

Tracking the Interregional Mobility of Recently Arrived Refugees in Canada: Data Snapshots from the IMDB ¹

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Abstract

Using data from the Immigration Database (IMDB) which links tax-filer information to provinces of landing and their current provinces of residence, the purpose of this study was to track the interregional mobility among three cohorts of refugees arriving to Canada between 2000 and 2013. The refugee sample consisted of approximately 181,000 individuals comprising government assisted, privately sponsored, landed in Canada and refugee dependants. Selected data snapshots allowed for the tracking interregional mobility in three domains: origins and destinations, movers and non-movers and the social demography of refugee flows. Confirming previous studies, the tracking of the first domain revealed favourable gains in the Prairies region (Alberta in particular) though Ontario and Quebec also benefited from migratory interchanges. Analysis of mover and non-mover domains also suggests that refugees were a very mobile group compared to other non-refugee classes, particularly within the first ten years after arrival in Canada. Investigation of the socio-demographic composition of flows identified five major flow types which were defined by refugee categories, age, gender, birthplace, education and the geographical area where the migratory interchanges occurred. The study suggests that some newly arrived refugees will eventually embark into "long distance" interregional migration a few years after arrival bringing settlement challenges to both the sending and receiving regions.

Keywords: Regions, Refugees. Mobility, Canada

Introduction

Between 2000 and 2013 approximately 382,000 refugees were admitted to Canada. They represented an estimated 11% of the total permanent resident intake of immigrants (CIC, 2014). More recently, over 31,000 Syrian refugees were accepted as permanent residents between November 4, 2015 and September 25, 2016 ². Canada's international obligations and domestic policy regarding humanitarian protection of refugees and international obligations is reflected in section 3(e) of the *Immigration and Refugee Protection Act (IRPA)*, which promote a successful integration of all refugees, recognizing that this integration involves mutual obligations for new immigrants and the Canadian society. Under Canada's present immigration criteria, three types of refugees are currently admitted as permanent residents. In contrast with skilled applicants or family class immigrants who are admitted either by the point system, *government assisted refugees (GARs)* or *privately sponsored refugees (PSRs)* are resettled through a series of programs which promote a quick integration into the Canadian labour market. Asylum, or landed in Canada refugees (LICs) is the third refugee category and refers to individuals who have applied

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² Source: www.cic.gc.ca/english/refugees/welcome/milestones.asp, retrieved Oct 1, 2016. The author would like to express its gratitude to Statistics Canada's Social and Aboriginal Statistics for providing the data and guidance during the research process.

for refugee status within Canada.

Canada's five major geographical regions (Atlantic, Quebec, Ontario, Prairies, and British Columbia) are important macro-contexts for refugee settlement. These regions are hubs for labour force markets, industry, trade, commerce and significant demographic concentrations. Metropolitan centers such as Toronto (Ontario region), Montreal (Quebec region) and Vancouver (B.C. region) offer a wide range of social and economic opportunities, which are highly attractive to both refugees and other immigrant groups. In 2011, 53% of the foreign-born population resided in Ontario. Large concentrations of immigrants were also present in British Columbia, Quebec and the Prairie regions (18%, 14% and 13% respectively).

Why do newly arrived refugees become interregional movers ³? Refugees may be regarded as social actors whose migration decisions occur within very constrained choices (Richmond, 1988). In order to cross regional boundaries, refugees must mobilize considerable financial and social resources and overcome significant distance, institutional, and even linguistic related barriers. If opportunities in cities or towns within their regions are scarce, refugees may embark on “long-distance” migration across their host countries (Aslund and Olof-Ruth, 2007). Migration decisions of refugees in their new countries are said to be closely tied to the “perceived” costs and benefits of moving elsewhere (Spilerman, 1972; Courgeau, 1995; Zavodny, 1999). Costs may range from losing access to local welfare, housing and social services to leaving established social networks and government or sponsors' support. Benefits may include better, higher paying jobs and being closer to co-ethnics residing in the major urban centers of the host societies (Dahl and Sorensen, 2010).

Compared to the native born and other immigrant groups, refugees may also react differently to various “push” and “pull” factors which “repel” and/or “attract” certain individuals to particular geographical regions (Bogue, 1977; Rashid, 2009; Piil Damm, 2015). Compared to other immigrants, refugees struggle more with local labour market conditions, scarcity of jobs and longer spells of unemployment (Hiebert, 2002, Devoretz, Pivnenko and Beiser, 2004; Shields et al. 2010; Amireault et al. 2013; Yu et. al, 2014). Two of *Citizenship and Immigration Canada's* evaluation reports indicated that high unemployment and lower wages represent significant economic integration challenges facing recently arrived refugee groups (CIC 2004, 2007). Compared to PSRs, GARs reported experiencing longer periods of unemployment, relying more heavily on income assistance programs (CIC, 2007). Asylum refugees (LICs) also face unique challenges as many had to wait longer periods for their status determination without timely access to employment services.

Regional business cycles have been linked to post-arrival refugee migrations in Canada (Orrenius and Zavodny, 2009 Okono-Myers, 2010, vanHuystee and St. Jean, 2014). Prior to the fall of oil prices, resource-rich Canadian provinces such as Alberta and Saskatchewan have experienced economic “booms” leading to increased in-migration of skilled and non-skilled labour from the Atlantic Provinces, Quebec and Ontario. Demographic literature also suggests that the presence of family, friends and co-ethnics is suspected to operate as triggers to regional out-migration (Jaeger 2000, Chiswick and Miller 2005). The large metropolitan areas located in geographical regions where co-ethnics are concentrated constitute residential “magnets”

³ It should be noted that mover counts observed over a given period of time depend on the administrative unit that is chosen. While the majority of regional movers may be individuals moving across the country, those regarded as regional non-movers may be, in fact, intra-city movers, inter-city movers, inter-provincial movers and also residential “stayers”. However, focusing on regions rather than individuals or smaller administrative units provides important information on how immigrants are redistributed across the larger hubs of labour markets, industry, trade, commerce and demographic concentrations.

for refugees and other types of immigrant class members (Nogle, 1994; Lin, 1998; Finnie, 1999;; Houle, 2004; Hou, 2011; Bonikowska et. al. 2015; Martel, 2015).

Given the heterogeneity of social and economic backgrounds, it is not unrealistic to expect differences in the patterns of interregional mobility among refugee groups compared to other immigrant groups. There are several important research questions that appear relevant for the tracking of this movement. For instance, what is the general picture of refugees' interregional mobility since 2000? Does interregional mobility increase after arrival to Canada? Is this interregional mobility similar for government assisted compared to those who were privately sponsored or landed in Canada? Looking at inflows and outflows, what were the distinctive characteristics in terms of socio-demographic characteristics of refugees participating in them? What have we learned from the historical experience of refugees' interregional migration experience between 2000-2013? Focusing on three cohorts of refugees arriving between 2000 and 2013, this analysis utilizes tabular data from the Canadian "Immigration Database" (IMDB) to track refugees' geographical mobility during this period to provide a historical summary and address these important research questions. The analytical approach to the IMDB data consisted in selecting key data domains or snapshots "frozen" at specific points in time (e.g. tax observation years) to summarize major ongoing trends. Three tracking domains are examined in the paper: 1) origins and destinations, 2) movers and non-movers and, 3) socio-demographic composition of regional flows. The first aspect is important because it provides information on the pace of migration and the typical "winners" and "losers" of migration interchanges. The second one informs the propensities of certain groups to become regional movers or nonmovers. The third aspect provides information on the types of refugee inflows and outflows and their varying compositional characteristics: age, gender, educational level and/or birthplace related backgrounds.

Data and Methods

The IMDB database is an ideal dataset to study the migration behaviour of taxfilers in Canada (Statistics Canada 2012, Vachon, 2007). The refugee sample used for this analysis is drawn from an IMDB special table which included information on refugee categories and their intended province/region of landing, province/region of residence, tax year, gender, levels of education at entry and selected regions of birth. The table provided information for three arrival cohorts of refugees (2000-2004, 2005-2009 and 2010-2013) observed at three tax years of reporting (2004, 2009 and 2013 respectively). Seven regions of landing were included in the data: Atlantic, Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia⁴. Refugee categories in the IMDB comprised refugee subcategories such as Government Assisted (GARs), Privately Sponsored (PSRs), Landed in Canada refugees (LICs) as well as refugee dependants. Though the IMDB table included a breakdown of geographical mobility by CMA and non-CMA destinations for the province of current residence it did not do so for the province of landing making it impossible to identify specific inflows and outflows of CMA vs. non-CMA areas of the country.

⁴ Note: Some Canadian provinces are treated as regions in this report.

The present analysis was limited to recently arrived refugees who were 25 to 64 years old upon entry to Canada. This age range was deemed optimal to study migration behaviour. The operational definition of geographical mobility used was the reporting of any *discrepancy between the reporting of the intended region/province of landing at arrival and the current provincial/regional residence at the time of tax reporting*. Multiple landing-residence (L-R) matrices were calculated for different arrival cohorts, refugee categories, and tax years of reporting. Each matrix consisted of migration flows presented in 49 cells (7 x 7 origin-destination regions). Analysis of the magnitude and composition of refugee flows was performed using a combination of social network graphing, principal components analysis and k-means classification clustering procedures.

Arrival Cohorts

The observed counts of the refugee arrival cohorts were as follows: 67,000 for the 2000-2004 arrival cohort, 66,660 for the 2005-2009 arrival cohort and 47,265 for the years 2010-2013 one. These produced a combined total of approximately 181,000 refugees. The combined counts of refugee sub-groups among the three arrival cohorts were the following: 39,895 GARs (22%), 25,179 PSRs (14%), 98,705 LICs (55%) and 17,155 dependants (9%). With regard to gender composition, males were more commonly found in the first arrival cohort (53%), equally distributed in the second (50%) and appeared slightly less than females in the third (49%). Refugee cohorts were composed mostly of individuals aged 25-34 years at the time of landing: 47%, 44% and 41% respectively. Refugees from the Asia-Pacific Region were the majority in the first cohort (38%) followed by those of the African Region (24%). This distribution was similar among members of the second cohort: 32% and 24% respectively. In the third most recent arrival cohort, however, the share was almost equal among those from the Middle East, Asia-Pacific and African region (22%, 24% and 27% respectively). In terms of levels of education, the majority of refugees in the arrival cohorts had only high school education or less at the time of entry to Canada: 54% among the first cohort, 52% among the second and 53% among the third one. In terms of official language proficiency, about 40% of the refugees of the first cohort did not have any proficiency in English or French at arrival. The corresponding percentages for the second and third arrival cohorts were 31% and 30% respectively.

Domain Tracking

1. Origins and Destinations Snapshots

Using social network graphing⁵, figures 1 to 4 display selected mobility networks by seven regions observed at the three tax observation years 2004, 2009 and 2013. Individual cohort counts for networks were aggregated cumulatively allowing for inspection of changes in the network configuration over time. In the heptagon-shaped graphs, the nodes represent the seven regions while the numbers associated with the lines represent the population moving across regions. Numbers closer to an edge are in-migration flows directed from a particular reference edge, and those underneath the nodes represent nonmover

⁵ Social network graphs are graphical devices used to detect and interpret patterns of links or ties among "actors" (deNooy et.al. 2005)

populations who have not changed their residence since the time of landing. Circles and arrows in the graphs represent mover counts of significance to the mobility network.

An examination of the mobility patterns of Figures 1 to 3 for the IMDB arrival cohorts suggests a progressive build-up of migration from Quebec to Ontario followed by a convergence of regional moves directed towards Alberta in subsequent mobility phases. The mobility network of Figure 1 indicates that the movement of refugees from Quebec to Ontario was the dominant pattern of interregional mobility occurring between 2000 and 2004 (observed at tax year 2004). Approximately 2,300 refugees moved from Quebec to Ontario while about 300 moved in the opposite direction. Other, less significant flows were found with the exception, perhaps, of those directed from Ontario to Alberta (about 560 movers). By tax year 2009 (Figure 2), almost 3,800 refugees had already moved from Quebec to Ontario while 3,600 did so from Ontario to Alberta, 1,900 from Quebec to Alberta and an additional 1,300 from Manitoba to Alberta. By tax year 2013 (Figure 3), the latter dominant mobility patterns became more firmly entrenched. Close to 4,700 refugees had already moved from Quebec to Ontario while the movement of refugees from Quebec, Ontario and Manitoba to Alberta reached historical levels particularly in Ontario (about 5,300). The interregional mobility of refugees born in the Middle East region reflects, at a smaller scale, the bigger picture of migration of all refugees (see Figure 4). The examination of the mobility network for all three arrival cohorts entering Canada between 2000 and 2013 and observed at tax year 2013 revealed that about 400 had already moved from Quebec to Ontario and the same number from Ontario to Alberta. Also visible were interregional moves occurring from British Columbia to Ontario and Ontario to Alberta (about 300).

Overall, between 2000 and 2013, the Alberta region benefited most from the influx of immigrants, including refugees. Net migration rates or NMRs⁶ for Alberta were found to be positive in each of the three arrival cohorts (+.79, +.83 and +.79 respectively). In absolute terms, Alberta received more than 4,000 refugees from the first two refugee arrival cohorts and about 2,300 from the third one. British Columbia was also a net gainer in the first two arrival cohorts and Ontario in the first one only. This pattern was replicated within the general immigrant population with the exception of Saskatchewan in the first two arrival cohorts. The Atlantic and Quebec regions lost the most immigrants to interregional interchanges. The Atlantic region lost 3,100 refugees from the first arrival cohort, 6,400 from the second and 4,800 from the third.

The IMDB data also revealed that both GARs and PSRs contributed to positive *NMR*'s with respect to their in-migration to the Alberta region. Net migration gains of 1,400 GARs were noticeable for the 2000-2004 arrival cohort, 1,200 for the 2005-2009 cohort and 400 for the 2010-2013 one. PSR net gains for the Alberta region totaled 1,200 for the 2005-2009 cohort and less than one thousand for the other cohorts. Net gains in Ontario were attributed to inflows of GARs coming from Quebec and the Atlantic region. Positive *NMR*s for Ontario were observed for the three arrival cohorts of GARs. With respect to LICs, all Prairies Provinces and British Columbia displayed mostly positive *NMR*s for first and second arrival cohorts suggesting greater inflows to these areas for this refugee category. Alberta's net gain of LICs totaled 1,600 and 1,900 among

⁶ The formula for the net migration rate is the following: $(I-O)/(I+O)$ where I represents inflows to a particular region from others and O outflows from this region to others. Positive signs represent net gains and negative signs the opposite losses. Both I and O were calculated using information from the L-R matrices for various immigrant cohorts.

those from the first and second arrival cohorts. Patterns for dependents resembled those of the general population of refugees in terms of in-flows direction towards Ontario and the Prairie region.

Figure 1: Interregional Mobility Network of the 2000-2004 arrival cohort observed at tax year 2004

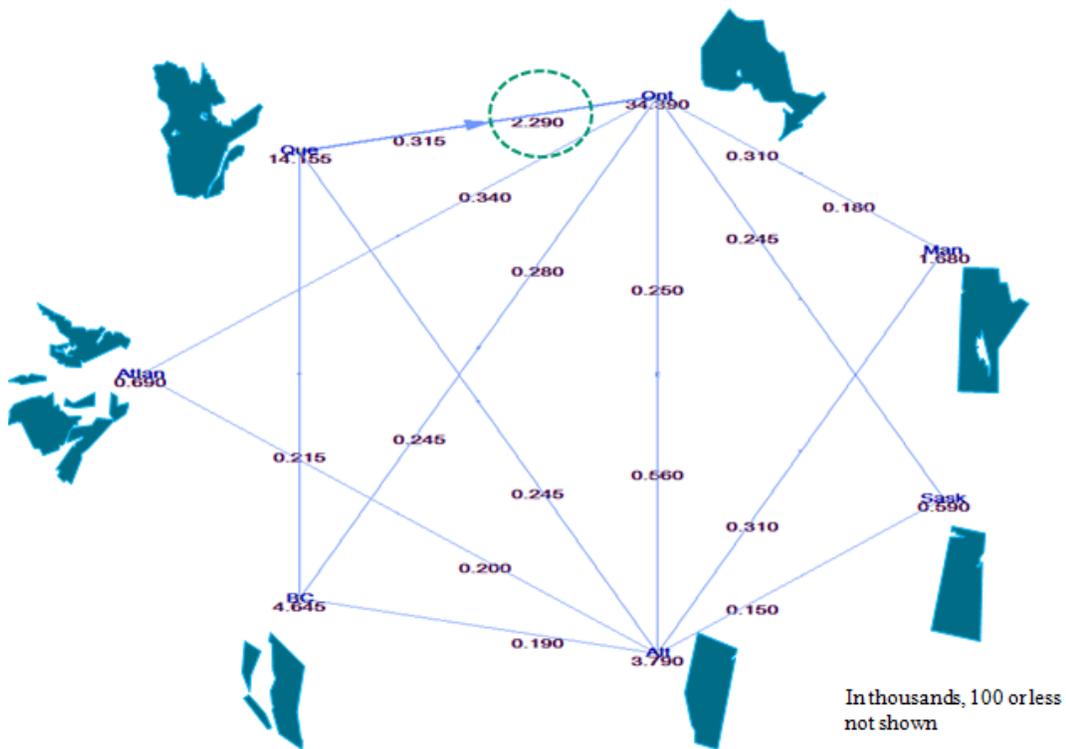


Figure 2: Interregional Mobility Network of the 2000-2004 and 2005-2009 arrival cohorts observed at tax year 2009

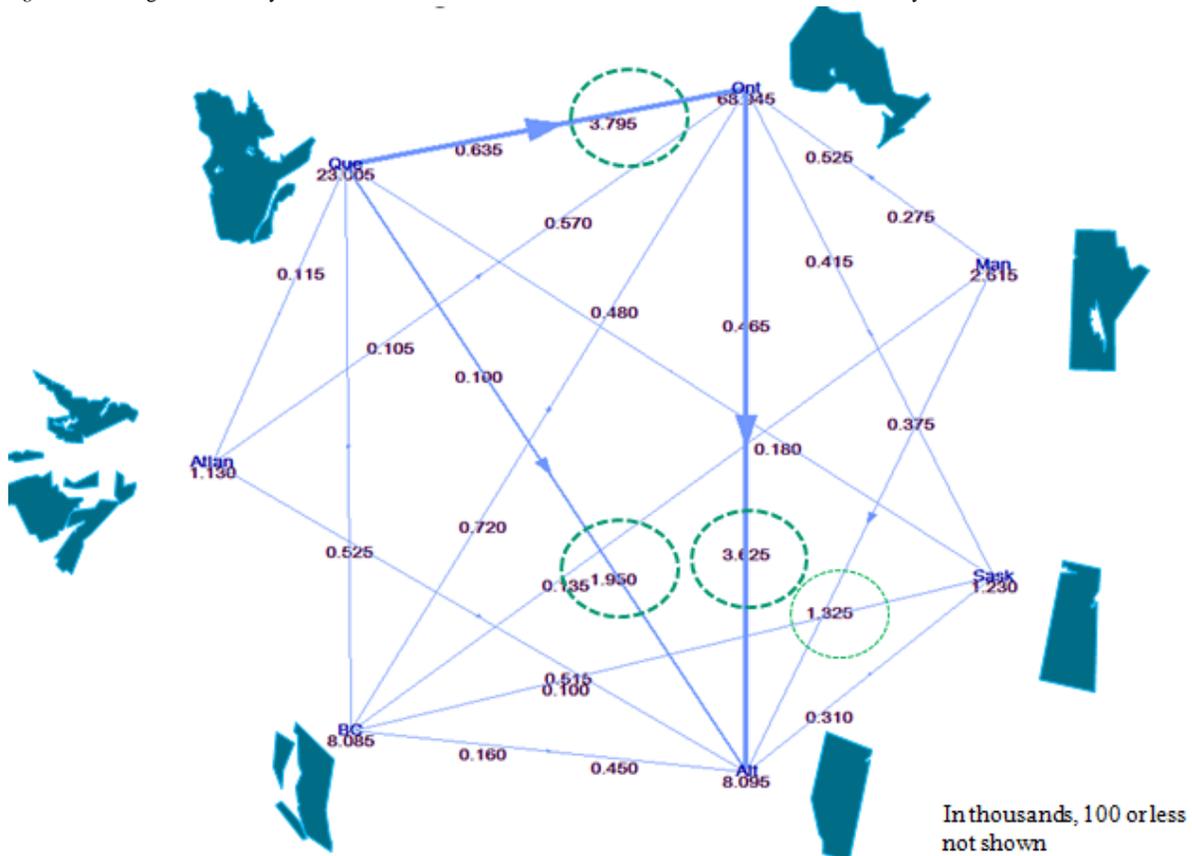


Figure 3: Interregional Mobility Network of the 2000-2004, 2005-2009 and 2010-2013 arrival cohorts observed at tax year 2013

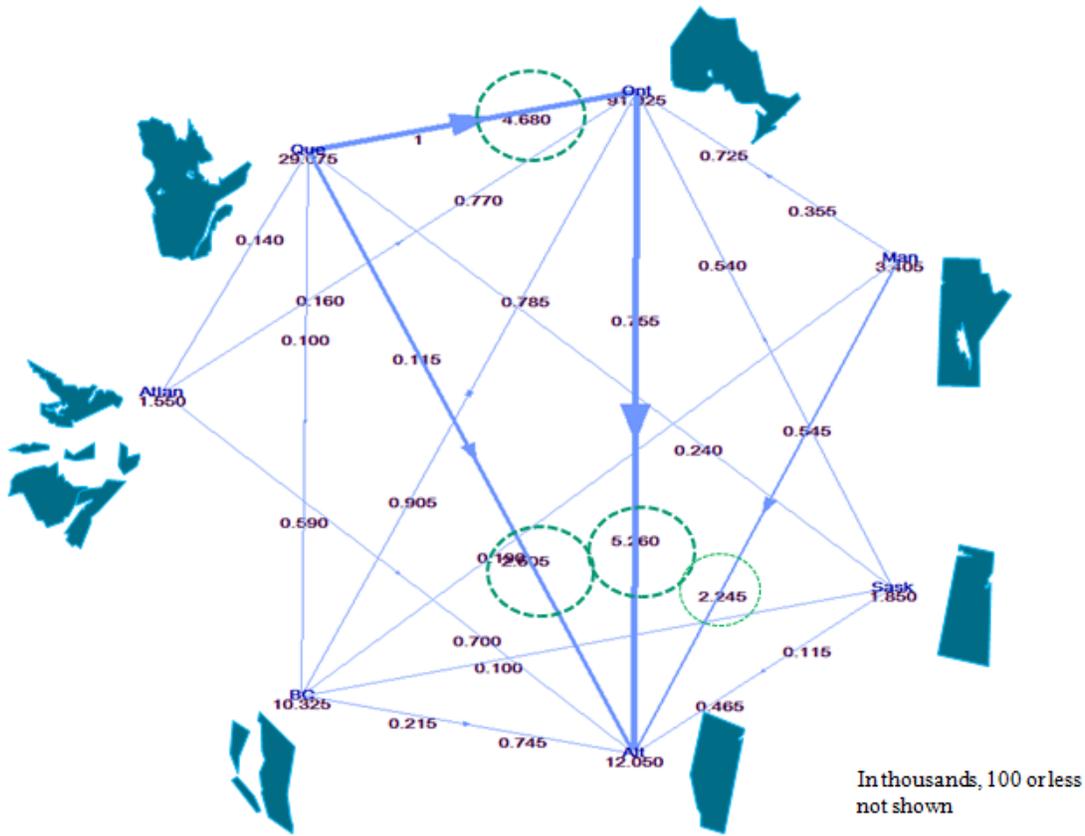
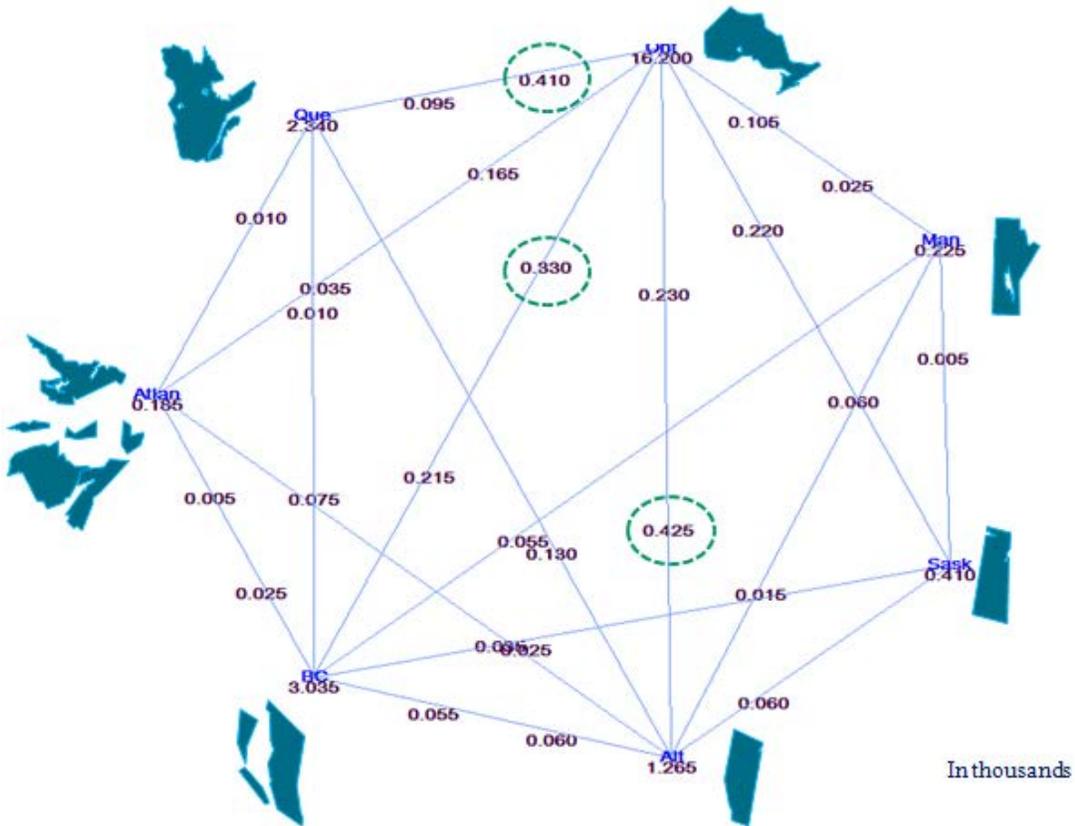


Figure 4: Interregional Mobility Network of the 2000-2004, 2005-2009 and 2010-2013 arrival cohorts, Middle East born observed at tax year 2013

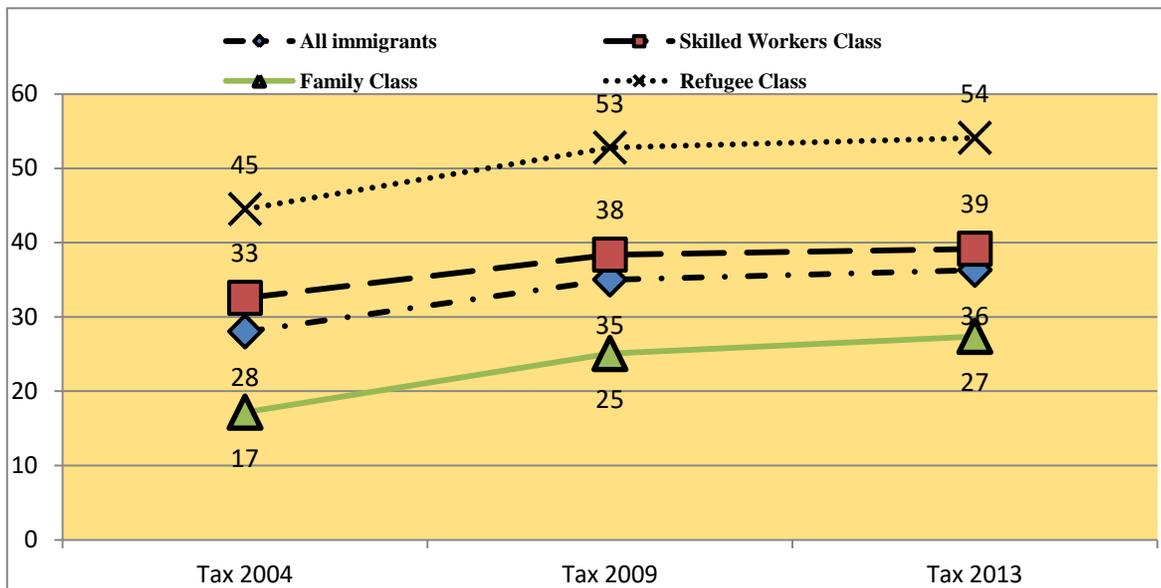


2. Movers and Nonmovers Snapshots

Another important tracking domain of the interregional migration of refugees involves looking at regional movers and nonmovers. Out of the 181.1 thousand refugees entering Canada during 2000-2013, 15% had already left their original region of landing by 2013. These percentages for the arrival cohorts were as follows: 17% for the 2000-2004 cohort, 12% for the 2005-2009 cohort and 9% for the 2010-2013 one.

To better understand this mobility, ratios of movers to nonmovers were calculated to determine how many of the original arrivals moved out from the region of landing after a certain period of time in contrast of those who stayed or not moved from the same region⁷. Movers are said to be individuals who "change their place of residence because moving benefits exceed costs, either because they have much to gain by moving or because they placed unusually low weights on the potential gains staying in their current place of regional residence " (Dahl and Sorensen, 2010). Non-movers, on the other hand, represent population segments that have decided to remain in their current residence and/or "postpone" their migration decisions.

Figure 5: Mover/Nonmover Ratios for the 2000-2004 Arrival Cohort by Immigrant Class, tax observation years 2004, 2009 and 2013



Source: IMDB special table, 2016

Figure 5 presents mover- nonmover ratios for the 2000-2004 arrival cohorts of skilled workers, family class and refugees classes observed at 2004, 2009 and 2013 years of tax reporting⁸. The ratio timeline for refugee groups suggest that these were

⁷ The formula for the movers/ non-mover ratios are: $(M/NM) \times 100$ where M is the number of regional movers and NM is the number of regional non-movers.

⁸ Tests of L-R matrices similarities for the 2000-2004 cohort at tax reporting time 2013 between refugee and other non-refugee classes such as skilled workers and family were carried out using Mantel tests. Mantel tests are inferential non parametric statistics which compute the significance of Pearson correlations through permutations of the rows and columns of one of the input matrices. Matrices were standardized in terms of transition probabilities before undertaking these procedures. The calculated Mantel r's for the refugees vs. skilled workers matrix was +.84 ($p < .01$) and the one contrasting refugee vs. family class was +.88 ($p < .01$). The skilled workers vs. family class matrices were, however, found to be dissimilar: .34, $p > .05$. In terms of the major refugee subgroup categories, these matrices were found quite similar: GARs vs. PSRs (.88, $p < .05$), GARs vs. LICs (.90, $p < .05$) and PSRs vs. LICs (.83, $p < .05$).

more interregionally mobile compared to both skilled workers and family class members. The ratio increased from 45 movers to 100 non-movers in 2004 to 54 movers to 100 non-movers in 2013. The greatest increase occurred between the 2004 and 2009 tax reporting years (18% increase) suggesting that interregional migration decisions occur more frequently within the first 10 years after arrival to the country.

Table 1: Mover-Nonmover Ratios by Arrival Cohorts 2000-2004, 2005-2009 and 2010-2013 by Region of Landing (L) observed at Tax year 2013

Cohorts/Regions	All Refugees	Government Assisted	Privately Sponsored	Landed in Canada	Dependents
2000-2004 cohort					
L:All Regions	69	75	56	46	21
L:Atlantic	230	256	125	91	10
L:Quebec	41	33	29	44	47
L:Ontario	10	20	13	8	6
L:Manitoba	107	101	120	74	10
L:Saskatchewan	157	191	91	67	50
L:Alberta	16	19	10	14	11
L:British Columbia	19	27	28	13	11
2005-2009 cohort					
L:All Regions	44	43	55	29	12
L:Atlantic	112	115	200	71	33
L:Quebec	26	27	25	25	29
L:Ontario	10	20	16	8	7
L:Manitoba	99	58	143	45	5
L:Saskatchewan	47	47	48	17	10
L:Alberta	11	11	7	12	7
L:British Columbia	17	20	29	12	7
2010-2013 cohort					
L:All Regions	27	22	31	16	2
L:Atlantic	44	49	20	18	2
L:Quebec	10	18	18	7	7
L:Ontario	5	6	10	5	3
L:Manitoba	89	33	123	22	5
L:Saskatchewan	27	20	37	38	10
L:Alberta	6	4	8	5	4
L:British Columbia	13	12	19	7	3

Source: IMDB special table, 2016

Table 1 presents mover-nonmover ratios in the seven Canadian regions, for refugee sub-groups for the three arrival cohorts. These suggest that the most mobile refugee group for the 2000-2004 arrival cohort were GARs or government assisted refugees (79 movers for every 100 non-movers). Other cohorts, such as privately sponsored refugees were more participatory in interregional migration (55 movers for every 100 non-movers and 31 movers per 100 non-movers respectively). In the earlier arrival cohort (2000-2004), ratios greater than 100 movers per 100 non-movers were observed for those who landed in the Atlantic, Manitoba and Saskatchewan regions, and were most common among those who were government-assisted refugees. The highest ratio was observed for those who were government assisted initially landing in the Atlantic region (256 movers per 100 non-movers). Among those refugees who arrived during 2005-2009, privately sponsored refugees followed, the lead of government assisted and displayed a ratio as high as 200 movers per 100 non-movers for the same region of landing. For the most recent arrival cohort of 2010-2013, ratios remained below the 100 mark except for PSRs who initially

landing in Manitoba (ratio of 123 movers per 100 non-movers). Finally, as expected, Alberta's ratios were the lowest as this was the region with the highest retention rates of the country, constituting a typical destination for different refugee sub-group categories.

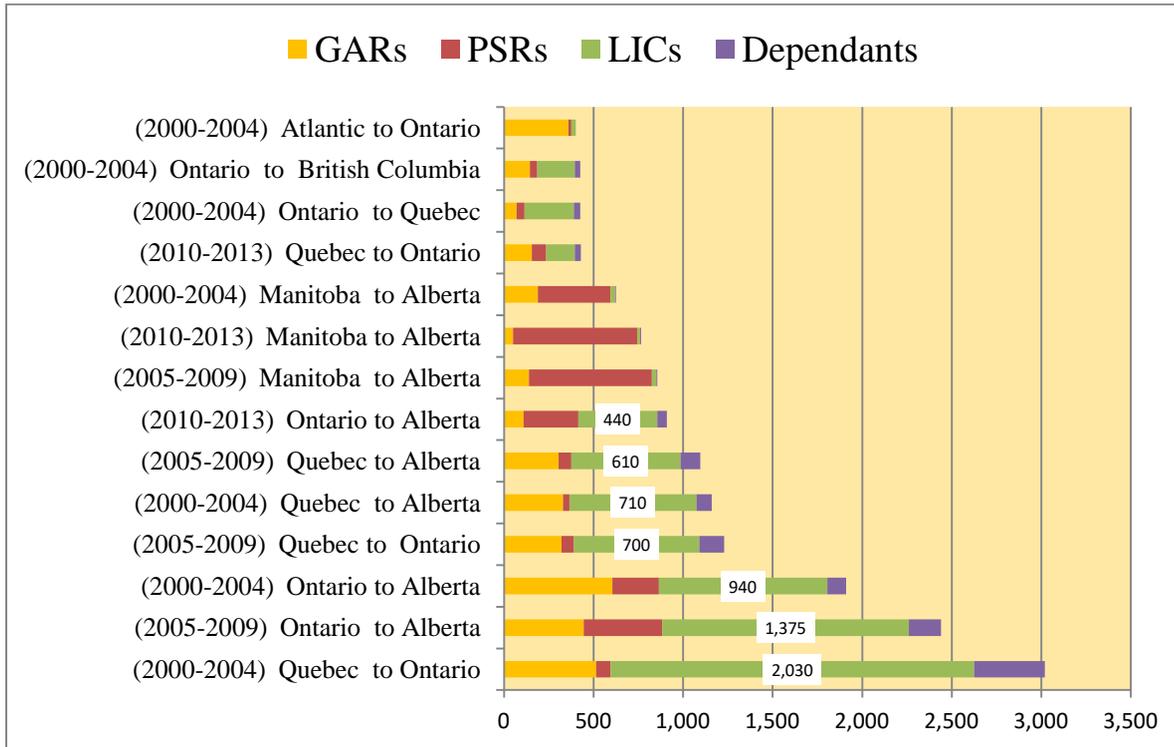
3. Composition of Flows Snapshots

An analysis of residential and socio-demographic characteristics of refugee flows was also undertaken. A total of 92 interregional flows (21 non-mover⁹ and 71 mover) were identified in the IMDB special table. The flows selected for this analysis had at least 40 observations observed at tax year 2013 to ensure enough reliable counts. Mover flows had, on average, larger proportion of males than non-movers (56% to 50%) as well as a greater share of younger individuals aged 25-34 at the time of landing (52% to 45%). In addition, mover flows indicated greater percentages of birthplaces in the African region when compared with non-mover flows (38% to 34%).

Figure 6 shows the largest of the 71 interregional mover flows for the three arrival cohorts by refugee categories observed at tax year 2013. Landed in Canada (LICs) refugees were over-represented in the largest flows particularly those from to Quebec to Ontario for the 2000-2004 arrival cohort (n=3,020) and Ontario to Alberta for the 2000-2004 and 2005-2009 arrival cohorts (n=2,440 and n=1,910 respectively). They represented about 67%, 56% and 49% of the share of these flows. Also noticeable was the presence of privately sponsored refugees (PSRs) in three flows directed from Manitoba to Alberta for the three arrival cohorts as well as that of government-assisted refugees (GARs) in the flow from the Atlantic region to Ontario for the first arrival cohort.

⁹ A nonmover flow may be regarded as a movement of individuals where the region of landing is the same as the region of tax reporting at a later date (i.e. flow directed to itself).

Figure 6: Top Interregional Mover Flows of Refugee Arrival Cohorts observed at Tax Year 2013 by Refugee Categories, arrival cohorts in parentheses.



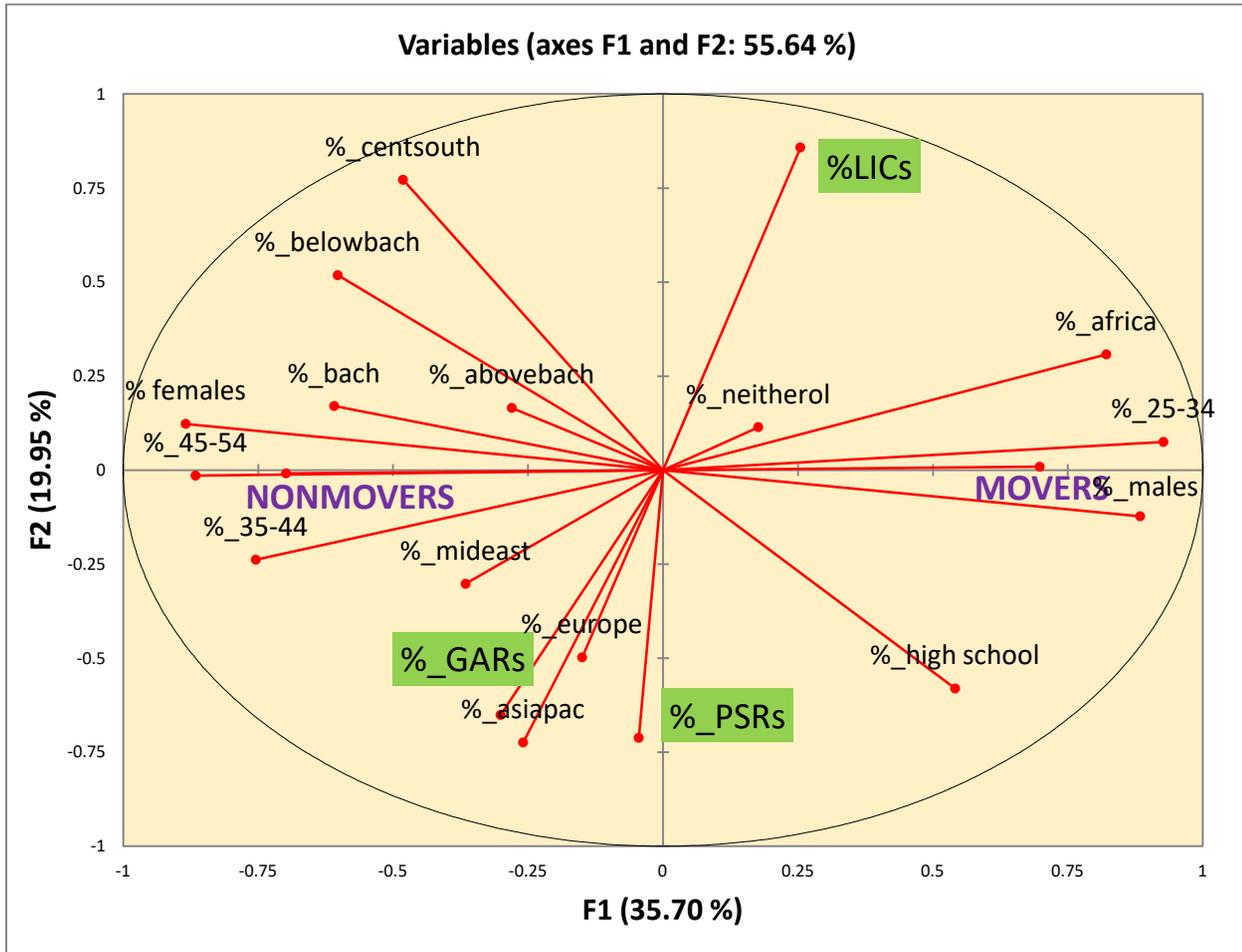
Source: IMDB special table, 2016

Principal Components Analyses (PCA) was used to identify the most important dimensions present in the composition of mover and stayer flows. *PCA* is a statistical technique that reduces data to a number of variables that progressively explain the total variation in the data¹⁰ (Joliffe, 1986). Flows were weighted by their sample size at tax observation year 2013. *PCA* analyses produced bi-plots¹¹ which provide powerful visualizations of the correlational patterns present in the flow data. Bi-plots are graphs where vectors representing indicators are presented as points in principal component space. The bi-plot of the second component on the first component (which represent the major sources of variation in the data) is particularly useful as it displays the correlations of variables in terms of indicator vectors of different magnitudes, directions and positions. Correlations between two indicator variables in component space are equal to the cosines of the angles between the indicator vectors (θ), or $r = \cos(\theta)$. Highly correlated variables are located at sharp angles from each other ($\theta = 90$ degrees or less) while those zero correlated are "orthogonal" to each other ($\theta = 90$ degrees). If variables are perfectly negatively correlated, then $\theta = 360$ degrees (vector in opposite direction).

¹⁰ These new variables, named principal components, are uncorrelated in order of their importance in explaining the total variation in the data. The number of components is typically chosen to be equal to the number of eigenvalues that are larger than one (Kaiser-Guttman criterion). Due to the mathematical property of "orthogonality" (at right angles) present in the principal components, flows were located on principal component space based on the prior knowledge of their average component scores.

¹¹ Bi-plots are graphs where vectors representing indicators are presented as points in principal component space.

Figure 7: PCA Bi-plot, dimensions related to socio-demographic correlates



Source: IMDB special table, 2016

Symbols: %_high school=% refugees with high school education in flow, %males=% male refugees in flows, %_25-34=% refugees aged 25-34 at arrival in flow, %_africa=% refugees born in the African region in flow, %_neitherol=% refugees speaking no official language at arrival, %_abovebach=% refugees with education above bachelor level in flow, %females=% female refugees in flows, %_45-54=% refugees aged 45-54 at arrival in flow, %_35-44=% refugees aged 35-44 at arrival in flow, %_mideast=% refugees born in the Middle East region in flow, %_europe=% refugees born in the European Middle East region in flow, %_asiapac% refugees born in the Asia Pacific region in flow, %_PSRs=% of Privately Sponsored Refugees in flow, %_GARs=% of Government Assisted Refugees in flow, %_LICs=% of Landed in Canada Refugees in flow

Figure 7 presents a PCA bi-plot comprising 15 indicators related to the socio-demographic composition of refugee flows including gender, age, birthplace, official language proficiency and educational characteristics¹². The first two components (F1 and F2) accounted for about 56 % of the indicators variance. Indicator vectors closest to the mover vector were those corresponding to indicators related to the % males, % aged 25-34 at arrival, %African-born, % high school education and no proficiency in official languages. Refugee flows fitting these socio-demographic profiles are more likely to be classified as interregional movers. This PCA bi-plot also indicates that indicators tapping older ages at arrival (35+), higher number of females and higher levels of education bachelor or above are strongly correlated to a membership in a non-mover type of flow. The distance between indicator vectors to the mover-nonmover axis also suggest that, compared to PSRs and LICs,

¹² This analysis found five major significant components accounting for 36%, 20%, 11%, 8 % and 6% of the total indicators' variance respectively. Component 1 loaded highly and positively with mover (+.69), % males (+.88), 25-34 years old at arrival (+.92) and African birthplace (+.82). The second component did so with respect to LICs (.86), below bachelor level education (+.52) and Central&South American region of birth (+.77). While the third component loaded highly on movers (.45) and indicators of above bachelor education (>+.40), the fourth one did so with respect to stayer flow (+.43) and European birthplace (+.63). The weakest fifth component only loaded highly lack of proficiency in Canada's official languages (.89)

GAR flows are somewhat less likely to be classified as interregional mover flows.

During the final stage of flow analysis, the five factor scores obtained for individual flows obtained in the PCA analysis of socio-demographic indicators were used as inputs for a k-means clustering procedure. K-means clustering is a non-hierarchical procedure in which each observation belongs to the cluster with the nearest mean serving as a prototype of the cluster. A k=4 and 5 solutions were tested and the latter was chosen due to its higher discriminatory power (F test=21.4 $p<.01$). The 5-fold classification produced the arrangement of flows presented in Table 2. Classes are labelled according to the magnitude and direction of class centroids ¹³.

Class 1 was comprised of 15 flows characterized by the presence of lowly educated mover types with over-representation of LICs. The prototypical flow was that of the 2005-2009 cohort movement from Alberta to Quebec. Class 2 was comprised of flows consisting of highly educated movers with a visible presence of Asia-Pacific birthplaces. The prototypical flow here was that of the 2000-2004 cohort movement from B.C. to Quebec. Class 3, consisting of 19 flows, corresponded with the characteristics of more "traditional" movers such as younger ages at arrival, males and with over-representation of African-born and GARs. The prototypical flow of class 3 was the 2005-2009 cohort movement from B.C. to Alberta. The last "mover" type of flows (23 flows) consisted of various refugee categories had a higher presence of GARs and those who had the highest percentage of individuals whose region of birth was European. The prototypical movement of class 4 corresponded to the 2005-2009 cohort movement from Atlantic to Ontario which, as seen previously, had one of the largest magnitudes observed. Finally, Class 5 (21 flows) was comprised of all non-mover flows corresponding to various arrival cohorts and regions of landing and residence. The prototypical non-mover flow of class 5 corresponded to the 2000-2004 arrival cohort, staying in the B.C region. Overall, the multivariate analysis undertaken using factor analytical and clustering techniques suggests that refugees' interregional mobility is a dynamic process moving in different spatial directions which have demographic, human and social impacts on all Canadian regions.

¹³ A class centroid is the mean position of all the points corresponding to class members

Table 2: k-Means Classification of Interregional Mobility Flows, Canada 2000-2013

Class 1 (n=15)	Class 2 (n=14)	Class 3 (n=19)	Class 4 (n=23)
Lowly Educated Movers, LICS	Highly Educated Movers, Asia Pacific	Young, Male, African-Born, PSRs	Other Mover flows, Europe, GARs
(2000-2004) Quebec to Manitoba (2005-2009) Alberta to Quebec **	(2000-2004) Manitoba to Quebec (2000-2004) B.C. to Quebec **	(2010-2013) Manitoba to Saskatchewan (2000-2004) Alberta to Saskatchewan	(2010-2013) Quebec to B.C. (2000-2004) Alberta to Quebec (2000-2004) Saskatchewan to B.C.
(2000-2004) Quebec to Alberta (2005-2009) Atlantic to Quebec	(2005-2009) Ontario to Atlantic (2000-2004) Atlantic to Quebec	(2005-2009) Alberta to Saskatchewan (2005-2009) Ontario to Saskatchewan	(2000-2004) Alberta to B.C. (2010-2013) Saskatchewan to Ontario
(2000-2004) Ontario to Atlantic (2005-2009) Quebec to Saskatchewan (2005-2009) Quebec to B.C.	(2005-2009) Alberta to B.C. (2000-2004) Quebec to Saskatchewan (2000-2004) Ontario to Manitoba (2000-2004) Ontario to Saskatchewan	(2010-2013) Ontario to Saskatchewan (2010-2013) Ontario to Manitoba (2000-2004) Manitoba to B.C.	(2010-2013) Atlantic to Ontario (2010-2013) Ontario to B.C. (2005-2009) Saskatchewan to Ontario
(2010-2013) Ontario to Quebec (2010-2013) Quebec to Alberta (2005-2009) Ontario to B.C	(2000-2004) B.C. to Alberta (2000-2004) Atlantic to Alberta	(2010-2013) Saskatchewan to Alberta (2010-2013) Atlantic to Alberta (2010-2013) B.C. to Alberta	(2010-2013) Alberta to Ontario (2010-2013) B.C. to Ontario (2000-2004) Saskatchewan to Alberta
(2005-2009) Ontario to Quebec (2000-2004) Ontario to Quebec	(2000-2004) Quebec to B.C. (2000-2004) Atlantic to Ontario	(2005-2009) Ontario to Manitoba (2005-2009) Saskatchewan to Alberta	(2005-2009) B.C. to Ontario (2005-2009) Atlantic to Ontario**
(2010-2013) Ontario to Alberta	(2000-2004) Quebec to Alberta	(2010-2013) Manitoba to Ontario	(2005-2009) Ontario to Saskatchewan
(2005-2009) Quebec to Alberta (2005-2009) Ontario to Alberta	(2000-2004) Ontario to Alberta	(2005-2009) Manitoba to Ontario (2005-2009) Atlantic to Alberta	(2005-2009) Alberta to Ontario (2000-2004) Saskatchewan to Ontario
Class 5 (n=21)		(2005-2009) B.C. to Alberta **	(2000-2004) Alberta to Ontario
Non-movers		(2000-2004) Manitoba to Alberta	(2000-2004) Manitoba to Ontario
Non-movers 2000-2004, all regions		(2010-2013) Manitoba to Alberta	
Non-movers 2005-2009, all regions		(2005-2009) Manitoba to Alberta	(2000-2004) B.C. to Ontario
Non-movers 2010-2013, all regions			(2000-2004) Ontario to B.C. (2010-2013) Quebec to Ontario (2005-2009) Quebec to Ontario
(2000-2004) B.C. to B.C.**			

***=central member of cluster (i.e. shorter distance to cluster centroid)

Discussion

Tracking the various domains of refugees' interregional mobility in Canada provides interesting insights into how this population is being redistributed, how it responds to needs of regional economies, and the success of immigrant integration and resettlement in each region. Between 2000-2013 Canada has accepted both in-land refugees and thousands of refugees as permanent residents. They have come from different parts of the world as diverse as the ex-Yugoslavia, Thailand and the Middle East.

Before discussing the findings of this analysis, it is important to mention some shortcomings present in the data and the scope of analysis. Firstly, the mobility behaviour of refugees was observed for aggregated yearly single cohorts (three arrival cohorts) at three fixed data points of observation (2004, 2009 and 2013). This "snapshot" approach made it difficult to evaluate how each yearly cohort changed their migratory behavior at specific points in time. Several moves could have also occurred between the tax year observation points. Secondly, information on inter-city (e.g. to Toronto, Montreal, Vancouver

and other cities of the West) as well as intraregional mobility was not available in the IMDB table. Approximately 5% of refugees resided in the non-CMA areas of their respective regions at the time of tax reporting. Although this number is relatively small it could still represent distinct types of refugee movers. Thirdly, data aggregations could not pinpoint precisely the unemployment related impact although rates at landing and current residence were somewhat incorporated in the socio-demographic composition of flows analysis. Refugees may have moved to other regions for a variety of reasons which could include the pursuit of better employment opportunities, attitudinal climates, affordable housing, health reasons, access to friends and family and even life-style related amenities. Data from surveys and qualitative research can reveal this in more detail.

Despite these limitations, the IMDB data analysis undertaken here revealed the presence of a complex dynamic of migratory interchanges and six general tendencies may be summarized as follows:

1. The likelihood for refugees' to undertake interregional migration increases with the length of residence in Canada and is more pronounced during the first 10 years after arrival.
2. Confirming previous studies, during the 2000-2013 observation period, major refugee flows involved migration interchanges between Quebec, Ontario and Alberta regions. Examination of the mobility networks revealed that Ontario compensated its refugee losses to the Prairies with gains from the Quebec region. After the fall of oil prices in the Alberta region these mobility patterns may look different today.
3. Landed in Canada refugees were dominant in the largest flows of refugee movers in the country. More than 2,000 LICs left Quebec for Ontario between the years of 2000-2004. Also 1,300 moved from Ontario to Alberta during 2005-2009 and less than a thousand during 2000-2004. Government assisted refugees were among the most active in interregional migration within the first arrival cohort while privately sponsored within the second and third cohorts. Landed in Canada and refugee dependants were less participatory than the other two groups. Government assisted refugees left the Atlantic regions in large numbers while privately sponsored ones did the same from Manitoba. Landed in Canada refugees moved between Ontario, Quebec and the Atlantic Provinces. All groups, however, had a common destination: the Alberta region.
4. The pace of interregional migration was quicker among refugees when compared to skilled workers and family class immigrants, which suggests they are responsive to a variety of regional "push" and "pull" related forces. After 9 years of residence the mover/non-mover ratio jumped from 45 movers per 100 non-movers to 53 per 100 non-movers in the first arrival cohort. This pattern appeared to be replicated in the second and third arrival cohorts.
5. Five types of refugee flows seem to be the most common among regional flow interchanges. European origin movers seemed to converge in the Ontario region while those migrating from Asia-Pacific origins headed to the Western Provinces of Canada. Younger male flows reported Alberta as their preferred regional destination and migration of the more educated refugees involved interchanges between Quebec, Ontario and the Atlantic regions. Canadian regions seem to have benefited from important human and social capital transferred by refugee movements during 2000-2013.
6. Gender, age, education and official language proficiency appear to be the most important socio-demographic correlates of post-arrival refugee migration in Canada. Regardless of refugee type, those who were males, younger and more educated at arrival had the highest propensities to change their status from non-mover to mover. Also, lack

of English or French may have prevented some refugees from reaching their intended destinations. A substantial number of government assisted and privately sponsored refugees are not proficient in any official language at the time of arrival. This could have dissuaded many refugees from permanently settling in Quebec and/or move towards English speaking regions of the country (i.e. GARs leaving the Atlantic region).

It should be noted that while geographical regions do not “attract” or “repel” refugees, cities or towns do. Although the interregional mobility of refugees is a smaller fraction of the total mobility occurring across the country their impacts on sending and receiving communities are not negligible. Considerable investments are presently made by local, provincial and federal government agencies to welcome and integrate refugees as potential long-time residents. This study, however, suggests that despite these efforts and the excitement this brings to sponsors and their communities of reception, some newly arrived refugees may migrate long distances eventually relocating elsewhere in Canada a few years after arrival. The refugee retention capacity of regions such as the Atlantic and Quebec appears to be limited due to a variety of economic, linguistic and administrative factors. If the initial place of residence does not meet their expectations, or they are unable to navigate through local/provincial or federal bureaucracies and no community support for families and their children, refugees will find more “suitable” residential destinations in Canada. In this quest, refugees may resettle multiple times at different locations, which may include metropolitan or non-metropolitan centers such as smaller cities, towns or rural areas where secondary refugee settlement is now happening. The arrival of new Syrian refugees to Canada posits the question if this new wave of refugees will follow the steps followed by their predecessors. Interregional mobility network findings for the Middle East born group point in this direction but new data from the IMDB or other survey sources in the coming years would provide empirical evidence if this is the case or not.

A final reflection refers to the societal response to the interregional mobility of newly arrived refugees to Canada. The heterogeneity of birthplace related backgrounds presents significant challenges for federal, provincial and local institutions as well as service providers supporting immigrant integration (e.g. GARs and PSRs from the Middle East, Pakistan, Somalia and/or Eritrea as well as LICs from China or Colombia). In light of the study findings, a community development approach suited for individual communities may be needed, and could bring newly arrived refugees together with others in local communities to create opportunities and support for them and their families. Those refugees who stay in their original regional location need to be reassured that there are adequate long-term employment and educational opportunities for them, while potential refugee movers need be provided information on opportunities in possible destinations and support during their interregional moves.

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