

# **The Geographical Migration Decisions of Immigrants in British Columbia, Canada: an Empirical Study Using an Immigrant Longitudinal Database**

## **Abstract**

*In this paper we use individual-level data from the Longitudinal Immigrant Database (IMDB) and community information from the 1996, 2001, and 2006 censuses of Canada to identify some of the individual and community-level determinants of secondary migration among three immigrant cohorts in the Canadian province of British Columbia. We use a rich set of observables, including admission category, recency of arrival, and household structure, at the individual level, and ethnic composition and neighbourhood affluence at the community level, to identify migration choices. We find distinct mobility patterns between immigrants that live in an ethnic enclave and those that do not. We also find that mobility differs by marital and low-income status, and discuss the implications of these findings.*

Keywords: Immigration, Internal Migration, Canada, Proportional Hazards Models, Propensity Score Matching.

JEL: J10, R23, J61.

## **Introduction**

According to the 2006 Census of Canada, Vancouver follows Toronto as the second most popular destination for new immigrants to Canada. At the same time, most of the rest of British Columbia, the province where Vancouver is located, experiences fairly low levels of immigration. Except for trickles of newcomers that head to B.C.'s smaller cities, most international migrants to Canada's westernmost province are in its largest city.

This uneven spatial concentration creates economic and social challenges in both the regions of the province that receive newcomers and those that don't. While Vancouver experiences infrastructure strain, many (though not all) other areas fight to stave off population decline. To address these challenges it is imperative to gain a better understanding of the reasons behind the clustering of immigrants. This paper focuses on a central component of this, namely what factors influence migration decisions. Identifying the individual- and community-level determinants of secondary migration is particularly important to the development of sound

settlement policies and to any efforts to shape the internal migration patterns of immigrants to Canada.

Our study tracks secondary migration among three immigrant cohorts in the Canadian province of British Columbia. We rely on two main sources, which together allow us to make an accurate assessment of their relocation patterns. One is the Longitudinal Immigrant Database (IMDB), which combines linked immigration and taxation records. Individual-level data from the IMDB provides us detailed annual information on where a person resides. Secondly, we also draw on community information from the 1996, 2001, and 2006 censuses of Canada, which allows us to embed individuals in their neighbourhoods. For the purposes of the paper we analyze only Canadian immigrant location decisions after landing. We do not study variables that influence *initial* location choices; rather, we take these as given. However, we acknowledge that the initial geographical landing location plays a significant role in determining immigrants' onward migration patterns (Kritz, Gurak and Lee, 2013; McDonald, 2004).<sup>1</sup>

Our findings are the first to establish the causal effect of enclaves on mobility. We find distinct mobility patterns between immigrants who live in an ethnic enclave and those that do not. In a recent study, Picot and Piraino (2010) argue that self-selectivity in emigration could potentially bias the estimation of earnings growth for immigrants in studies using repeated cross-sectional data. They found an upward bias in the earnings trajectory of immigrants by using the repeated census cross-sectional data. A similar process may be at work here, except that instead of self-selectivity determining entry in a country, it may instead denote neighbourhood entry.

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<sup>1</sup>We could not directly identify the initial landing location of immigrants in the data, however, the intended landing location is reported by immigrants prior-landing.

This has significant implications as it suggests that most studies on the effects of immigrant location choice are biased by non-random geographical sorting across regions.

Migration decisions are made in a complex social context, where economic and socio-demographic conditions produce different determinants for the mobility of different groups of immigrants, under different circumstances, and during different lifetime stages. Some factors may act as “anchors” that keep immigrants attached to their initial residential places, while others serve as “oars” to push them to migrate/emigrate to other regions/countries. In the first part of the paper we examine the socio-demographic correlates of immigrant migratory patterns, We observe that the presence of children, marital status, and the existence of the co-ethnic community around their residential region appear to anchor immigrants to a given place. Compared to non-married immigrants, for example, married/common-law couples have a higher probability to move to a community with lower ethnic concentrations, possibly due to the presence of support within the household (thereby reducing the dependence on ethnic networks). In contrast, single young professionals might have higher lifestyle-related incentives to give up his/her current well-paid job to move closer to co-ethnics. In the second part of this paper, we move on to examine whether or not economic integration barriers may be driving immigrants to other areas of Canada. To measure these barriers we use the following variables: pre-moving employment income and low-income status; educational attainment; pre-moving overall community-level unemployment rate; and official language knowledge<sup>2</sup>.

## **Literature Review**

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<sup>2</sup>The language ability here refers to the number of official languages (French and English) the immigrant understands at the time of landing.

The initial choice of residence and internal migration pattern of immigrants have been widely documented (Bartel and Koch, 1991; Belanger and Rogers, 1992; Camarota and McArdle, 2003; Chui, 2003; Edmonston, 2002; Moore and Rosenberg, 1995; Bruce, 1996; Rogers and Henning, 1999). Generally, these studies try to establish where immigrants move in relation to where they are located upon arrival, and also compare the migration patterns of the foreign-born to those of their peers in the native-born population. Much of this research shows that the location choices of immigrants are related to their labour market performance (Frank, 2013; Haan, 2007; Rashid, 2009; Warman, 2007).

In addition, the geographical migration pattern of immigrants has also been studied as part of the, 1985) predicts that racial minorities will move away adaptation/integration process (Murdie and Ghosh, 2010). Spatial assimilation theory (Massey and Denton from their co-ethnic community as they integrate into their host country. This theory has been empirically tested and shown to hold in Canada in general (Fong and Wilkes, 1999), although there are some higher human capital groups that do not follow the predicted pathways of spatial assimilation (Myles and Hou, 2004; Hou, 2006).

Ethnic enclaves have been intensively analyzed in terms of affecting the location decisions of immigrants (McDonald, 2004; Hou, 2007; Kritz and Nogle, 1994), but largely with mixed results. While Hou (2007) finds that the ethnic community does not impact geographical decisions once the location fixed effects are controlled, both McDonald (2004) and Kritz and Nogle (1994) conclude that the ethnic enclave is, in fact, a significant determinant of the locational choice of immigrants. The other commonly controlled factors related with the migration decisions of immigrants are community level characteristics, such as the unemployment rate and welfare generosity, birth place and human capital of immigrants

(Belanger and Rogers, 1992; Gurak and Kritz, 2000; Newbold, 1996; Rogers and Henning, 1999; Zavodny, 1999). Thus, overall, the existing literature on the migration decisions of immigrants tends to focus on a few macro-level factors, rather than on micro-level attributes or micro-level characteristics interacted with the macro-level environment.

Compared to these previous works, our paper differs in the following ways. First, no other studies have tried to empirically identify the causal connections between economic and socio-demographic factors and the regional migration patterns of Canadian immigrants within Canada, or in an immigrant-concentrated region like British Columbia. This paper is the first to provide empirical evidence of the causal relationship between micro-level factors and immigrants' migration decisions by using a rich longitudinal Canadian dataset. Second, in order to capture the underlying causal effect of enclaves on the mobility of immigrants we use the relatively new econometric methodologies of propensity score matching and a duration model. Third, we are able to link individuals to their geographical characteristics at time of filing by using census data to provide detailed aggregate information, allowing us to follow a tax-filing cohort over time.

## **Data**

The Longitudinal Immigration Data Base (IMDB)<sup>3</sup> is an ideal dataset to study the mobility of immigrants in Canada. It covers 100% of immigrants who landed from 1980 to 2010 and filed taxes at least once in these years. We operationalize regional effects at the level of the Census Sub-division (CSD) in the mobility analysis of immigrants in British Columbia, since it corresponds in most cases to a municipality (a relatively well-known level of geography). We

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<sup>3</sup>The IMDB contains both administrative landing records information and information from individuals' subsequent family-related tax records.

restrict our analysis to a five-year census window due to the inconsistency of CSD boundaries across censuses. The migration is defined as the change of the residential locations across census subdivisions identified from the tax files over the years. Further, for immigrants who move across CSDs more than once over the tracking period, only the first move is counted. This will not affect the identification of migration behavior; however, it will only confound the duration calculation. Because all the covariates controlled in the model capture the initial characteristics of immigrants before migrating across regions, multiple movers will not bias our results.

Since the IMDB provides information on tax filers only, we cannot observe those who do not file taxes in the IMDB. Consequently, the IMDB may not be representative of all immigrants in Canada. That said, 90-95% of all eligible immigrants file taxes. To ensure the accuracy of our analysis, we compare the sample statistics from the tax file of the IMDB with those from the corresponding census sample across basic characteristics. The results are presented in Appendix Table A1<sup>4</sup>. Through the comparison, we see that the two samples match fairly well with slightly younger immigrants and higher proportions of married immigrants in the IMDB tax files.

All our migration analyses are conducted on successive cohorts of immigrants, who are grouped based on the year in which they filed their taxes. To cope with the issue of geographical boundary changes across censuses, we track all immigrants who filed taxes in each of the available census years (1996, 2001 and 2006) for five consecutive years<sup>5</sup>. Hence, we explore three tax-filing cohorts of immigrants. For instance, the 1996 tax-filing cohort comprises of all immigrants who filed taxes in 1996 and the 2001 tax-filing cohort includes all immigrants who

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<sup>4</sup>Due to differences in definition of income-related variables between Census and tax file, we are only able to conduct comparison among a few basic demographic variables (Age, marital status, and number of children).

<sup>5</sup>Although the tax file of IMDB starts in 1982, we dropped the 1982 tax -filing cohort from our investigation because immigration policy underwent significant alterations in early 1990s. Besides, the 1986 and 1991 tax cohorts do not exist since the CSD variable is not available from 1987 to 1995.

filed taxes in 2001. One reason for conducting the tax-filing cohort analysis is that the migration decisions of the three cohorts of immigrants could be examined under different macro-economic conditions.

Each cohort enters a different economic context. The 1996 cohort encountered the “dot-com bubble” (referring to the rapid growth in IT and its related industries), whereas their successor 2001 cohort faced the “dot-com bubble” burst, as well as the impact of “9/11”. Similarly, the 2006 tax-filing cohort of Canadian immigrants was tracked over a time period covering the recent economic recession that resulted from the American housing market collapse in 2008. When all the other factors are held constant, the macro-economic differences across the three cohorts of immigrants are likely to explain part of the differences in their mobility patterns.

As the place of residence of immigrants could only be identified if an immigrant files taxes, the identification of migration could be censored until filing resumes. For example, if an individual moves from Vancouver to a CSD in Ottawa, Ontario in 2006, but does not file until 2008, that person is assumed to have moved in 2008, even though this was not the case. Instances such as these are relatively rare, however, and we assume that the decision to file taxes is correlated with factors affecting migration behavior. Controlling for this group is critical to the identification of a causal relationship between economic and demographic “anchors” and the migration decisions of immigrants. Immigrants who emigrated out of Canada are excluded from the migration analysis.

Additionally, this paper mainly addresses the internal mobility of immigrants across urban CSDs within British Columbia because this accounts for roughly 93% to 96.5% of all forms of observed migration - rural-urban/urban-rural, urban-urban and migration out of B.C. - for the province of British Columbia across cohorts. Conceivably, some policy makers might be

more interested in the remaining types of migration (other than the urban-urban), considering that they are more relevant to addressing the uneven geographical distributions of immigrants. Nevertheless, identifying the push/pull factors related with urban-urban migration could also shed new light on the other types, since the processes of decision making are very likely to share common attributes across the different forms of mobility.

The IMDB contains detailed information on initial landing locations, immigrant admission categories, and many other demographic characteristics of new immigrants upon arrival in Canada, such as knowledge of the official languages, occupational skills, and highest education levels. In addition, the IMDB tracks immigrants on an annual basis, collecting information on many demographic and economic attributes prior-migration/emigration such as income by source, family structure, educational activities, and employment status. By linking IMDB data with the Census information at the level of census sub-division, we are able to factor in the community-level characteristics before migration, such as the ethnic concentration of immigrants, labour market situation, community education level, housing price, etc.

Immigrants admitted to Canada under different categories might exhibit quite different characteristics and migration patterns within Canada. Therefore, we control for admission category in our models and we focus on principal immigrant applicants and their spouses/common-law partners whose immigration application was processed abroad and who landed in Canada at ages that range from 20-65 (inclusive). We exclude the dependents of immigrants from the sample. The unit of analysis for this paper thus includes principal applicants and their spouses/common-law partners, who either file taxes or are identified from their family members in the tax file.



Note that there is no variable recording the ethnicity of immigrants in the IMDB dataset. Instead, we use the country of birth to approximate ethnicity.<sup>6</sup> We include the following ethnic groups in our analysis: Chinese<sup>7</sup>, Indian, South Korean, Filipino, Italian, German, Polish, Portuguese, Vietnamese, Ukrainian, Russian, Sri Lankan, Romanian, and Iranian. To measure the extent of ethnic clustering, we employ the indicator of an ethnic enclave following Bobo et al. (2000), which takes the 10% of population by country of birth as a threshold.

### **Sample Summary Statistics**

Table 1 provides some basic descriptive statistics on immigrants from each cohort in British Columbia. For each covariate, two samples are considered: 1) immigrants who have moved across CSDs over the 5-year tracking period, and 2) immigrants who have stayed in the same location within the 5-year window.

\*\*\*\*\*Table 1 about here \*\*\*\*\*

Since an unconditional comparison of sample means could not capture the overall migration pattern, here we provide some basic sample characteristics. Most statistical evidence is consistent across cohorts. Overall, roughly 21% to 24% of immigrants moved across CSDs over each 5-year period. The average age is lower for immigrants of each cohort who move from one CSD to another than that of immigrants who stay at the same places, implying that younger immigrants tend to migrate through those years. Lower percentages of migrants are female or married, and these groups also spend fewer average years in Canada since landing compared to their counterparts who are non-migrants. On average, migrants have fewer children than their non-mobile peers. In contrast, among immigrants who have moved over the tracking time, higher

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<sup>6</sup>Warman (2007) also used the country of birth information to generate the ethnic enclave variable.

<sup>7</sup>People from Hong Kong, Taiwan and Macao are also included in the Chinese group.

percentages attended school in the first year, and this pattern is fairly consistent across cohorts. However, in terms of percentages of immigrants living in ethnic concentrated locations, mixed results are shown across cohorts between movers and stayers. Particularly, in the 1996 cohort, immigrants who lived in non-ethnic clustered communities made up a higher proportion of immigrant movers than immigrant stayers, while this trend is reversed in the latter 2001 and 2006 cohorts.

The summary statistics of education attainment in Table 1 suggest clear differences in human capital between migrants and non-migrants. Higher percentages of immigrants who are movers hold a bachelor degree or above, while lower percentages of movers have a degree below the college diploma. The opposite holds true among immigrants who have not moved over time in each cohort.

Although immigrants with occupational skill levels 1 and 2 account for the majority of the immigrant population across cohorts, there is a shift in the skills distribution of intended occupations over time. Particularly, more immigrants with skill level 1 are in later cohorts (2001 and 2006), while more immigrants with skill level 2 are in the earlier cohort (1996). Immigrants with knowledge of French only account for the lowest proportion of all immigrants in British Columbia, while Anglophone immigrants and immigrants without knowledge of either English or French make up for the largest proportion.

Preliminary statistical evidence further suggests that movers are in economically disadvantaged positions, with lower average annual total income and higher numbers living in low-income households. For example, on average migrants earn \$2500 to \$4300 less than their non-migrant peers, and this gap increases over the years. Similarly, there is a 6 to 8 percentage

points difference in the proportion of low-income immigrants between movers and stayers across cohorts.

## Methodology

### Model 1

As a benchmark, we first use a proportional hazard model to evaluate the risk of migration of immigrants while controlling for different economic and socio-demographic “anchors”. Specifically, we employ a mixed proportional hazard model with shared frailty introduced by Cox, (1972) and Gutierrez (2002):

$$h_{ij}(t | X) = \mu_j e^{X_{ij}\beta} h_0(t) \quad (1)$$

$$X_{ij}\beta = \beta_1 ESDA_{ij} + \beta_2 OC_{ij} + \beta_3 (Clustering_{ij} * ESDA_{ij}) + \beta_4 Birthcountry_{ij} + \beta_5 Clustering_{ij} \quad (2)$$

where  $i$  stands for individual and  $j$  stands for the group over which the frailty is shared.  $\mu_j$  is the unobserved heterogeneity, which is shared over the census division (CD) where immigrants were initially located and in this case it is called group level frailty. It is reasonable to assume that immigrants living in the same CD might share similar unobserved characteristics so that controlling for their initial CD helps us disentangle the true effects of the aforementioned “anchors” on mobility. *ESDA* includes a set of economic and socio-demographic “anchors” in the first tracking year since landing<sup>8</sup> (marital status; number of children; total individual income; self-employment status; knowledge of two official languages; education levels and years since migration) and community-level information at the CSD level, such as the overall unemployment rate, income, housing price, community turn-over rates, house ownership rate, and education

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<sup>8</sup> We use the prior-migration/emigration information from the first year since landing to reduce the potential reverse causality issue. Additionally, we will also employ the model of cox regression with time-varying covariates to account for the changes of some variables through time.

levels. *OC* contains other covariates (such as age and gender). Birthplace and ethnic clustering are included as controls in the model and respectively denoted by *Birthcountry* and *Clustering*.

## **Model 2**

Another test for “anchoring” effects on immigrants’ migration decisions is conducted through a non-parametric propensity score matching exercise (Rosenbaum and Rubin, 1983, 1985; Heckman et al., 1997, 1998; Dehejia and Wahba, 1999; Abadie and Imbens, 2006), which relaxes the functional assumptions in the previous models and also balances the distributions of the covariates between participants and non-participants (Heckman et al., 1997). In this paper, we specifically look at differences in mobility between immigrants grouped by the following scenarios: 1) single immigrants and those in a married/common-law relationship; and 2) immigrants who are in low-income families and those who are not. We chose these cases as they did not provide sufficient information on causality under the semi-parametric hazard model analysis.

The treatment effects of each case are the marital status and the initial low income status. For each case, we first compute the propensity score of treatment:

$$p^* = \Pr(\textit{treated}|\mathbf{X}).$$

$\mathbf{X}$  here include variables of years since migration, ethnic enclave, birthplaces, educational attainment, gender, immigration class, occupational skill levels, self-employment and school attendance indicators. Then, nearest neighbour one-to-one caliper matching with common-support is conducted based on the estimated propensity score. A significant difference in the proportion of immigrants who have migrated between the matched treatment and control groups will give a direct indication of the “anchor” effect due to each treatment variable.

The propensity score matching is based on the conditional independence assumption. This assumption states that the assignment to the treatment group is not confounded if it is conditional on a set of pre-treatment covariates. It rules out any systematic selection into levels of the treatment based on unobserved characteristics correlated with outcomes. If the assumption is violated, the matching results will not be robust to hidden biases. Although we are unable to identify whether the independence assumption is violated, we can check the sensitivity of the average treatment effect on the treated to the potential deviations from the assumption by conducting the test proposed by (Rosenbaum, 2002; Aakvik, 2001; Caliendo et al., 2005; DiPrete and Gangl, 2004), which provides evidence on whether the significant results depend on the untestable assumption.

### **Results from Cox Proportional Hazards Model**

The risk of migration for B.C. immigrants is measured using a mixed proportional hazard model. The model controls for a rich set of information linked to the decision of migration for immigrants from B.C. The analysis is conducted respectively for three tax filing cohorts (1996, 2001 and 2006). Table 2 lists the estimated coefficients on some of the selected variables from the hazard model.

\*\*\*\*\*Table 2 about here\*\*\*\*\*

Consistent with conventional wisdom, the results in Table 2 provide many stylized facts related to the migration decisions of immigrants. In particular, older immigrants and female immigrants are less mobile, and being in a married/common-law relationship is negatively correlated with the probability of migration across CSDs. Having more children is also seen to be a significant “anchor” to restrict immigrants in their current residential locations. Further, if

immigrants initially landed in British Columbia, it is more likely that they will stay in the same CSD over the 5-year tracking period for each cohort. However, except for the number of children effect on mobility risks of immigrants living in non-ethnic enclaves, all the aforementioned mobility “anchors” experience decreasing inhibition impact across cohorts from 1996 to 2006. On the other hand, attending Canadian schools is related with higher risks of mobility in the following five years for immigrants in B.C. and the “pushing” effect rises across cohorts. One possible explanation that could contribute to the cohort differences in the magnitude of the “anchor” and “oar” effects across cohorts could be the deteriorating economic environment from 1996 to 2006. Under depressed economic conditions, one would expect that immigrants’ migration decisions are mainly driven by economic factors and they will be more likely to ignore the demographic “anchors” in pursuit of economic benefits.

There are distinct patterns in how educational attainments are associated with migration patterns between the first two cohorts (1996, 2001) and the 2006 cohort. Specifically, compared to immigrants with a high school degree or lower, immigrants having obtained a bachelor or graduate degrees at the time of landing are more likely to be observed to move around in the first two cohorts of 1996 and 2001. However, no significant differences in mobility are shown among immigrants with different educational achievement in the 2006 cohort. Over the period spanning from 2006 through to 2010, low-educated immigrants were equally as mobile as their high-educated peers, which is not the case for the previous cohorts. One of the consequences of the 2005-2008 oil boom in Alberta is the labour shortage of low-skilled workers, which could explain part of the differences in the mobility patterns between educated and uneducated immigrants across cohorts.

The significant positive estimates of low-income status tell us that economic disadvantages in the initial year are associated with higher likelihood of migration in the following years. Furthermore, the positive impact of low-income status on mobility increases dramatically from 1996 to 2006 for immigrants living in non-ethnic regions, which supports our previous hypothesis that immigrants are more likely to move around in a weak economic environment to look for better jobs. Immigrants living in regions where many co-ethnic immigrants cluster do not, nevertheless, show this pattern across cohorts.

In addition, the impacts of many demographic and economic factors on the probability of migration of immigrants vary, in terms of either signs or magnitudes, according to whether the immigrants live in an ethnic community. For example, married immigrants in enclaves are much more mobile than those married immigrants in non-ethnic concentrated CSDs, although married immigrants living in the ethnic communities are still less mobile than their single counterparts. This is consistent with our hypothesis from the introduction that part of the married immigrants in ethnic enclaves are more likely to move to other regions to exploit economic opportunities relative to their single peers because they have their family companions and are less likely to feel isolated in non-ethnic regions. Interestingly, similar patterns are found for the gender variable with women in enclaves being more mobile than women in non-ethnic concentrated communities.

Furthermore, the impact of economic factors (low-income status) on mobility gets stronger for immigrants living in co-ethnic concentrated CSDs than for those living in areas with fewer compatriots, which could be explained by the possibility that although many social facilities are provided by ethnic-enclaves (such as local amenities, ethnic networks, etc.),

economic well-being could potentially offset all these demographic “anchors” in terms of making migration decisions. In contrast, the differential impacts of children and age on mobility between immigrants in co-ethnic areas and those in non-enclaves depend on the number of children they have and their age. In particular, for immigrants residing in ethnic enclaves who are older than 15 years old or for those who have more than two children, the inhibition effect is stronger relative to the effect for their counterparts living in non-ethnic communities.

Finally, two interesting community-level mobility related facts are suggested by the rest of the estimates in Table 2. First, immigrants living in a poor area with a higher proportion of people in low-income families are significantly less likely to migrate across CSDs. The existence of this negative peer effect requires further exploration, and could stem from two sources: 1) living with people in similar disadvantaged economic positions may make people at once more dependent on support networks and more likely to find such support within their group, so that they have lower incentives to move to another place; and 2) immigrants with lower earnings could be generally less mobile and they self-select themselves to live together. To further disentangle the two mechanisms, we need to focus on identifying whether there is a causal effect of low-income status on reduced mobility. If it is found to exist, it is very likely that it is the negative neighbourhood effect that contributes to the lower mobility in the poor regions. At least, the higher the unemployment rate is in the area, the more likely it is that immigrants living in this region will move to other places, while holding all other factors constant. This effect is much more pronounced in the last two cohorts, and could also be explained by the fact that since early 2000 many other areas such as Alberta underwent dramatic economic developments, and thus there is an uneven labour demand across regions in Canada. To test this prospect, we will



specifically investigate the causal effect of one demographic factor (marital status) and one economic element (low-income status) using propensity score matching below.

### **Results from Propensity Score Matching**

Canadian immigration policy has put great weight on the family category of admission. Preliminary duration estimates show that being married or in a common-law relationship is negatively related with mobility. The extent of this negative role and the possible explanations for this phenomenon require further exploration. To better assess causality between marital status and migration decisions, for each tax-filing cohort of immigrants in British Columbia married/common-law immigrants are matched with immigrants who are single by a propensity score (PS). The propensity score is predicted from a logit regression of marital status on a group of covariates documented in the methodology section. Based on the matched sample, the weighted differences in the probability of migration across CSDs between the treatment and control groups (married vs. single immigrants) are calculated and the results are presented in the top panel of Table 3. Further, considering the evidence that there are differences in mobility patterns between the married population living in ethnic and non-ethnic enclaves, the same matching process is repeated on sub-samples of immigrants who live in an ethnic clustered CSD of B.C. and also on those who are from a non-ethnic enclave in B.C. Table 3 sequentially lists the matching results on the two sub-samples in the second and third panels.

\*\*\*\*\*Table 3 about here\*\*\*\*\*

The undertaken causal analysis captures cohort specific local effects and is used to clarify the effect of being married in the migration of immigrants. We find that married immigrants in British Columbia are significantly less mobile than their single counterparts. This pattern holds

across the three tax-filing cohorts, with the highest effect for the 1996 cohort and the lowest effect for the 2001 cohort. As expected, marriage serves as an “anchor” to hamper migration behavior of immigrants while other factors held constant. During the “IT bubble” period (1996-2000 cohort), the “anchor” impact of marriage reaches to its maximum of around 8%, indicating that married immigrants are less likely to migrate than immigrants who are single by around 8 percentage points over this time period.

These results are eminently plausible, since the relocation of married immigrants entails moving not only a spouse, but also often children. In contrast, it is much easier for a single immigrant to move because he/she only needs to consider his/her own interests in the relocation process. Hence, the pecuniary costs of moving might be higher for immigrants in a relationship than for their single counterparts. If we consider migration as a way of relocating labour to places where more employment opportunities are available, in an economic boom, when jobs are more readily available everywhere, migration should be less frequent than it is in a recession period. Conversely, immigrants might shift more weight to their “social anchors”, such as marriage, when making migration decisions under a prosperous economic macro environment. Therefore, it makes sense that we have observed the highest effect of marriage on anchoring immigrants only for the 1996 cohort, as this was in the midst of the IT boom.

The “anchor” effects of marriage on mobility in non-ethnic clustered communities are estimated to be between 5% and 7%, while the estimates for ethnic regions are 5% to 11%. For the 1996 cohort, married immigrants residing in ethnic enclaves are around 11 percentage points less likely to move to other areas compared to their single counterparts. This represents more than two thirds of the effect for those living in non-ethnic regions. Nevertheless, for the 2001 and 2006 cohorts the marriage anchor restricts the mobility of immigrants to their original residence

place regardless of whether their original CSD is an enclave or not. This shows again that better economic environment is correlated with higher demographic “anchor” impacts.

Another test is to examine whether low-income status plays a significant role in driving the migration decisions of Canadian immigrants. Correspondingly, the propensity score matching techniques are employed on the low-income status and the results are outlined in Table 4.

\*\*\*\*\*Table 4 about here\*\*\*\*\*

Across each tax-filing cohort, low-income status is a significant driver of mobility. The magnitudes of the effects range between 3.1% to 4.2%, suggesting that immigrants under the low-income cutoff have mobility rates of 3.1 to 4.2 percentage points higher than their counterparts who are not in the low-income status. The highest impact of low-income on migration is observed for immigrants in the 2006 cohort, while the lowest effect is for the 1996 cohort. This evidence is consistent with our hypothesis that when labour market conditions are more favorable under a prosperous macro-economic environment, it is less likely that immigrants will migrate to another region for economic benefits.

Next, we conducted the propensity score matching analysis of low income status on immigrants with different educational attainments. Interestingly, the patterns of mobility among different education groups in response to low-income incidence change dramatically from the 1996 cohort to the 2006 cohort. In the 1996 cohort, immigrants with the highest education achievement (Bachelor or above) are most responsive to low-income conditions in terms of migration, with a propensity of moving of 2.9 percentage points higher than that of their counterparts who are not in low-income. However, in the 2001 cohort, immigrants with a college degree rank the first and those with a bachelor degree or above rank the second in their mobility

responsiveness to low-income. Surprisingly, in the last cohort, the least educated immigrants are the most responsive to low-income conditions. This could be explained by the rising labour market demand for the low-educated population in the oil-stimulated areas. It is possible that highly educated immigrants are more active on searching for economic opportunities across different regions to gain upward mobility, and therefore it will take longer for them to find opportunities when the economy is not running well. However, when economic opportunities are present and are well-recognized by people, immigrants with different education backgrounds are equally mobile in order to capture the economic benefits.<sup>9</sup>

## **Conclusion**

In this paper we identify some of the individual and community-level determinants of secondary migration among three immigrant cohorts. We find distinct mobility patterns based on whether immigrants settle initially in ethnic communities. Our findings suggest that self-selection may have an effect on the migration decisions of immigrants, rather than other observed factors related to cohort, residence, or access to services. Longitudinal analysis that assesses location-related outcomes needs to take these selection issues into account.

First, we find that, under depressed economic conditions, migration decisions are largely driven by economic factors, and that socio-demographic factors like marital status are less consequential. Conversely, when economic conditions are better for immigrants, they will be more likely to consider socio-demographic factors when they make migration decisions. These findings are consistent with the work of others, such as Hou (2007) and McDonald (2004).

The strength of economic factors (such as low income prevalence) on mobility is stronger for immigrants living in co-ethnic CSDs than it is for those living in areas with fewer co-ethnic

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<sup>9</sup> We tested the robustness of our results, we employ the Rosenbaum bounds test (DiPrete and Gangl, 2004; Rosenbaum, 2002). Results from these tests are available from the authors upon request.

residents. In some studies, these disparities are explained by looking at time of arrival, where more recent arrivals are expected to cluster in co-ethnic neighbourhoods, and less recent arrivals will be more dispersed. Since we are comparing immigrants within the same arrival year, however, duration can be eliminated as an explanation, implying that other factors are driving the trends. It is possible, for example, that despite many of the social facilities that are provided by the ethnic enclaves, such as local amenities and ethnic networks, economic well-being is a higher priority for those with low income, which could offset all these demographic “anchors” in terms of making migration decisions. It is an area worthy of further study.

Another disparity between residents in enclaves versus non-enclaves concerns education, with mobility increasing along with educational attainment among the two more established cohorts, and no discernable trends among the most recent cohort. It is possible that highly educated immigrants are more active in searching for economic opportunities across regions, but that there are credential recognition issues among recent arrivals. Another possibility is that emerging opportunities for low-skilled labour (like those in neighbouring Alberta) have levelled the field across educational groups between cohorts. This could explain why the differences in the mobility patterns between educated and uneducated immigrants diminish with each successive arrival cohort.

One of the more novel findings in this study concerns the differences between married and non-married individuals. We find support for our hypothesis that married immigrants in ethnic enclaves will be more likely to move to other regions to exploit economic opportunities relative to their single peers. Single individuals are more likely to remain in their enclaves. A possible explanation for this disparity is that married individuals have a ‘built-in’ social network at home, thus reducing the utility of an enclave. That said, children counteract this effect,

presumably because parents will once again value the tangible benefits that living in an enclave can provide, such as co-ethnic children's activities, schools and events. It is interesting to see that (presumably single) women are more likely to leave enclaves than are men, although we are not certain why this trend exists.

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