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In-Migration and Return Migration to Cities in Northern Ontario, Canada: Benefits by City Size in the Context of Today's Knowledge Economy

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Abstract

By examining the geography of in-migrants and return migrants to Canada's Census Metropolitan Areas (CMAs) and Census Agglomerations (CAs), this paper compares and contrasts migration patterns of Northern Ontario's large, medium, and small cities. Results are examined within the foundations of 'brain circulation' and 'institutionalism' theories about migration. Findings show that large cities in Northern Ontario, though historically dependent upon raw resources, are in a more advantageous position moving forward in today's knowledge economy. Large cities attracted a higher percentage of inter-regional migrants with higher skills and education in the late 1990s and early 2000s, especially when compared to small cities. Less expected were results regarding medium cities, especially North Bay and Sault Ste. Marie. The study reveals how these cities rival large cities in their appeal to inter-regional migrants with high skills and education, so significant in today's knowledge economy.

Keywords

In-migration; return migration; Northern Ontario; knowledge economy

Introduction

Northern Ontario has long been considered a peripheral region whose development has been linked to the extraction of natural resources and government services. Prolonged modifications to the mining and lumber industries, such as an increase in mechanization, have had a profound impact on workforce requirements and consequently the demography of the area. With few exceptions, Northern Ontario has recently experienced both economic and demographic difficulties. In fact, of the eight Census Metropolitan Areas in the region (Greater Sudbury, Thunder Bay, North Bay, Sault Ste. Marie, Timmins, Kenora, Elliot Lake, and Temiskaming Shores), the only city to witness a population increase since 1991 has been Sudbury. Though important centers for health, education, and other services, other cities lost population due to their dependency on resource industries (Southcott, 2006). Thus certain areas within the region have not fully adapted to a global economy where knowledge is now a key resource.

The purpose of this study is to place one component of population change in the region—that of migration—within the context of the current thinking in economic geography by examining whether migrants are potentially beneficial to transforming the economy of Northern Ontario cities. It examines whether cities of different sizes, in a region historically

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dependent upon the primary economic sector, can attract migrants significant to today's knowledge economy. To accomplish this, three questions are posed:

1. Is there a spatial difference in the source of in-migrants for Northern Ontario's large, medium, and small cities?
2. Is there a spatial difference in the destination and source of return migrants for Northern Ontario's large, medium, and small cities?

Northern Ontario has historically had difficulty in attracting migrants from outside the region. Question 1 and Question 2 attempt to capture the spatial significance of this phenomenon.

3. Are Northern Ontario's large, medium, and small cities benefitting from migrants related to today's knowledge economy?

The purpose of question 3 is to examine whether return or in-migrants to cities in a region historically dependent upon primary resources can contribute to the development of the knowledge economy.

Migration, Urban and Regional Growth in the New Economy

Significant to this study are theories of urban and regional development that utilize individuals as the primary level of analysis, with Saxenian's concept of 'brain circulation' prominent in the research agenda. Brain circulation, a migration theory that has arisen especially since the 1990s, explains the movement of highly skilled individuals who eventually influence regional development. Saxenian (2002, 2006) shows how the success of Silicon Valley was built upon individuals with previous backgrounds outside the region. The knowledge brought by these people was an important contributing factor leading to competitive advantage for firms in the region.

Saxenian's work illustrates how debate about the consequences of migration has changed drastically over time. During the 1950s and 1960s development economists argued that migration was an integral part of modernization. From the 1960s to the 1980s, they suggested that migration was associated with a vicious cycle of poverty as developed areas gained the brightest individuals while those developing lost them. The concept, referred to as the brain drain, continually reinforced a core-periphery division and the increased dependency of poor countries. This theory gained popularity to explain the consequences of skilled labor emigrating from poor nations to pursue better opportunities elsewhere.

More recently, theorists make the case that Brain Drain is only one part of the equation (Saxenian 2002, 2006; Kuznetsov 2006). The other component relates to the social contacts and international experience that migrants gain when working or studying in a foreign country. These experiences and social contacts are valuable resources for the country of origin of these migrants, provided it is able to tap into them. This concept of 'Brain Circulation' contends that return migrants are even more important in the development process. Saxenian (2002) shows how a number of immigrants, so important to the development of Silicon Valley in the 1990s, returned to their home countries of India, China, and Taiwan soon after. The economic success of these countries is now partly accounted for

by the circular movement of this skilled labor. She argues that return migration brings much of the knowledge learned in Silicon Valley back for the country's development.

In essence, brain circulation branches out from the concept of institutionalism. In its most absolute form, the institutional approach argues that regional economic differences are primarily related to inconsistencies in institutions (Hodgson 2006; Saxenian 1994; Peck 2005). Institutions may be identified as compartments of socioeconomic organization and socioeconomic practices (Amin, 2001). They can include formal structures such as legal rules, property laws, and government policies, as well as informal habits, codes of conduct, and organizational cultures. Cities and regions where migrants return then become new centers of idea creation. Places that do not take advantage of this flow of return migrants (and the ideas that they bring) repeatedly rely on internal knowledge. Unchanged formal structures and informal habits of a place are continually reinforced by the same population. Unfortunately, this insular position continually relegates these places to remain in the periphery as they are slow to adapt.

Broadly defined, the knowledge-based economy is a system of production and consumption that is based on a greater dependence on the knowledge and higher level skills of the labor force (Organization for Economic Co-operation and Development (OECD), 2005: para. 71). In the New Economy, development is dependent on the quantity, quality, and accessibility of knowledge, rather than traditional raw materials. In a knowledge economy, a significant part of a region's resources may consist of intangible assets, such as the value of its workers' knowledge.

The knowledge economy is the latest stage of development in a globally interdependent economy. Thus far, the developed world has transitioned from an agricultural economy to the industrial economy, the post-industrial economy and finally to a knowledge economy (late 1900s – 2000s). The phrase was introduced by Drucker (1969) to highlight the fact that rules and practices that determined success in the industrial economy need revision in an interconnected, globalized economy where knowledge resources are critical. Among the most successful worldwide examples of the knowledge economy are the computer industry in Silicon Valley, aerospace and automotive engineering in Munich, and biotechnology in Hyderabad, to name a few. For regions traditionally dependent on raw resources, it is difficult to transcend into this new competitive environment where human capital is now the key component of value.

Migration and Economy in Northern Ontario

This study compares and contrasts migration patterns for large, medium, and small cities in Northern Ontario. Ontario is the province in Canada with the largest population (732,914 in 2013 (Statistics Canada, 2014)) containing the largest city (Toronto). It has traditionally been divided into Southern Ontario, the core, and Northern Ontario, with more peripheral characteristics. Southern Ontario has historically been associated with manufacturing and service sectors while Northern Ontario is a vast region providing raw materials. Since Northern Ontario is so large (over 800,000 square kilometers (Statistics Canada, 2014)), academics studying the area have separated it into Western and Eastern halves to provide more meaningful results.

Research on Northern Ontario comes mainly from government reports and research papers that link the region's economic and demographic development, summarize the economy of the region as a whole and examine the economy of communities (Atkins, 2009; Robinson, 2008). Additionally, this research emphasizes competitive advantages within the context of strategic plans for individual towns (Constante, 2008) as well as the entire region (Ontario Ministry of Northern Development and Mines, 2008; Ontario Ministry of Energy and Infrastructure, 2009; Sudol, 2010).

Perhaps Southcott is the only researcher who has extensively examined demographic change in Northern Ontario (Southcott 2002a, 2002b, 2002c, 2002d, 2006, 2007a, 2007b). The vast majority of Southcott's work tracks broad demographic changes for the region as a whole (2002a, 2002d, 2006, 2007b), including its aging population (2002b) and youth out-migration (2002c, 2007a). Related to this study, Southcott (2006: 74-75) suggests that "it is likely that a large percentage of Northern Ontario's migrants are not 'in-migrants' to the region, but residents of Northern Ontario that are simply moving to another location in the same region." From a geographical standpoint, the spatial implications of this statement are particularly intriguing. His conclusion also has direct relevance to the theoretical foundations of brain circulation and institutionalism discussed earlier.

The purpose of this study is to determine if city size has implications for attracting these migrants during a time when accessing knowledge, and people with access to this knowledge and skills, is increasingly important. The intention here is to examine this movement within the theoretical constructs of Saxenian's 'brain circulation' concept and the conclusions of Southcott's previous research. By examining the geography of in-migrants and return migrants, the study compares and contrasts migration patterns of Northern Ontario's large, medium, and small cities. It examines whether cities in the region obtain a sufficient proportion of their migrants from external sources to indicate that new knowledge and institutions are continually being introduced to these areas. Perhaps just as important, it investigates whether the region is benefitting from migrants related to today's knowledge economy. Findings from this research can be applied to regions throughout the world that have been extensively dependent upon the primary sector. Finally, the paper explores whether city size has implications for attracting in-migrants and return migrants that can contribute significantly in today's knowledge economy.

Data and its Limitations

Northern Ontario possessed eight cities with over 10,000 inhabitants in the 2006 census. Two of these cities, Sudbury and Thunder Bay, are referred to as Census Metropolitan Areas (CMAs) because they possess a population over 100,000. For the purposes of this study they are categorized as large, with Sudbury the most significant center in Northeastern Ontario and Thunder Bay in Northwestern Ontario. The remaining cities are separated into medium and small cities. Medium sized cities possess a population between 40,000 and 100,000, which include the Northeastern Ontario cities Sault Ste. Marie, North Bay, and Timmins. Small cities possess a population between 10,000 and 40,000, which includes Elliot Lake and Temiskaming Shores in Northeastern Ontario and Kenora in Northwestern Ontario (Statistics Canada, 2006).

To measure migration in Canada, researchers commonly utilize Statistics Canada's compilation of micro data from the long form census. We adopt this approach, which

enables our analysis to be based on Census Master Files representing twenty percent of the population (Statistics Canada, 1991, 1996, 2001a). The long form census asked detailed questions in order to make generalizations on the entire population of the country. From a total population of 807,703 in 1996, the micro data contains 161,540 residents of Northern Ontario; from a total of 786,290 in 2006, it contains 157,258 residents. The mobility question on the Census long form in 2006 asks the place of residence five years ago, whereas in the 1996 census a new questions is also introduced: the place of residence one year ago (Statistics Canada, 2007).

In-migrants are defined as those individuals now residing in one of the Northern cities but not living in those cites five years earlier. In-migrants will be studied from 1991 to 2006. Return migrants are defined as those individuals living in a specific city that did not live in that city one year earlier, but who did live in that same city five years before that. Unfortunately, Statistics Canada does not provide a longer window to measure return migration through the census questionnaire. Additionally, return migration data from the long form census is only available starting in 1996. Therefore, this study tracks these individuals from 1996 to 2006. Relevant characteristics of migrants' potential contribution to the knowledge economy, including their education and employment sector, are examined using microdata from the long form questionnaire.

Results

Question 1. Is there a spatial difference in the source of in-migrants to large, medium, and small cities in Northern Ontario?

The first portion of Table 1 provides a percentage breakdown of the origin of in-migrants to Northern Ontario cities geographically; the second reveals how this geographic distribution has changed over time. Most significant is the fact that the majority of cities experienced similar distributions of intra-regional migrants (from within Northern Ontario) and in-migrants from Southern Ontario. Large, medium, and small cities obtained 39, 42, and 39 percent of their migrants from Northern Ontario and 35, 38, and 42 percent of their migrants from Southern Ontario respectively. After amalgamating in-migrants from Northwestern Ontario and Northeastern Ontario into one group, it is seen that large cities attracted a greater percentage of inter-provincial migrants and immigrants while small cities receive more intra-provincial migrants (chi-square weakly significant at $p<.10$). As revealed by Chui, Tran & Maheux (2007), immigrants' motives for moves to larger centers are the potential social support networks of family and friends, job prospects, and cultural advantages such as language.

When examining specific cities in Table 1, a few notable exceptions to this pattern are worth mentioning. Timmins and Temiskaming Shores are dissimilar in that the two cities depend largely on intra-regional migrants. On the other hand, Elliot Lake diverges from other Northern Ontario cities in its disproportionate reliance on Southern Ontario in-migrants. Converted from a mining town, Elliot Lake now markets heavily to Southern Ontario as a retirement community. Kenora does not fit the conventional pattern either as the city obtains 42 percent of their migrants inter-provincially. Geography still plays an important role though as these movers are dominated by individuals from Manitoba, a short distance away from Kenora. The other city in Northwestern Ontario, Thunder Bay, also obtains a large

percentage of their migrants interprovincially, 23 percent. But these interprovincial migrants are coming from all Western Canadian provinces.

Table 1 also summarizes migrants from place of origin. A notable difference exists between Sudbury and the small cities of Northeastern Ontario. The proportion of intra-regional migrants to Sudbury shrank over the study period while the greatest growth came in the form of immigrants. On the other hand, the three medium sized cities, all in the Northeast, received more intra-regional migrants. Elliot Lake is again an anomaly in that the percentage of inter-regional migrants, namely from Southern Ontario, becomes significantly more important. Thunder Bay, the largest city in Northwestern Ontario, obtains its migrants from Northern Ontario, especially intra-regional migrants. These insular gains are the result of inter-provincial migrants and immigrants.

Table 1: Origin of In-Migrants to Northern Ontario Cities

City	% of in-migrants, 2006					% change by origin of in-migrants, 1991 to 2006				
	NEOnt	NWOnt	SOnt	Other Prov.	Immigration	NEOnt	NWOnt	SOnt	Other Prov.	Immigration
Greater Sudbury	35.2	3.5	40.2	14.9	6.3	-2.08	0.05	-0.41	0.12	2.33
Thunder Bay	11.3	29.2	26.8	23.3	9.4	2.26	3.41	1.05	-5.12	-1.60
North Bay	37.9	2.0	38.1	16.4	5.6	6.59	0.42	-4.78	-3.62	1.38
Sault Ste. Marie	35.0	4.9	39.8	12.8	7.5	1.85	-2.47	-0.95	-0.60	2.17
Timmins	43.3	4.4	33.9	13.9	4.4	3.93	-2.76	4.23	-4.76	-0.64
Kenora	6.8	32.2	15.3	42.4	3.4	3.08	-3.60	1.67	0.40	-1.55
Elliot Lake	22.9	2.1	64.6	6.3	4.2	-13.36	-0.86	14.58	-2.57	2.21
Temiskaming Shores	54.2	2.8	33.3	9.7	0.0	5.71	-1.35	-1.72	-2.65	0.00
Large	25.3	14.1	34.7	18.3	7.6	-1.37	2.29	-0.38	-1.52	0.98
Medium	38.1	3.5	37.8	14.6	6.0	4.51	-0.98	-1.58	-3.18	1.24
Small	28.6	10.1	41.9	16.7	2.6	-2.44	-2.72	7.56	-2.90	0.50
Ontario	3.1	0.8	39.7	13.3	43.1	-0.78	-0.27	0.53	-5.59	6.11
Chi-square Sig.			p<.10							

Source: Statistics Canada 2006, 2001, 1996, 1991

The results somewhat verify Southcott's assertion that Northern Ontario relies on intra-regional migrants. If standardized for size of the populations of Northern and Southern Ontario, the dominance of intra-regional migrants becomes more apparent. For every 1,000 people in Northern Ontario, 12.0 moved to large cities, 8.8 to medium cities, and 7.3 to small cities. Conversely, for every 1,000 people in Southern Ontario, less than one person moved to any category of Northern Ontario city. Specifically, 0.6 moved to large cities, 0.5 to medium cities, and 0.4 to small cities.

Most relevant to the concept of brain circulation in Table 1 are results regarding migrants from other provinces and immigrants. The most important result is the obvious difference in the proportion of immigrants to Northern Ontario cities when compared to Ontario as a whole. Over 40 percent of Ontario's in-migrants are immigrants, whereas no city in Northern Ontario reaches 10 percent. Of course this is influenced by the size of the immigration stream to Toronto, Canada's largest city and the country's most attractive destination for immigrants. When examining immigration to Northern Ontario cities, no clear pattern emerges. Certainly immigrants are more likely to move to larger centers and

less likely to move to smaller centers; but even in larger cities, Sudbury's immigrants increased as a percentage of all migrants and Thunder Bay's decreased.

Question 2. Is there a spatial difference in the destination and source of return migrants for large, medium, and small cities?

Table 2 provides a geographical summary of the origin of return migrants to Northern Ontario cities in 2006. With regard to small cities, it is important to point out that all return migrants were intra-regional. Return migrants to Kenora were from Northwestern Ontario while they were from Northeastern Ontario for Elliot Lake and Temiskaming Shores. Although it is reasonable that return migrants would desire short distance moves, if approving of the concept of institutionalism, the dominance of this close proximity migration is disconcerting. Small cities fail to obtain migrants and their fresh ideas from outside Northern Ontario, which potentially will relegate these urban areas to the periphery.

Table 2: Origin of Return Migrants to Northern Ontario Cities, 2006

City	% of return migrants, 2006				
	NEOnt	NWOnt	SOnt	Other Prov.	Immigration
Greater Sudbury	36.4	0.0	48.5	6.1	9.1
Thunder Bay	0.0	44.4	22.2	22.2	11.1
North Bay	47.8	0.0	34.8	8.7	8.7
Sault Ste. Marie	28.3	0.0	50.0	8.7	13.0
Timmins	50.0	0.0	50.0	0.0	0.0
Kenora	0.0	100.0	0.0	0.0	0.0
Elliot Lake	100.0	0.0	0.0	0.0	0.0
Temiskaming Shores	100.0	0.0	0.0	0.0	0.0
Large	23.5	15.7	39.2	11.8	9.8
Medium	43.3	0.0	42.6	6.3	7.9
Small	57.1	42.9	0.0	0.0	0.0
Chi-square Sig.			p<.001		

Source: Statistics Canada 2006

Return migrants to medium sized cities showed a similar pattern to that of in-migrants seen in Table 1, whereby individuals were equally divided between intra-regional migrants from Northern Ontario and in-migrants from Southern Ontario. The smallest of the medium sized cities, Timmins, received exclusively intra-regional and Southern Ontario origin movers. Return migrants to North Bay were of more widespread origin, with a small percentage coming from other provinces and from immigration. Return migrants to Sault Ste. Marie, the largest of the medium class of cities, obtained an even greater percentage of their return migrants from other provinces and countries. Large cities showed this same trend. Most of their migrants returned from within the region or from Southern Ontario. Overall though, they were significantly more likely to return from inter-provincial and international moves than from medium-size cities ($P < .001$).

Thus the results on return migration (Question 2) also indicate that there is a spatial difference in the origin and destination of return migrants: similar to in-migrants, they are generally intra-regional, especially as city size decreases. Small cities were in a less enviable

position whereby they mainly received proximate return migrants. On the other hand, large cities were in a more advantageous position as they relied more heavily on inter-regional, interprovincial, and international return migrants. Results thus far suggest that small cities in regions historically dependent upon primary sector jobs may be unable to attract in-migrants and return migrants. The following section now turns to examine characteristics of those individuals migrating to the region.

Question 3. Are Northern Ontario's large, medium, and small cities benefitting from migrants with skills and education favorable to today's knowledge economy?

While the notion of brain circulation was originally applied to high-end technical workers, this article adopts a somewhat different approach. Since the foundations of brain circulation are based on migrants as transponders of knowledge, characteristics of Northern Ontario in-migrants and return migrants are examined with variables that measure this. Specifically we address the importance of migrants in a knowledge economy by examining education and employment data for those individuals moving to Northern Ontario cities. Table 3 examines this question as it relates to in-migrants and Table 4 presents findings for return migrants.

Results suggest that cities possessing a university were able to attract migrants with higher educational backgrounds. Table 3 reveals that large and medium sized cities attracted in-migrants with similar educational attainment while small cities lagged behind. Examining specific cities reveals that slightly over 30 percent of migrants to both large cities had a post-secondary education. There was a large discrepancy between medium sized cities: 31 percent of migrants to North Bay and 30 percent to Sault St. Marie had obtained a university education, but only 24 percent of those to Timmins. This discrepancy is correlated with educational access: Timmins does not possess a university while North Bay has a small university that is slightly larger than Sault St. Marie's. These educational results suggest that policies targeted at aiding Northern Ontario's access to education has benefitted medium sized cities, enabling them to move to a more comparable position to large cities of the region. By subsidizing post-secondary education in North Bay and later in Sault St. Marie, access to these institutions has increased the portion of in-migrants with higher education levels, so important in a knowledge economy. The results suggest that if governments worldwide are concerned for the development of their medium sized cities, investing in post-secondary education is important.

A Chi-square test reveals a statistically significant difference in migrants' educational background between the three city classes ($P < .001$). To examine whether this result could be attributed to the large dichotomy between small cities and the other two classes, small city data was omitted and a Mann-Whitney test was performed on the remaining two groups. Results verify that there is no significant difference between large and medium sized cities in the number of migrants possessing a university education.

Table 3: Summary of Characteristics of In-Migrants to Northern Ontario Cities, 1991-2006

City	% of all in-migrants, 2006				
	University Education	Employment Sector			
		Knowledge	High Technology	Management/ High Skilled	Cultural
Greater Sudbury	30.5	18.3	5.1	64.5	5.4
Thunder Bay	32.5	18.8	3.5	63.4	4.0
North Bay	31.1	17.5	3.4	59.2	4.2
Sault Ste. Marie	30.0	18.4	4.5	64.1	5.6
Timmins	24.3	16.8	4.5	62.1	3.9
Kenora	30.3	16.4	3.3	60.7	3.3
Elliot Lake	16.2	5.2	0.0	46.7	2.1
Temiskaming Shores	20.3	16.0	3.2	61.5	4.1
Large	31.3	18.5	4.5	63.9	4.8
Medium	29.2	17.6	4.0	61.8	4.6
Small	20.3	10.5	1.9	58.0	3.0
Ontario	35.8	19.3	5.2	67.2	4.4
Chi-square Sig.	p<.001	p<.001	p<.001	p<.001	p<.001
Kruskall-Wallis Sig.	.145	.287	.335	.121	.302

Source: Statistics Canada 2006

The second component of Table 3 summarizes migrants' employment sector as it relates to the knowledge economy. These are captured through categorizing migrants who are employed in the knowledge, high technology, high skilled and cultural sectors. Table 4 starts with the portion of in-migrants that are considered to be knowledge workers. This article adopts a labor market perspective to measure knowledge workers, proposed by Beckstead and Vinodrai (2003)[2]. Knowledge migrants were calculated as the percentage of total in-migrants employed in a knowledge job during the current census.

Table 3 reveals that those involved in knowledge jobs constitute a modest percentage of total migrants for all in 2006. Results agree with the general hierarchical trend found thus far. A Chi-square test verified a difference between the three city classes but a Mann-Whitney test did not find a significant difference between large and medium cities. Knowledge workers composed the largest portion of in-migrants to large cities at 18.5 percent, followed closely by medium sized cities at 17.6 percent, with small cities following in the distance at 10.5 percent.

Human Resources and Skills Development Canada created the skill levels categories used here as a method for researchers to collect and describe nature of work data consistently. National Occupational Classification (NOC) is the nationally accepted reference on occupations in Canada, organizing over 30,000 job titles into 520 occupational group descriptions (Statistics Canada, 2001b). Embedded within each occupation code is the skill level normally held by workers in an occupation. There are ten broad skill-type categories with each skill type having four potential levels of skill (five including a management category) into which occupations are classified. Skill levels are based on the formal education normally required for the job, although the system also incorporates whether the

[2] For a more comprehensive description of the knowledge occupational categories, see Table 1A on p. 60 of Beckstead & Vinodrai, T. (2003).

job requires supervisory responsibility or significant health and safety responsibilities. For the purposes of this article, only management occupations and the highest skill level, those requiring a university education, are used.

This article presents a labor market perspective based on the NOCs, in this case proposed by Wong, Monrad, Jackson, and Miller (1999)[3]. High technology migrants were calculated as the percentage of total migrants employed in a high technology job during the current census. Table 3 reveals that workers in this sector comprise a minor component of total migrants for all Northern Ontario cities, trailing the provincial average. Results once again agree with the general hierarchical trend discussed thus far: the highest portion of high technology sector in-migrants were found in large cities at 4.5 percent, followed closely by medium sized cities at 4.0 percent, with small cities once again following at a distant 1.9 percent. Again, a Chi-square test verified the percentage as significantly different between the three city classes, but the Mann-Whitney test of the difference between large and medium cities was not significant.

It was hypothesized that education would be related to city size. The large cities of Sudbury and Thunder Bay were able to attract highly educated in-migrants, as was Sault Ste. Marie. As anticipated, results for the three small cities were poor in this capacity. More unexpected was that North Bay also did not draw highly educated workers, but there was no overall difference between large and medium cities. Results suggest that medium sized cities can rival large cities in their ability to attract migrants significant to the knowledge economy if access to a university exists. Thus, an emphasis on access to university education can enable regional governments dependent upon primary resources to adapt to the knowledge economy.

Although cultural sector employment is not specifically linked to the knowledge economy, such employment is indicative of the quality of a place. Martin and Florida (2009) emphasize culture and recreation employment as having an ability to attract the creative class, with a segment of the literature giving a renewed interest in quality of place as a key attribute of the knowledge economy. This article adopts Statistics Canada's definition of cultural employment, which recognizes creative and artistic production, heritage collection and preservation occupations as categorized by the NOCs.

Results in Table 3 reveal that the largest portion of cultural worker migrants was to Sault St. Marie, followed closely by Sudbury. A smaller portion of this sector of individuals moved to North Bay and Temiskaming Shores and even fewer moved to Thunder Bay. In-migrants employed in the cultural sector of Kenora, the other Northwestern Ontario city, comprise a less than expected portion, certainly when compared to other results related to employment. Once again, a Chi-square test verified a difference between the three city classes but a Mann-Whitney test did not find a difference between large and medium cities.

[3] For a more comprehensive view of the high technology occupational categories, see Table A on p. 25-26 of Wong et al. (1999).

Table 4: Summary of Characteristics of Return Migrants to Northern Ontario Cities, 1996-2006

City Size	% of all in-migrants, 1996-2006				
	University Education	Knowledge Sector Employment	High Technology Sector Employment	Management and High Skill Employment	Cultural Sector Employment
Large	27.3	17.6	2.7	53.4	3.8
Medium	21.8	13.3	2.4	48.8	2.9
Small	4.6	11.3	0.9	40.0	1.1
Chi-square Sig.	p<.001	p<.001	p<.001	p<.001	p<.001
Kruskall-Wallis Sig.	p<.001	p<.001	p<.106	p<.001	p<.001

Source: Statistics Canada 1996, 2001, 2006.

The final purpose of the study is to determine if cities of the region are benefitting from migrants related to today's knowledge economy. Results in Table 4 correspond to those seen earlier for in-migrants, with a Chi-square test verifying the same hierarchical pattern embedded in every variable. For return migrants though, large cities become even more prominent. When compared to in-migrants, a greater gap exists between large cities and medium cities for every variable other than high technology employment; a Kruskall-Wallis test verifies this difference is statistically significant. For example, in-migrants with a university education constituted a similar portion of movers to medium and to large cities (Table 3); but a disparity arises between these city size classes for return migrants. Perhaps this can be explained by the fact that individuals who moved away returned due to their awareness of the greater number of opportunities that a university education provides in a large city. Applying this premise to small cities, only 4.6 percent of return migrants possessed a university education. This would suggest that once they have left the small cities and are exposed to opportunities elsewhere, they realize their training can serve them better in a larger city. Similarly, in-migrants involved in knowledge sector employment were of similar proportions in medium and large cities, while for return migrants a disparity arises once again. Individuals that moved away and returned later were possibly aware of the greater number of opportunities in knowledge sector employment existing in larger centers.

Conclusion

These are regarded as challenging times for Northern Ontario, with the region's link to the primary sector having demographic and economic impacts. This article compares and contrasts the number and characteristics of in-migrants and return migrants to Northern Ontario cities, especially as these individuals relate to the knowledge economy. The findings of this study, which focuses on a region traditionally dependent upon raw resources, may provide insight for other regions of the world. The results provide answers to the three questions indicating that:

1. The geography of in-migrants for large, medium, and small cities differs. Generally, small cities relied on intra-regional in-migrants while immigrants and inter-provincial movers constituted a larger portion of in-migrants to large cities.
2. The geography of return migrants for large, medium, and small cities differs. This difference is more pronounced than for in-migrants, suggesting that the ability of

large cities to attract inter-regional return migrants is higher than that of small cities. Results show that individuals leaving Northern Ontario are highly unlikely to return to small cities. Geography also plays a role for large cities because intra-regional return migrants are more likely to go back to large cities than inter-regional return migrants.

3. Characteristics of return and in-migrants to large, medium, and small cities in today's knowledge economy differ. While notable exceptions exist, a hierarchical pattern generally persists whereby individuals possessing a higher education and involved in higher skilled employment were more likely to go to large cities. However, this difference was not apparent between large and medium sized cities for in-migrants. Thus, the study reveals how medium sized cities rival large cities in their appeal to in-migrants significant for development in today's knowledge economy.

When examining the concept of place, the Northern portion of the province was the main source of migrants. Although it is reasonable that people desire to relocate short distances the dominance of these geographically proximate moves is detrimental for development, especially when standardized for the small population based in Northern Ontario. This unfavorable position becomes more pronounced when in-migrants for Ontario as a whole are compared to Northern Ontario cities. Over 40 percent of Ontario's in-migrants are immigrants whereas no city in Northern Ontario receives as high as 10 percent immigrants.

Placing this within the context of the current economic geography literature, inter-regional migrants are more valuable than local migrants. The reasoning is because intra-regional migrants possess established views and procedures already familiar to the area. On the other hand, the concept of institutionalism suggests that inter-regional migrants are more likely to bring new ideas valuable for an area's development. Those cities that do not take advantage of this flow of people (and the ideas that they bring) continuously rely on internal knowledge. Unfortunately, this insular position continually relegates these places to remain in the periphery. Regions in today's competitive global climate must find ways (e.g. access to university education) to attract migrants significant to the knowledge economy.

Small cities were in the least enviable position whereby they relied on proximate migrants and had few return migrants. In addition, individuals moving to small cities were less likely to possess the education and skills necessary for competitive advantage in a knowledge economy. On the other hand, large cities were in a more advantageous position as they relied more heavily on inter-regional, interprovincial, and international migrants. Additionally, migrants were more likely to return to large cities with the skills and education necessary to make these cities more competitive in a knowledge economy.

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