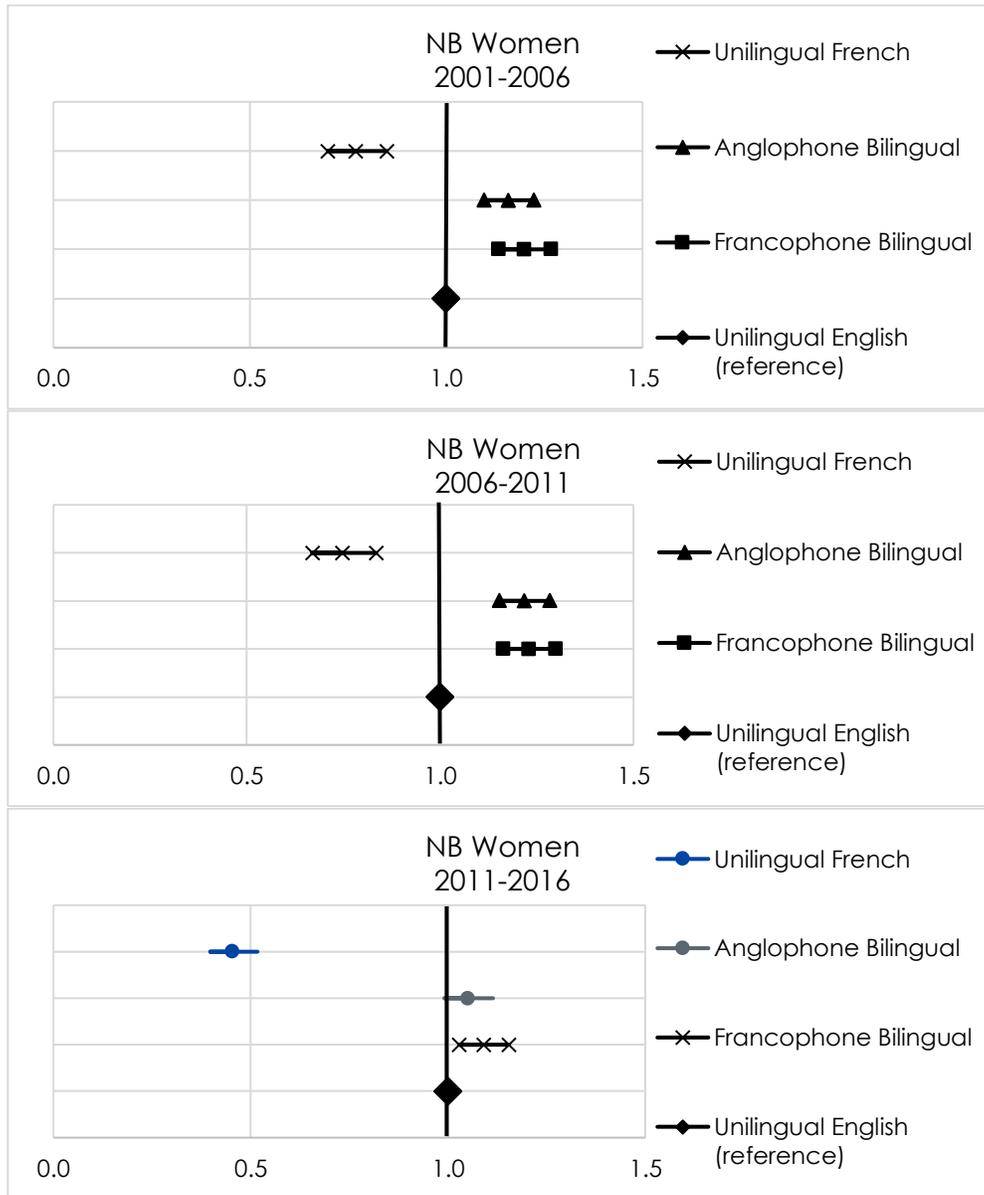


Figure 53: Odds-Ratios by *Linguistic Attribute* for NB Women (Intra-Provincial Migration Model)



Both bilingual Anglophone and Francophone male and female NBers were significantly more likely to relocate intra-provincially between 2001 and 2016 than unilingual English NBers, whereas unilingual French NBers were significantly less likely to do so.

2. Multinomial Logistic Regression Analysis Results

The results of our multinomial logistic regression model show New Brunswickers' decisions in relation to moving out of NB, moving intra-provincially within NB, or staying where they are in the province with no movement or relocation.

The reported RRRs tell us that over the study period (2001-2016), both bilingual Anglophone and bilingual Francophone NBers were more likely than unilingual English NBers to move intra-provincially than to leave the province. Unilingual French NBers were the least mobile linguistic group in terms of both inter- and intra-provincial geographic mobility over the investigated timespan. These findings further validate the results of our logistic regression models, which we ran separately for the out-migration and intra-provincial migration samples.

CONCLUSION

Our regression results show consistency with Birchall's (2016) migration report. In short, the characteristics of NBers significantly influence their decisions with respect to geographic movement. The older New Brunswickers become, the less likely it is that they will move inter- or intra-provincially. Young adults, especially those between the ages of 18 and 34, are more mobile in terms of geographic movement both inter- and intra-provincially. The higher level of education NBers receive, the more likely they are to leave NB or at least relocate within the province.

Both unilingual and bilingual Francophone men and women in NB were significantly less likely to emigrate from the province between 2001 and 2016 than unilingual and bilingual English NBers. Compared to unilingual Anglophone men, bilingual Anglophone men were significantly more likely to leave the province between 2001 and 2006, though they became significantly less likely to do so between 2006 and 2011 and eventually became indifferent in terms of out-migration between 2011 and 2016.

Bilingual Anglophone women were slightly more likely to leave NB than unilingual Anglophone women between 2001 and 2011; however, they became significantly less likely to emigrate from the province between 2011 and 2016.

Both bilingual Anglophone and Francophone male and female NBers were significantly more likely to relocate intra-provincially in NB between 2001 and 2016 than unilingual English NBers, whereas unilingual French NBers were significantly less likely to do so.

Our results show that Anglophones – unilingual and bilingual – are more likely than Francophones to leave New Brunswick. Though bilingualism had a larger impact on Anglophones' migration decisions during the earlier years of the study, the influence of second language acquisition on Anglophone outmigration has increasingly declined and is not a significant factor in inter-provincial geographic movements. Finally, we find that bilingualism encourages both Anglophones and Francophones to move intra-provincially within New Brunswick, whereas unilingual NBers are much less likely to relocate in the province.

Implications

These results suggest that out-migration from NB is most likely to occur among NBers with an English mother tongue. Acquisition of a second official language had little to no influence on Anglophone out-migration, since NBers with an English mother tongue were more likely to leave the province between 2001 and 2011 anyway – whether they acquired the French language or not.

Between 2011 and 2016, bilingual Anglophone male NBers were as likely as unilingual Anglophone male NBers to emigrate from the province. However, bilingual Anglophone female NBers became less likely to emigrate than unilingual Anglophone female NBers, suggesting that official bilingualism has had a small but positive effect inducing Anglophone female NBers to stay in the province.

Second official language acquisition by both English mother tongue and French mother tongue persons in NB is associated with higher rates of intra-provincial mobility between 2001 and 2016. This suggests that the acquisition of a second official language in NB generally improves labour market efficiency in the province by increasing the geographic mobility of both Anglophones and Francophones.

Suggestions

Most existing studies have not addressed the problem of high levels of out-migration from and intra-migration within NB. This may be the case because language, and bilingualism in particular, can be a sensitive topic throughout New Brunswick – the only officially bilingual province in the country. Perceptions of bilingualism vary for each New Brunswicker. Further, bilingualism is associated with millions of dollars spent by the provincial government every year to support bilingual services and education. It is possible that the strong opinions associated with the topic of bilingualism may have discouraged previous discussion of the language factor in relation to migration within and from NB. Alternatively, it is also possible that many researchers have found New Brunswick too small to be worth the effort to study compared to the much larger province of Quebec.

Although we attempt to fill this knowledge gap on the impact of bilingualism on mobility in New Brunswick, we cannot declare causality between linguistic attributes and geographic movement decisions because of the cross-sectional nature of the data we have. However, we provide insights and analysis framework for future studies in this area. Optimally, access to longitudinal data, which tracks the same NBers over time, is needed to declare causality. With that information, we would then be able to examine the effects of second language acquisition by the same individuals and compare their migration decisions when they had no second official language versus when they acquired a second official language.

Our study shows that outmigration from NB is more likely to occur among Anglophones than Francophones, and learning a second language does not appear to significantly influence Anglophones' outmigration decisions. On the other hand, bilingualism does impact the intra-provincial mobility of NBers. We suggest our government incorporate linguistic factors in their investigations of the declining and shifting population of New Brunswickers. This is essential if we want to better understand and address the high levels of out-migration and intra-provincial migration from rural to urban areas and from north to south within the province.

REFERENCES

- Amirault, D., Munnik, D., & Miller, S. (2013). Explaining Canada's regional migration patterns [PDF file]. Retrieved from The Bank of Canada Review website: <https://www.bankofcanada.ca/wp-content/uploads/2013/05/boc-review-spring13-amirault.pdf>
- Amit-Talai, V. (1993). Will they go? A study of intentions regarding migration among secondary students in Quebec. *Canadian Ethnic Studies* 25(1): 50-61. Retrieved from <http://web.b.ebscohost.com/ehost/detail/detail?vid=2&sid=eb65e4a8-c82b-476f-9733-4bec65e7d30f%40sessionmgr104&bdata=JnNpdGU9ZWhvc3QtbnGl2ZS7zY29wZT1zaXRI#AN=9607032430&db=aph>
- Bérard-Chagnon, J., & Lepage, J. (2016). *The literacy skills of New Brunswick francophones: Demographic and socioeconomic issues*. Ottawa, Ontario: Statistics Canada. Retrieved from http://publications.gc.ca/collections/collection_2016/statcan/89-657-x2016001-eng.pdf
- Birchall, J. (2016). Gender, age and migration: An extended briefing [PDF file]. Retrieved from https://www.rosavzw.be/digidocs/dd-001417_2016_Gender_Age_Migration_IDS.pdf
- Brown, W. M., & Newbold, K. B. (2012). *Cities and growth: Moving to Toronto - Income gains associated with large metropolitan labour markets*. [Catalogue number 11-622-M – No. 023]. Retrieved from Statistics Canada: <https://www150.statcan.gc.ca/n1/en/pub/11-622-m/11-622-m2012023-eng.pdf?st=bwGsQp68>
- Buis, M. (2014, December 12). Multinomial logit interpretation: RRR vs COR [Msg 2]. Message posted to <https://www.statalist.org/forums/forum/general-stata-discussion/general/545887-multinomial-logit-interpretation-rrr-vs-cor>
- Emery, H., Dunbar, J., & Peters, P. (2017). *How large are the economic returns to English-French bilingualism in New Brunswick?* Paper presented at the CRDCN 2017 National Conference, Montreal, QC. https://crdcn.org/sites/default/files/herb_emery.pdf
- Grant, E. K., & Vanderkamp, J. (1980). The effects of migration on income: A micro study with Canadian data 1965-71. *The Canadian Journal of Economics* 13(3): 381-406. doi:10.2307/134700
- Grenier, G. (1987). Earnings by language group in Quebec in 1980 and emigration from Quebec between 1976 and 1981. *The Canadian Journal of Economics* 20(4): 774-791. doi: 10.2307/135415
- Haley, A. (2017). Defining geographical mobility: Perspectives from higher education. *Geoforum* 83: 50-59. doi: 10.1016/j.geoforum.2017.04.013
- Lee, E. S. (1966). A theory of migration. *Demography* 3(1): 47-57. doi: 10.2307/2060063
- Nadeau, S. (2010). Another look at the Francophone wage gap in Canada: public and private sectors, Quebec and outside Quebec. *Canadian Public Policy* 36(2): 159-179. doi:10.3138/cpp.36.2.159
- Niedomysl, T., & Fransson, U. (2014). On distance and the spatial dimension in the definition of internal migration. *Annals of the Association of American Geographers* 104(2): 357-372. doi: 10.1080/00045608.2013.875809

Shapiro, D. M., & Stelcner, M. (1997). Language and earnings in Quebec: Trends over twenty years, 1970-1990. *Canadian Public Policy / Analyse De Politiques*, 23(2): 115-140. doi:10.2307/3551481

Sioufi, R., & Bourhis, R. Y. (2017). Francophone intergroup attitudes and readiness for interprovincial migration in Canada. *Canadian Ethnic Studies* 49(1): 43-65. doi:10.1353/ces.2017.0002

Sioufi, R., & Bourhis, R. Y. (2018). Acculturation and linguistic tensions as predictors of Quebec Francophone and Anglophone desire for internal migration in Canada. *Journal of Language and Social Psychology* 37(2): 136-159. doi:10.1177/0261927x17714571

Statistics Canada. (2012). *Focus on Geography Series, 2011 Census*. (Catalogue number 998-310-XWE2011004). Retrieved from <https://www12.statcan.gc.ca/census-recensement/2011/as-sa/fogs-spg/Index-eng.cfm>

Statistics Canada. (2017). *Focus on Geography Series, 2016 Census*. (Catalogue number 98-404-X2016001). Retrieved from <https://www12.statcan.gc.ca/census-recensement/2016/as-sa/fogs-spg/Index-eng.cfm>

Veltman, C. (1986). The interpretation of the language questions of the Canadian Census. *Canadian Review of Sociology and Anthropology* 23(3): 412-422. Retrieved from <http://web.b.ebscohost.com/ehost/detail/detail?vid=3&sid=2fc8eaef-b76c-4c89-8ae6-573ccbcbcd20f%40pdc-v-sessmgr02&bdata=JnNpdGU9ZWhvc3QtbnGl2ZS7zY29wZT1zaXRl#AN=10632399&db=sih>