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RURAL AND SMALL TOWN (NON) DEVELOPMENT IN CANADA

Internal Migration and Local Development Between 2001 and 2006

Par

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RÉSUMÉ

Cette thèse de doctorat explore le phénomène de la migration urbaine-rurale et les liens entre le développement rural et la migration. Plus précisément, nous analysons les effets des caractéristiques individuelles et locales sur la propension à migrer vers des bassins d'emplois ruraux canadiens entre 2001 et 2006. Nous examinons ensuite cette « attraction du milieu » en analysant les flux migratoires de différents groupes d'âge vers les communautés rurales, certaines étant plus dotées en attraits que d'autres, tout en contrôlant l'effet des facteurs traditionnels géographiques et économiques. Enfin, nous nous posons la question à savoir si l'émergence de la migration urbaine-rurale, la migration des retraités, les économies d'habitation ou la migration de longue distance peuvent potentiellement aider "certaines" collectivités rurales éloignées au Canada à survivre au long terme malgré le déclin des possibilités d'emploi et de leur base d'exportation ou de commerce.

Mots clés: Développement rural, migration, Canada.

ABSTRACT

This doctoral thesis explores the phenomenon of urban-rural migration and the general linkages between rural development and migration. More specifically, we analyze the effects of individual and local characteristics on the propensity to migrate toward Canadian rural labour markets between 2001 and 2006. We then examine this “attraction to place” by analyzing migration flows from different age groups to rural communities, some being more endowed than others in terms of assets, while controlling for traditional geographic and economic factors. Finally, we ask if the emergence of urban-rural migration, retirement migration, residential economies or long-distance commuter can potentially help “some” smaller rural-remote Canadian communities survive in the long-run despite the decline in employment opportunities and their lack of export or trade base.

Keywords: Rural development, migration, Canada.

FOREWORD

This doctoral thesis is presented in the form of a thesis by article. It is comprised of three articles, of which I am the main author, submitted for publication in scientific journal with peer review committees, where they are subject to evaluation.

The first article (Chapter 4) was submitted for publication in *Agriculture and Rural Working Paper Series*, published by Statistics Canada: http://www5.statcan.gc.ca/bsolc/olc-cel/olc-cel?catno=21-601-m&CHROPG=1&lang=eng

The second article (Chapter 5) and third article (Chapter 6) were both submitted for publication in *The Canadian Geographer*.

This doctoral research was directed by M. Mario Polèse.

PROLOGUE

The names and places in these stories were changed to respect anonymity:

"*Mario was born and raised in a small town in rural Cape Breton, Nova Scotia. He was captain of his high school rugby team and was a good student. His father used to work at the local coal mine before it shut down and his mother as a teacher. He was told by his teachers that his grades were good enough he could become a doctor one day. His local town only offered a community college with select trades' certification and some limited remote campus university credentials. Upon graduating, he applied for and received a student loan from the provincial government, moved to Halifax where he enrolled at the University of Dalhousie, the university with highest tuition rates in Atlantic Canada, in pre-medicine. Having not been accepted in medicine upon completion of his preliminary degree, he moved to Toronto in order to pursue a related university degree in a field of sports medicine. His university degree in hand and five years of student loans pressing on his shoulders - after he could not find a job in his field of expertise back home in his small town - he decided to move to a once rural town in Northern Alberta to make money working in the oil sands. He makes good money and paid off most of his almost $80,000 in student loans but the cost of living is much higher than he expected. Still, he married an Albertan, bought a house in the Wood Buffalo area and settled down in his new life. He visits Nova Scotia once or twice a year to see his family and friends. It's been over 15 years now but deep down, he's still a rural Nova Scotian at heart and longs to one day return to the Maritimes."*

"Lily was born and raised in various parts of Canada and other countries. She never spent much time in one school and was envious of classmates who kept the same best friend since childhood. Her father was in the military and her family moved often, her mother finding various work around the forces' base. Upon graduating from high school in Chilliwack, British Columbia, she enrolled at the University of British Columbia in political science, focusing on international politics and foreign aid. She wanted to be a diplomat or be working in some humanitarian aid capacity but she also wanted a job where she could plant her roots and not be moving with her family every few years. She switched majors a few times while in university but having the luxury of living at home during her studies, about 100km from campus, she hadn't racked up too much debt. She finally moved to Vancouver permanently after meeting her husband but the real estate market was prohibitively expensive in the city. They managed to find a small place in the suburbs but it didn't feel right. Their kids are all grown up now and are leaving the nest. They always said they would one day sell the house, buy a plot of land with an orchard in the Okanagan Valley and with retirement approaching, they are seriously considering their options."

"Zachary was born and raised in an affluent urban neighbourhood on the island of Montréal. His high school band played at their year-end prom and he was always involved in the arts. His father was a lawyer and his mother stayed home until the children were all grown up before returning to the workface as a legal assistant. Upon graduating from Cégep, he took a year off to travel the world, to expand his horizons. He came back with a new perspective and enrolled in film school in order to one day produce documentaries. He lived at home while in school to save money; Montreal boasting many post-secondary institutions, he needn't go very far to acquire an education. Upon completion of film school, he found a job at a local marketing agency. It wasn't quite what he had in mind but it was in a related field of study; making commercials and viral videos for businesses. The weight of the metropolis was starting to feel like a burden to him and he felt the need to escape; having lived in rural Nepal for a few months, he knew he wanted some peace and quiet. Using some of his inheritance money, he bought his first "house", a winterized cottage nestled in the Laurentides, about a two hour's drive from Montréal. His work was flexible in letting him telework most days of the week, attending meetings via Skype or driving in the city to meet with clients. He even started his own small film production company, producing a few ski and snowboard videos for local mountains and as a videographer for music festivals in his area. It's been over 7 years since he's left Montréal but still has regular contact with his family and friends who live on the island. For now, he has no plans to return to the big city; he's happy with his chosen lifestyle and enjoys fixing up his cottage on his days off."

This thesis is to better understand where you're form, where you've been and where you're going.

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LIST OF ABBREVIATION AND ACCRONYMS

CA	Census Agglomeration
CMA	Census Metropolitan Area
CSD	Census Subdivision
MIZ	Metropolitan Influence Zone
SAC	Statistical Area Classification
SLA	Self-contained Labour Areas

Introduction

What is rural?

What do we understand by the term “rural”? Physical geography may be more or less static over time but human geography does not stand still like a mountain. In that sense, the concept of “rural” is an ever changing, complex and rather subjective one. As a starting point, *rural* almost always refers to place (physical) but is often backed by identity (human). It is also often defined as what is “not urban”; that is, the remainder of the land lying outside cities. The term rural conjures an imagery of landscapes and nature to some people: forests, lakes, wildlife, etc. just as the term urban can invoke images of tall buildings, traffic and density. For others, the big city suggests a diversity of good restaurants, major sporting events and city “buzz” while the countryside is synonymous with adjectives such as boring, isolated or even scary, as in the setting of horror films. Furthermore, there may not be consensus amongst different actors as to whether or not a specific location or its habitants is rural. Some people identify themselves as “rural folks” whereas others would qualify them as “city slickers”; for example, residents of a suburban neighbourhood outside a large city with close proximity to a lake, forest or farm might considered themselves “rural” even though they have a relatively short commute to the city for work every day whereas residents of a smaller town located further away would consider themselves rural but the former group to be urban. That being said, most experts and actors would agree that there exists a degree or spectrum of rurality. The rurality of such communities on this continuum is in part determined by their relative distance to cities plotted on the urban continuum; the further removed from a large city and the smaller the surrounding cities, generally speaking, the more rural is the community. While this introduction of the concept of rural might suggest the use of a continuous index of rurality for qualifying communities as rural or not, for the purpose of this thesis, as is generally the case in the literature, we will use the rural-urban dichotomy based on population size and density, the generally accepted definition of rural by Statistics Canada, as a starting point and build upon it.

According to Statistics Canada’s “census rural” definition – the simplest and most consistently used rural definition in Canada over time - the rural population refers to persons living outside centres with a population of 1,000 AND outside areas with 400 persons per square kilometre. du Plessis *et al*. (2002) further define the rural territory into Rural and Small Town (RST), population living outside the commuting zones of larger urban centres, 10,000 inhabitants or more – specifically, outside Census Metropolitan Areas (CMAs) and Census Agglomerations (CAs). The concept of rurality is further explored with the use of Metropolitan Influenced Zones (MIZ), a classification which disaggregates RSTs into sub groups, depending on their accessibility to surrounding metropolitan areas: Strong, Moderate, Weak or No MIZ (Mendelson, Murphy and Puderer, 2000). The latter definition is applied to the smallest rural spatial units for which sufficient data is available in Canada, the Census Subdivisions (CSDs). CSDs using MIZ categories are the starting point, or the building block, of our analysis. That being said, running migration analysis using rural CSDs is often problematic as people who live in one CSD might not necessarily work in that same spatial unit, and vice-versa. In order to broaden the catchment area of rural areas, we must build “labour markets” (or self-contained labour areas (SLAs)), rural areas in which most residents both live and work (Munro *et al*., 2010). Finally, joining together various spatial units inevitably increases population size for these newly created units and we must therefore increase the population threshold for rural areas above the traditionally used 10,000 inhabitants or less for rural communities. The methodology in this thesis follows this geographic evolution as stated above: starting with the smallest geographic unit in the first article (RST MIZ), to rural SLA in the second article and finally rural and medium SLA in the third article.

Canada as a rural nation

In 1851, approximately 87 percent of the Canadian population was living in rural areas. By 1931, rural Canadians had become a minority and over the last three decades, about one third of Canadian communities experienced continuous population decline (Alasia *et al.*, 2007). By 2006, only 20 percent of Canadians were living in rural areas (see *Figures 1* and *2*, Annex 2).

For most rural communities, development is essentially a demographic phenomenon (Rothwell *et al.* 2002) as internal migration is now the most important contributing factor to population growth or decline. Birth rates[1] in most rural and peripheral areas have dropped to match levels found in urban areas (Shearmur and Polèse, 2002; Caron-Malenfant *et al.*, 2007) and international migrants are settling predominantly in urban areas (Beshiri, 2004).

Demographic changes and migratory patterns across the rural-urban gradient in Canada and over recent years have been presented in several studies (Rothwell, 2002; Rothwell *et al.*, 2002; Audas and McDonald, 2004; Caron-Malenfant *et al.*, 2007; Dion and Coulombe 2008). Generally speaking, communities who attract in-migrants, from within and from outside Canada, will be those recording high population growth rates, while communities that experience migratory out-flows will typically be those experiencing rapid population declines (Caron-Malenfant *et al.*, 2007).

While some rural communities have experienced continuous decline over recent years in Canada, between 2001 and 2006, Frenette *et al.* (forthcoming) report that the absolute numbers of urban-to-rural migrants (138,800) outweighed the number of rural-to-urban migrants (118,000) by approximately 20,000 working age individuals. This, of course, does not imply that ***all*** rural communities experienced positive net migration during that period; but ***some*** communities necessarily did. One question however remains unaddressed by these numbers: *why did some rural communities fare better than others*?

Rural (non)development in Canada

Throughout their history, many rural communities in Canada have relied on natural resource extraction and transformation (i.e. fishing, forest, mining, agriculture, etc.) to sustain their economic survival. However, reliance on natural resources has become increasingly risky in recent decades due in part to volatile market conditions, resource exhaustion and new ways of extracting resources (e.g. the creation of temporary camps rather than permanent settlements) (Barnes, 1996; Hayter and Barnes, 2001; Polèse and Shearmur, 2002).

At the same time, many rural communities across Canada have been suffering from economic decline over several decades due in part to increased international competition. For instance, low transportation costs combined with the liberalization of trade made it easier for multinational corporations to make use of global supply chains (Bryden and Bollman, 2000). They could extract natural resources from rural Canada (i.e. forestry, mining or fishing communities), transform and produce goods where inexpensive labour is readily available (i.e. China, India, etc.) and ship final products back to large hub cities (i.e. Toronto, Montreal, Vancouver, etc.) for distribution where consumers are located - and ultimately back to rural areas where some products originated. In such global supply chains, rural communities reap very few economic benefits from the extraction and sale of raw material compared to a point in time when the production and consumption of products were more spatially concentrated near the source. Rural communities now import much more goods than they export and rely more on seasonal employment than urban areas.

Furthermore, given the increase in the minimum efficient size of enterprise in many manufacturing industries, traditional manufacturing employers such as fish plants, smelters or pulp and paper mills often located in rural areas have had to shut down their operations over the years. For example, in agriculture, the mechanization of farming since the end of the Second World War has led to out-migration of farming populations toward cities. Bollman (2000) reports that “in Saskatchewan, the census rural population has been decreasing since 1931”. While in Atlantic Canada, the collapse of the cod fisheries off the east coast of Newfoundland in 1992 has more recently marked the end of one of the region’s most important industries and the beginning of massive unemployment and outmigration rates in the region (Candow and Corbin, 1997; Palmer and Sinclair, 1997; Palmer and Sinclair, 2000).

Finally, seeing middle-aged individuals struggling to find decent employment in their respective hometowns, youth growing up in rural areas have been migrating toward cities in the hope of gaining

[1] The fertility rate in rural areas has gone from being well above the national average to only slightly above urban Canada (in 2001 the fertility rate was roughly 1.5 child per household in the largest Census Metropolitan Areas (CMA) and still below 2.0 in most rural areas (Statistics Canada, 2007).

work experience and education in order to ensure a future for their families (Palmer and Sinclair, 2000). The ensuing decline in the workforce in such areas translates into a depleting tax base for rural towns, making it harder to provide adequate services to their inhabitants. This is the vicious cycle in which many rural communities in Canada are stuck.

The tale of two rural Canada's

Given the history of rural communities, much of rural population decline in Canada and elsewhere is directly or indirectly linked to present or past *resource dependency* in declining industries. Communities dependent on declining natural resource jobs to serve as their economic base and who have not been able to recycle themselves (i.e. tourism, bedroom or retirement communities, diversified economies, alternative resources, etc.) following the declining of employment opportunities in their respective specialization have been seeing more population out-migrate than in-migrate. However, resource dependence has not affected all rural communities the same way. Stedman *et al.* (2004) report a great deal of variation in the effect of 'resource dependence' on community indicators such as unemployment or income. In particular, some industries exhibit fairly positive outcomes (e.g., agriculture), others more negative community outcomes (e.g., fishing). For example, farmers who choose to stay and work in agriculture communities can be quite successful, if not more than those who chose to leave. In the case of fishing communities, where the decline of stock can be more sudden, the number of people wishing to stay often exceeds the number that the local economy can sustain, causing unemployment rate to be higher and average income to be lower. Consequently, while many theories treat 'resource dependency' as a unitary phenomenon, it may be best to draw parallels between the specific resource bases (i.e. forests versus fish versus minerals).

For example, the case of Canso in Nova Scotia highlights some of the possible negative outcomes of fisheries-related resource dependency. One of Canada's earliest settlements and a longtime fishing port, Canso has suffered economic hardship for decades. After the Canadian Department of Fisheries and Oceans was forced to close the fishery in 1992, causing more than 40,000 Atlantic Canadians to be left without their traditional livelihood, and even after extensive attempts to buffer the losses through such initiatives as the Atlantic Groundfish Strategy (TAGS), many Atlantic communities such as Canso went dwindling in both population and economic viability (Dayton-Johnson and King, 2003). Guysborough County in particular has felt great strain in terms of population losses, losing 23.8 percent of its population between 1986 and 2001; the county's median age in 2001 is almost five years older than that of Nova Scotia overall (43.3 years versus 38.8 years). Employment numbers also continue to deteriorate: in 2001, the unemployment rate in Guysborough County was 22.9 percent compared to 10.9 percent in Nova Scotia overall. In Canso, the unemployment rate was considerably higher again at 31.7 percent (RCIP, 2003). When considered simultaneously, these numbers are particularly sobering, as an elevated outmigration rate should lead to reduced unemployment, if those who left the area were seeking work elsewhere. While these trends do not bode well, economically speaking, for areas such as Canso, this example also highlights another interesting point: natives of Canso seem to want to stay in Canso, against all odds.

Good ol' fashioned community development

Rural Canada is particularly "blessed" with stories of inhabitants who decided to stay aboard their sinking communities in order to try to find solutions for 'revitalization' of their local surroundings through a process often coined *local* or *community development* (Savoie, 2000). The long term goal of community development is generally to "strengthen the capacity of communities to resist the forces of change in capital and to build vital communities with the power and means to renew and to ensure their survival over time. In other words, to build sustainable communities" (Pell, 1994). The short term goal of community development in the mind of the citizen, however, is often to hold on to a certain ideal of normal life in a community which they remember as a fine place to live and work. This being said, there might be a reason why some people would be more inclined to want to stay and fight for a fishing community rather an agricultural community.

In the case of agriculture, technological progress has been slowly cutting jobs in farming communities for decades. Substitution of capital for labour has been occurring at an increasing rate ever since the

industrial revolution. These Western communities were colonized much later in Canadian history than Eastern communities and people might have never held on to the idea that they would last forever. Thus, farmers were not surprised when youth started leaving and towns had to shut down; it was already in the cards. Fishers saw their livelihood crashing overnight, even though over-fishing and mismanagement of resources had been a problem for years. However, there might also be a link between resource dependency and 'attachment to place'. Furthermore, if this 'attachment to place' can translate into 'attraction to place', perhaps a complete stranger could also fall in love with communities others are fighting to keep alive.

Pack your bags and/or stay for a while

While it is relatively easy to identify historical and economic reasons why some rural communities have been experiencing continuous out-migration over the years (*see previous section*), some researchers have recently began documenting an opposite force: a resurgence of in-migrants towards rural communities in recent years across the globe (Champion, 1989; Kayser 1990; Fougerouse, 1996; Boyle and Halfacree, 1998; Walmsley *et al.*, 1998; Roussel, 2000; Mitchell, 2004; Simard, 2007; Brown and Glasgow, 2008; McGranahan *et al.*, 2011).

If people are not moving to rural communities for jobs, why are they migrating? Within richer nations, the growing preference for shorelines and sunny locations is well documented (Rappaport and Sachs, 2003; Cheshire and Magrini, 2006; Rappaport, 2007). This shoreline attraction may be unrelated to past geographic advantages involving access to waterways. Today, roads and highways, and to a lesser extent railways, constitute the major driving force for economic relations between places (Polèse, 2009). However, coastal attraction remains a potential factor in hedonic migration patterns. Whether these migration choices only remain a trend amongst mid-life career changers and retirees or not, it might also hold the key for economic revival in certain rural communities.

Canada is well endowed in water access; being surrounded by three oceans. However, climate can also play a role in migration decisions. In France, Duboys-Fresney (2006) speak of *héliotropisme* (the search of the sun) and *thalassotropie* (the search of water), to qualify the geographic evolution of population movements in France. In the United States, much of the Sunbelt (e.g. Florida, Texas, California, etc.) experienced a significant increase in population beginning around 1960, reversing a century of outmigration (Partridge *et al.*, 2010). Likewise, rural areas with high endowments of natural amenities began to experience a significant rebound in the early 1970s, reversing decades of decline related to problems associated with the mechanization of labour (Graves and Clawson, 1981). In Canada, amenity migration has not proven to be been a major phenomenon (Ferguson, *et al.* 2007), but there are signs that this is changing in parts of British Columbia and for many sea-side communities of Atlantic Canada (Polèse, 2010), in the Laurentians regions or around the Great Lakes, at least to a greater extent amongst certain sub-population groups (e.g. pre-retirement aged individuals, etc.). Limited research has been conducted on the subject in Canada but Guimond and Simard (2008) have documented many cases of migration within the province of Québec where urbanites leave cities to settle in the countryside.

Perhaps there is a relation between the reasons "why certain people *don't want to* leave a community with no (or few) economic opportunities" and "why certain people *want to* move into a community with no (or few) economic opportunities?" Could "attachment to place" and "attractiveness to place" be related to migration, resource dependency and development in rural communities?

Rural migration as an issue of social justice

Rural-to-urban migration was a natural and vital movement of the population from the rural countryside, where labour was not being utilized to its full potential, to the emerging cities, where there was greater demand for labour as a result of the industrial revolution and other technological advancements. At the same time, this influx of labour added pressure on these growing cities to accommodate all these new migrants. Urban poverty and "slums" emerged as a negative by-product of these larger and larger cities (Todaro, 1969) and the rural cottage life became a luxury for the metropolitan elite. Just as osmosis of water in-and-out of a cell's membrane affects the well-being at the cellular level – in a hypotonic

solution, the cell is letting in too much water and is swollen while in a hypertonic solution, the cell is losing too much water and is shrunken – allowing people to freely move in-and-out of cities and locate where they desire would help society as a whole reach its optimal equilibrium. For far too long, country folks were driven to cities for economic reasons, and to this day, many people live in a place in which they do not feel they belong. Restoring that balance in rural-urban migration is thus not only an economic issue but also a social justice one.

Thesis Plan

The thesis will be presented as a “thesis by article”. This approach allows us to examine the issue of internal migration and local development using three different perspectives. As such, the results of the thesis will have been published through three articles, submitted in scientific journals, each with peer review committee, active in the field of regional economics and development.

In this context, the thesis is divided in seven chapters. The first chapter presents a review of the literature on regional economics, internal migration and local development. Following the literature review is chapter 2 which covers the research questions and guiding hypothesis for this thesis. Chapter 3 will present the methodological approaches considered and their limitations. Data will be discussed and the appropriate methodology for using this data to answer our research questions.

The three articles are presented in Chapters 4, 5 and 6:

- Chapter 4 deals with individual level migration decisions between rural and urban Canada.
- Chapter 5 looks at migration flows between urban and rural Canada.
- Chapter 6 analyzes net migration rates of rural communities in Canada.

A general conclusion will follow with a cross-article analysis, methodological limitations and future research questions raised by the thesis.

CHAPTER 1 : INTERNAL MIGRATION AND LOCAL DEVELOPMENT – A LITERATURE REVIEW

The first chapter of this thesis discusses the link between internal migration and rural local development.

1.1 Background

The earliest Europeans first settled in Canada during the 1600s and the 1700s, a time when the entire country would have been considered "rural" (Reimer and Bollman, 2010). Some of the earliest rural communities grew up to become great Canadian cities: evolving from its early fort and trading post days, Samuel de Champlain's "l'Habitation" grew into old and then new Québec City. Some settlements were deliberate attempts at constructing "cities", as in the case of Halifax. Others such as Canso, Nova Scotia, one of Canada's earliest settlements and a long-time fishing port, remained "rural" for the entire course of its 400 years of existence. To be fair, these early settlements were established for various geo-political purposes and the numerous wars between the French and the British helped shape the early geography of rural and urban Canada, at least in Eastern Canada. At one point or another, all rural communities in the New World were either internally sustainable or relied on exports to the homeland but this would not last very long. After the initial period of settling, rural areas were established to export commodities (such as cod fish, lumber, wheat, coal, nickel, etc.) to fuel the growth of urban Canada. In this sense, most rural communities in Canada were never again "internally" sustainable after the first few generations of settlers (Reimer and Bollman, 2010).

As settlement patterns slowly but surely began to move westward, the exploitation of resources provided a *raison d'être* for most rural communities in Canada over the course of their existence. Whether it was fisheries or shipbuilding in the Atlantic, forestry in Québec and British Columbia, mining in Ontario, farming in the Prairies or oil and gas extraction in Alberta, over the last two centuries, there has been an "Increasing Value of Human Time." (Schultz, 1972). Specifically, the price of labour has been increasing relative to the price of capital, or more specifically; the price of machine has been falling due to innovation (Reimer and Bollman, 2010). Thus, for farms, manufacturing, mining and other businesses in rural Canada, there was an incentive to substitute machines for labour. Thus, many rural communities in rural Canada have been suffering a continuous decline in the number of workers producing commodities – and many of these communities have not been able to find a new good or service to produce in their communities to maintain employment levels (Bradbury, 1985; Barnes, Hayter and Grass, 1990; Barnes and Hayter,1992).

Incapable of providing sufficient jobs for their inhabitants, many of these communities saw their population migrate towards areas presenting better economic opportunities. Rural-urban, periphery-central or poorer-richer interprovincial migration has been well-documented in Canada (Courchene, 1970; Vanderkamp, 1971; Robinson and Tomes, 1982; Dupuy, 2000). Over the years, several factors in Canada made it easier for rural workers to move from low employment areas to more dynamic rural areas or more likely, towards major cities.

As Reimer and Bollman (2010) outline, first, in order to export the commodities produced in rural areas to their respective markets (other areas in Canada), the transportation infrastructure needed to be adequate (e.g. initially waterways and ports, then railways). This infrastructure also allowed workers to move to these communities and then, when population growth was larger than the requirement for workers in commodity production areas, excess workers were able to leave the community to find jobs elsewhere. Today, roads and airports have replaced railways and ports.

Secondly, most rural Canadians have had access to basic quality education comparable to urban centres for over 50 years. Individuals who could not find work in their home community had adequate education to seek jobs in another rural community or urban centre. If they wished to pursue higher

education, individuals could move to cities to attend universities or colleges and might end up never returning to their community of origin and settle where their education investment would be more valuable. It should be noted that fewer rural high school graduates go to universities, compared to urban high school graduates (Frenette, 2002). However, smaller technical and community colleges compensate for this. Furthermore, a federal policy was implemented in recent years to connect every school to the Internet. Rural students have since been able to compensate for the lack of internet access at home and become as technologically savvy as their urban counterparts. Rural high-school students have since had the opportunity to take part in distance learning without leaving their community (e.g. Holland College in rural Tignish, PEI or Athabasca University based in Alberta but offering many degrees completely online).

Finally, other social factors such as universal health care, old age security and the right to own and sell private land (i.e. selling property located in a rural community to pay for the expenses of moving to a city) have not only prevented pockets of poverty to form in rural communities, it also allowed individuals more liberty to escape otherwise poverty stricken and low employment opportunity rural communities (Reimer and Bollman, 2010).

1.1.1 Rural population and employment decline / growth

The combination of these factors and others has led to trends that we are still witnessing today in rural Canada, and this has only been exacerbated in recent decades due to the rapid globalization of economies everywhere. Over the last two decades, about one third of Canadian communities experienced continuous population decline (Alasia *et al.*, 2007) and it has been reported that rural communities are more likely to be situated within declining regions (Mwansa and Bollman, 2005). Internal and external migration being the most important contributing factor to population growth or decline, communities that attract in-migrants, from within and from outside Canada, are those recording high population growth rates, while communities that experience migratory out-flows are typically those experiencing rapid population declines (Malenfant *et al.*, 2007). These in-coming and out-going migratory flows represent both an opportunity and a challenge for rural areas of Canada, as rural development is essentially a demographic phenomenon (Rothwell *et al.* 2002). It is for this very reason that rural development can be studied from a migratory perspective. Understanding the factors which affect community vulnerability to various socio-economic changes such as population and employment change has become increasingly important when developing policies to ensure the long-term sustainability and viability of rural communities (Mwansa and Bollman, 2005).

However, it should also be noted that not all declining communities are located in rural regions; research shows a great variety of rural conditions, some rural areas presenting the most dynamic demographic trends of Canada (Mwansa and Bollman, 2005; Malenfant *et al.*, 2007; Alasia *et al.*, 2008). For many rural areas, typically metro-adjacent, migratory inflows have been the driver of a rural renaissance (typically, due to the migration of young adults with at least one member of the family commuting to the city) and the rural population is growing around lakes and mountains – which is a preferred landscape for individuals who are early retirees (i.e. 55 years and over). For many other rural communities, typically remote communities and dependent on the production of commodities (which includes agriculture, forestry, oil and gas, fishing, and mining commodities), migratory out-flows have represented one of the greatest challenges to their economic sustainability and viability.

Overall, there has been a dramatic shift within the rural population from resourced based to non-resource based activities. That being said, while some rural-remote communities are suffering from jobs shortage, other urban-adjacent rural communities are dealing with housing and labour shortage; two very different rural realities.

1.1.2 Community development

Since the after war period, many disciplines such as regional sciences have studied regional

disparities and aimed to explain differences between the capacity of regions to offer viable employment opportunities to their inhabitants (Polèse, 1999). Needless to say, socio-economic inequalities across a country have important implications at the social and political levels. Consequently, governments have also tried to comprehend why certain regions in their country fare better than others and how they can help the less fortunate areas. Often inspired by academic research in regional sciences and other practitioners in the field, a number of public policies in local and regional development were formulated, implemented and reviewed over the past several decades. Policies such as decentralization of federal public services employment at the end of the 1970s, the promotion of growth poles and financial assistance offered to businesses or investment in infrastructure and the construction of industrial parks have unfortunately experienced limited success in remedying peripheral regions' challenges (Savoie, 2006).

In their search of new solutions for dealing with the economic disparities of regions, many academic researchers, authors and practitioners operating from these regional development agencies have advocated empowering community members with the future of their own economic development; leading to a broader discussion of "bottom-up" development (Ross and Usher, 1986). In fact, over the past two decades, "community-based development activity has gained momentum as a way of dealing with economic and social problems associated with global economic restructuring" (Diochon, 2003) in Canada and around the world. Citizens have come to grips with the fact that governments cannot always find adequate solutions for promoting growth in their respective regions and communities. This paradigm shift has thus served to encourage community members to take on the responsibility for dealing with the many issues facing their communities. In this sense, communities have now become agents of growth in the new economy. While this may be very beneficial in some cases, the lack of direct government involvement has also been criticized for allowing politicians to wipe their hands clean from regional development initiatives. Furthermore, while community members are being empowered and gaining valuable experiences through the process, it is necessary to understand that not all communities are equipped with the skills and tools necessary to find solutions and successfully launch economic development initiatives. As Savoie (2000) writes:

> "This begs the question, should or, better yet, can governments play God and decide which communities have the capacity to launch new economic activities and which do not? How can they tell? Assuming it is possible to identify communities with the potential for promoting new economic activities, what should be the role of government in assisting them?"

However, the very idea of community development can also raise other less obvious questions such as: "what makes a community so special that it makes its citizens want to fight for its survival?"

1.2 Theory and Research

The theory and research literature is divided by relevance to the different articles that will comprise the thesis.

1.2.1 Migration and development

It has been recently reported that internal migration is now one of the principal determinants of population growth in nonmetropolitan areas in Canada (Caron-Malenfant *et al.* 2007). Given that most rural areas do not tend to attract a significant number of international migrants, birth rates are too low to compensate for outmigration and the economy of Canada's resources areas no longer produce jobs (Delisle and Shearmur, 2009), understanding internal migration is

primordial in the study of rural community development.

In this case, the personal characteristics of migrants and non-migrants are analyzed to understand the factors which push certain people to migrate out of their rural community for employment or other reasons. Out-migration of working age population can have a negative effect on a community; depleting the human capital resources of these communities along with tax base and spending within the community. Alternatively, we also analyze the factors that influence individuals to move from urban to rural areas as these "neo-rurals" may prove to be essential for the survival of certain rural communities in Canada. For these reasons, we study community development from a migratory perspective.

1.2.2 Insight from migration theory

In this section we review and summarize some of the theoretical and applied literature on migration, with particular reference to the Canadian context. Far from being an exhaustive review, we focus on the key elements of relevance for our analysis. There are several extensive reviews of migration research upon which these summary insights are based (Taylor and Martin, 2001; Goetz, 1999; Mendola, 2006). Given that internal migration in Canada is now one of the principal determinants of nonmetropolitan population growth (Caron-Malenfant *et al.*, 2007), it is an important question to address when studying rural (e.g. nonmetropolitan area) development.

Motivations to migrate vary largely, depending on the economic context and conditions in which migrants are located as well as the personal characteristics of the migrants themselves. However, the study of migration was founded on several "laws" of migration initially stated by Ravenstein (1885) which seem to have stood the test of time:

1) Most migrants move only a short distance;
2) There is a process of absorption, whereby people immediately surrounding a rapidly growing town move into it and the gaps they leave are filled by migrants from more distant areas, and so on until the attractive force [pull factors] is spent;
3) There is a process of dispersion, which is the inverse of absorption (people [pushed] away from unattractive localities);
4) Each migration flow produces a compensating counter-flow (although not necessarily of the same volume);
5) Long-range migrants usually move to urban areas;
6) Rural dwellers are more migratory than urban dwellers;
7) Females are more migratory than males;
8) Economic factors are the main cause of migration.

Generally speaking, these "laws" still hold true to this day, especially applicable to the study of rural-urban migration, as this type of migration has been largely driven by sector restructuring and economic factors. Traditional manufacturing and resource related jobs in rural areas are declining while service sector jobs are growing in cities; people are moving where the opportunities lay, classic migration story. However, these "laws" can also provide insight into urban-rural migration counterflows, albeit seemingly counterintuitive at first glance. For example, the process of absorption (2) into a large urban centre can reach a point where density and its negative externalities (congestion, traffic, crime, etc.) initiate the process of dispersion (3) onto its inhabitants. Given that most migrants move only a short distance (1) and that long-range migrants usually move to urban areas (5), it is conceivable to imagine that exiting urban migrants will not venture too far from their origin urban centre, but will rather choose a

destination devoid of negative externalities they wish to escape while remaining in close proximity of the positive aspects of agglomeration economies, a commuting distance neighbouring rural community, for example. Furthermore, the focus of migration studies has also recently extended to the analysis of migratory flows driven by factors that are not strictly economics (8) or not merely reflected in “classical” migration models; these include returning to region of origin, retirement, amenities, and life style choice driven migration.

Many researchers have elaborated on these basic laws of migration over the years; however, they have generally taken two distinct approaches to the study of migration: micro-level analysis and regional flows. Through seminal theoretical works in migration conducted in the 1960s (Sjaadtad, 1962; Lee, 1966), four major type of factors have been associated with the decision to migrate: personal factors, migration factors associated with the area of origin, factors associated with the area of destination, and intervening obstacles. Following such insights, theoretical frameworks have consolidated these factors in what has since become known as the cost-benefit or human capital investment framework to migration (Sjaadtad, 1962; Taylor and Martin, 2001). In broad terms, the migration decision using the cost-benefit framework implies that each individual moves to another region if the present value of the total benefits to move is higher than the present value of the cost of moving (Taylor and Martin, 2001; Etzo, 2008). In this framework, migration is treated as an investment which constitutes a sacrifice of current consumption in exchange for (presumably higher) future consumption (Kremarik, 1999).

The costs associated with migrating will be internalized differently by different migrants. For example, younger migrants, in general, have a longer period of time to recoup the economic and social costs of migrating: a lengthy professional career ahead of them, a new region filled with opportunities to make a new circle of friends, more disposable possessions, (e.g. cheap furniture) and fewer social commitments to uphold (e.g. apartment rental lease, non-permanent jobs). In contrast, more established and older professionals are more likely to need to sell (and buy) a residential property or have to consider the impact of changing schools on their children when migrating, for example. Therefore, the benefits for migrants with higher internal costs must be much higher than for migrants with lower costs. Notwithstanding the age factor, different types of people will be more or less risk-averse; some migrants may find it easier – even exciting - to adapt to a new culture and environment whereas some will dread the prospect of new beginnings and see migrating as an ultimate last resort. The latter group may also see themselves slipping in a downward spiral if they choose not to migrate and wait too long to sell their house in a declining region. They would see their residential property steadily losing value and may even see it becoming impossible to sell in the long run, therefore increasing the costs of migrating and further solidifying the justification to stay, especially if the only option to migrate is towards an area with much higher real estate prices. Finally, this last point alludes to the purchasing power of individuals living in different regions; average salaries in Toronto or Vancouver are higher than what is found in Baie-Sainte-Anne, for example, however, the cost of living can also be prohibitively higher in larger metropolitan centre. In cases where the financial costs negate the benefits, the argument that tips the scale toward the decision to migrate may simply lay in the desire to live amongst other likeminded people.

Vanderkamp (1971) further elaborated on some major conceptual basis of migration flows by suggesting that the degree of migration between two regions is determined primarily by the average incomes in the two regions and by the distance between them. Subsequent works emanating from this tradition helped identify and estimate some of the important costs and returns of migration (employment opportunities, wage rates, distance, etc.) linked to the origin and potential destination regions. Analyzing aggregated migratory flows rather than individual micro-data level migration information, this research stream has taken a more place-based oriented approach to the study of migration. This approach suggests that in every area there are factors which facilitate retention of people within the area or attract people to it, and there are others which tend to repel them (Lee, 1966). Some authors have conceptualized these regional or community level factors as push or pull factors to potential migrants. Dorigo and Tobler

(1983) describe the push factors as those life situations that give one reason to be dissatisfied with one's present locale while the pull factors are those attributes of distant places that make them appear appealing. In sum, the relative attractiveness of a region or community can be calculated as the difference between its push and pull factors (Dorigo and Tobler, 1983). Evidently, push and pull factors can vary in terms of migratory inducing influences, depending on the individuals, while some are more generalized and consistent across the population (i.e. economic or labour market conditions). There are amenities, such as cultural amenities, that can be particularly attractive for certain subsets of the population (Florida, 2002). Amenities can take the form of cultural activities, climate as well as a welcoming social environment for new comers with diverse lifestyles.

Notwithstanding the local effects, individuals moving from disadvantaged areas to more dynamic economic areas, whose migration decision is largely driven by economic reason, are also simultaneously influenced by attributes such as education and skills level, age, risk taking capacity, capacity to face new situations, entrepreneurship and ethnicity (Todaro, 1980; Mendola, 2006). In this sense, it can be postulated that characteristics of migrants also interact with place-based factors in the decision to migrate. Liao (2000) suggests that older people are more likely to be affected by non-economic determinants of migration, such as scenic amenities or retirement reasons, while younger people tend to change residences for economic opportunities or educational reasons. In sum, the cost-benefit calculation, theoretically estimated by each individual, incorporating the elements of place as well as distance and personal factors, explains why some people migrate while others do not.

While the cost-benefit/human capital framework along with the place-based oriented approaches to studying migration explains a large part of migration, it has become evident that the nature of the migration flows is more complex and motivations underlying migration decisions might vary greatly between individuals (Robinson and Tomes, 1982). In fact, if all inhabitants of a country held equal perceived costs and benefits regarding migration, all utility maximizing economic agents would, for example, migrate towards the single highest wage region of that country. This is clearly not the case in practice and the existence of heterogeneity in the population and disparities across geographies offer an interesting twist to the study of migration patterns. Contrary to simple choice models, it is assumed that “each individual faces a set of profiles defined over alternative locations unique to him, rather than the average profiles for a person of his type, thus allowing for heterogeneity in the population” (Robinson and Tomes, 1982:477). Robison and Tomes (1982) argued that this heterogeneity is one of the factors that may explain sizable reverse migration flows from ‘attractive’ areas (higher income) to less attractive ones (lower income) (or from urban to rural).

1.2.3 Migration and gravity models

Building upon the concept of attraction to place, some researchers have introduced the gravity model of migration as “a model in urban geography derived from Newton's law of gravity, and used to predict the degree of interaction between two places” (Rodrigue *et al.* 2009, 216). Making the jump from Newtonian physics applied to celestial spheres, with fewer movable parts than human geography, Newton's law can still apply to migration as it states that: "Any two bodies attract one another with a force that is proportional to the product of their masses and inversely proportional to the square of the distance between them." In this case, the bodies correspond to population centres, or quite literally, the number of bodies or people in a given space.

When used for explaining migration patterns, the gravity model is based upon the idea that as the importance of one or both of the location increases, there will also be an increase in movement between them. The farther apart the two locations are, however, the fewer the number of migrants. Many researchers have analyzed migration flows through the use of spatial interaction model such as gravity models: demographers (Shen, 1999; Zhu and Poncet, 2003), international economists (Anderson, 1979; McCallum, 1995; Helliwell, 1996, 1997; Anderson

and van Wincoop, 2001), geographers (Tobler, 1979; Fotheringham *et al.*, 2000) and economic geographers (Crozet, 2004).

In the case of urban-to-rural migration, gravity models may not necessarily predict a high mobility rate between these types of regions; however, such models have the advantage of taking into account population size and distance in determining flows. Consequently, they are equally, if not more suitable when compared to other spatial interaction models for analyzing urban-rural or rural-rural flows.

1.2.4 Applied research in Canada

Several Canadian researchers have studied internal migration over the past few decades and have empirically tested different hypothesises using various methods and databases. Two approaches are generally opposed in most empirical literature: first, the use of regional flows (origin-destination); second, the use of micro data (generally individual level). This opposition often leads to the classification of migration studies in which some look at the individual characteristics which influence migration and place-based factors. Multinomial logit, probit, tobit, two-stage (Heckman) for estimating discrete-continuous models, have been widely used to estimate migration-decision models at a micro level. Regardless of the type of data, in most cases, the studied level of geography is inter-provincial migration.

1.2.4.1 Migratory flows

Among the studies that use aggregate flows, one of the first applied contributions to empirical migration research using Canadian data is that of Courchene (1970); he studies inter-provincial migration using aggregate data from the 1961 Census of Canada. The cross-section regression analysis models and time-series results explains a significant portion of the variance in migration rates over the period 1952-67 and shows that migration is positively related to relative wage or income differences and negatively related to distance, the higher the level of education or the greater percentage of the labour force employed in agriculture in province [of origin] the greater is the outmigration for that province (Courchene, 1970). These findings support some of the theoretical underpinning regarding human capital investment in the migratory decision and that the distance between origin and destination increases both the financial and psychological costs of migrating.

Vanderkamp (1971) looks at new mover, return and autonomous migration flows in Canada between seven regional aggregates (Atlantic regions and the remaining six provinces) which amounts to 42 cross-section observations on migration flows. Running various regression models for each year between 1947 and 1966, Vanderkamp (1971) explores the link between migration, income differentials between origin and destination and distance of the moves. The expected trends ensue, new and repeat migrants are attracted to higher income destinations and negatively affected by distance involved in the move, but it is also found that these variables vary strongly with business activity in such a way that overall migration slows down along with the economy. However, it is also reported that return migrants may respond differently to migration incentives than other migrants as their flow varies negatively with the state of labour markets.

More recently, Coulombe (2006) examined net migration flows across age groups between the ten Canadian provinces since 1977 and found interprovincial migration to be driven by "structural factors such as the long-run regional differential in unemployment rates, labour productivity, and the rural/urban differential structure of the provinces".

1.2.4.2 Individual characteristics

Of great importance to our analysis are migration studies that use micro data (individual or household level); offering the benefit of controlling for individual factors associated with the propensity of migrating. Robinson and Tomes (1982) uses 1971 Census of Population data to

investigate self-selectivity of migration. Using structural probit equations estimated with and without selection allows them to address a key point recognized in the literature; that is, estimates of the returns to migration are subject to selectivity bias. Previous migration models suggest that permanent income differentials between provinces, net of moving costs, will dictate the propensity to migrate between these provinces. Robinson and Tomes (1982) find that controlling for self-selection using personal factors such as age, educational level, language, family size, marital status, etc. the coefficients of variables associated with migration such as wage gain differentials, language and education levels are significantly altered. This supports the claim that heterogeneity in a population results in differentiated levels of return amongst migrants and non-migrants. This selectivity of migrants has been tested empirically in many of the studies using micro-data.

Using data derived from the 1986 Census of Canada, Newbold (1996) studies the determinants of return and onward migrants for non-native adults aged 20 to 64 years. After controlling for self-selection effects of individual characteristics which influence the propensity to migrate, Newbold (1996) finds that migrants returning to their province of origin are negatively selected in such a way that their migration is not primarily determined by provincial economic variables such as average employment growth and income levels in the same manner as onward migrants.

Other individual factors such as immigration and visible minority status can also have implications for migration propensity. Lin (1998) investigates the different mobility of foreign born and native born Canadian across provinces. The analysis uses micro-data from the Labour Market Activity Survey to analyze interprovincial mobility of foreign-born and native-born between 1989 and 1990. Using a probit and logit specification to estimate the propensity of out-of-province migration and using a dummy variable to distinguish immigrants from native-born Canadians, Lin (1998) finds that overall, there are no structural differences between the two groups in interprovincial migration behaviour when controlling for labour market outcomes/conditions, personal and job-related characteristics, and policy interventions. However, a lower mobility rate found among foreign-born Canadians can be attributed to compositional differences between the immigrants and non-immigrant populations.

Vachon and Vaillancourt (1998) use data from family allowances/child tax benefit recipients and income tax filers to describe annual interprovincial mobility and report that the decision to migrate can also be influenced by policy or singular events in market economies. For example, it was reported that national mobility patterns were influenced by local issues such as the collapse of the cod fisheries in Newfoundland, the victory in 1976 of the Parti Québécois in Québec and the fluctuation of wheat prices in Saskatchewan and oil in Alberta.

Finnie (2004) applies a panel logit model to the Longitudinal Administrative Data (LAD) which includes data covering ten percent of Canadian tax filers over the years 1982 to 1995. The findings show that inter-provincial migration is influenced by various personal attributes (i.e. age is negatively related to mobility, presence of children increases the costs of migrating) as well as the size of the province and area of origin (i.e. smaller provinces experience higher out-migration rates but living in a rural area was negatively related to inter-provincial mobility), cultural factors such as language (i.e. francophone Québécois are less likely to migrate out of Québec), labour market conditions in province of origin (i.e. mobility is greater in province with higher unemployment rates) as well as the employment status of the migrants (i.e. individuals having received unemployment insurance were more likely to move).

More recently, Dion and Coulombe (2008) apply a multinomial logistic model to individual level data from the Census of Population 2006. This analysis confirms the earlier ideas that migrants have specific features that distinguish them from people who did not migrate and that these trends still apply in recent years. Specifically, it is reported that: people aged 20 to 29 are more likely to migrate, the presence of children reduces the probability of migrating, individual reporting aboriginal identity are also more likely to migrate and finally, the analysis shows that

persons living in rural areas are more mobile than those living in urban areas. These cited analysis show how micro-data can be valuable in isolating the effects of personal factors in decisions and can also serve as control variables to isolate the regional effects in migration outcomes.

That being said, micro-data stemming from sources such as Census data do have their limitations. Because of privacy laws in Canada, for example, Statistics Canada cannot link multiple Census date years into a single longitudinal file tracking individual migration decisions over several decades. Therefore, researchers must make use of date from one Census year, at the time of destination, and extrapolate their situation at the time of origin. Age, gender, ethnicity and other linear or constant in time variables, for example, are easily to estimate back to their time of origin. However, other information such as education, family status, occupation, salaries, etc. are not straightforward and could have changed as a result of the migration or may be the causes of such decisions. For example, many students will migrate for post-secondary schooling, especially if they are living in a region without access to colleges or universities; however, not knowing the migrants education level at the onset, only after migrating, makes it difficult to estimate whether the move was an education related one (i.e. attending university) or as a result of obtaining an educational degree (i.e. finding a job once education completed). Directly survey migrants might be better suited for identifying the underlying motivations these migration choices but such sources usually come at the cost of smaller sample size.

1.2.4.3 Rural and urban migration

Other researchers have focused mainly on migration across the rural-urban gradient. In Canada, the rural-urban gradient can be understood through the Statistical Area Classification (SAC). This classification groups census subdivisions according to whether they are a component of a census metropolitan area, a census agglomeration, a census metropolitan area and census agglomeration influenced zone (strong MIZ, moderate MIZ, weak MIZ or no MIZ), or the territories (Northwest Territories, Yukon Territory and Nunavut).

Using a combination of Census data, T1 tax records and the Survey of Labour and Income Dynamics (SLID) covering the period between 1986 and 1996, Dupuy *et al.* (2000) have documented migration patterns in the 1990s between rural and urban areas in Canada. Although rural areas across Canada tend to lose 12-16% of their population aged 15-19 during a 5-year period, migration patterns in rural areas are not necessarily homogeneous across the country. For instance, Newfoundland, New Brunswick and Saskatchewan had experienced net losses of their rural population aged 15 and over while Quebec, Ontario, Alberta and British Columbia were net gainers for the period 1991-1996. Furthermore, the greater part of youth rural out-migrants choose a destination urban area in their province of origin except in the case of Newfoundland where rural out-migrants end up in urban areas outside the province. The research using this data also reports that while university graduates represent only a minority of rural leavers, they have a high propensity to leave rural areas.

Audas and McDonald (2004) also make use of SLID data from three overlapping panels covering the period between 1993 and 2000 to study rural-urban migration in the 1990s. They also state that young, single and university-educated individuals have a higher propensity to migrate out of rural areas but they also report that the flow of people moving from urban to rural area more than offsets the rural out-migration.

More recently, Guimond and Simard (2008) have examined the case of urban to rural migrants in select Quebec regional municipalities (i.e. Arthabaska, Brome-Missisquoi**)** using case studies and interview data. From these isolated cases, it is reported that the “neo rural” (*néo-ruraux*) population is heterogeneous. In the case of Brome-Missisquoi, neo rurals are comprised of individuals who are generally older and retired individuals who have lived the greater part of their adulthood in urban areas whereas in the Arthabaska region, the new rural migrants are younger adults who are still active in the labour force.

1.2.4.4 International studies

Finally, some empirical studies deserve some attention, even if not conducted with Canadian data, as some of their methodological approaches and general findings would also apply to the case of Canadian migration. For instance, in the case of developing countries, Bilsborrow *et al.* (1987) focuses on the impact of origin community characteristics on rural-urban out-migration in Ecuador during the period 1977-1978. The probit model estimated in this research accounts for individual, household, and origin area level characteristics; the latter variables being: distance to capital, agricultural related indicator, size of the local urban labour market and an indicator of level of services or amenities in the area. They find that the distance from the capital has a negative effect on the out-migration of a rural community but only for sons. Furthermore, the availability of electricity in the community is found to have a mitigating effect on out-migration. Moreover, they examined a wide range of theoretically plausible interaction effects involving model variables. Only one interaction term, indicating the interaction of land owned and distance to Quito, appeared consistently enough to be included in the final model. This implies that while sons living farther from the capital are less likely to migrate, those with no farm land are more likely to leave than those with farm land but living in more remote areas.

In the case developed nations, Pekkala (2003) studies the regional flows of migrants in Finland during 1985-1996 using micro-data covering a one percent sample of the population representing approximately 300,000 individuals. Using a multinomial logit model with classification for migration type (e.g. first move, repeat migration, return migration) and regional type for destinations (e.g. growth centers, declining region, other region), the evidence supports the claim that human capital tends to migrate towards growth centers while some return migrants, especially older and less educated, move back to their original home regions even though these destination regions may be classified as declining.

1.2.4.5 Community factors

There is a long standing tradition of empirical studies devoted to identifying traditional factors of economic growth (e.g. population, employment, income, migration, etc.) at the local level in the regional development literature stream as well as a series of more recent studies (Rupasingha, 2002 ; Wong, 2002 ; Shearmur and Polèse, 2007 ; Apparicio *et al.*, 2007 ; Alasia *et al.*, 2008). Most empirical studies generally agree on using a certain number of key factors but the interpretation of the results may vary (Glaeser, 2000). In sum, determinants of local economic development generally includes tangible elements such as “localization factors, infrastructure factors, human resources, capital and financial resources, industrial structure” (Wong, 2002) as well as intangible factors such as “entrepreneurial culture, institutional framework encouraging inter-business collaboration, private and public sector cooperation, a dynamic tertiary sector, financial activity supporting innovation and emerging activities” (Maillat et Bataini, 2001).

1.2.4.5.1 Location factors

Wong (2002) defines locational factors as "the external attributes of a region or the accessibility gained by the spatial interaction between a region and its partners in the process of production and consumption - for example, markets, suppliers and major business centers. It is thus possible to measure the factors of geographical location of a community (i.e. distance of a major urban area, geographic coordinates, etc.) and to assess their effects on local economic development.

As mentioned by several authors, the location of a region or community within a country may greatly affect its economic growth potential. That said, a community located near a large city or metropolitan may reap the benefits of agglomeration economies of its neighbours. To measure this factor, Reimer (2002) uses the code Beale (modified for the Canadian context by Ehrensaft and Beeman, 1992), Connell and Wall (2004) measures the distance in miles from an urban center (in least 10,000 inhabitants), the Atlas of Canada (2004) uses the metropolitan influence

zones (MIZ) developed by Statistics Canada, Alasia *et al.* (2008) use the distance to both a CMA (over 500 000) and a CMA or CA (less than 500 000 inhabitants), Rupasinghe *et al.* (2002) use a dichotomous variable (rural / urban) and finally, Polèse and Shearmur (2007) classify the regions into four groups (central urban, urban fringe, rural center, rural peripheral).

1.2.4.5.2 Human resources

According to Wong (2002), human resources refer to the “availability, level of participation, quality, attitude, cost and other characteristics of the workforce.” As a result, many economists have long stressed the importance of human capital in the process of economic growth (Mankiw, Romer and Weil, 1992). These authors concluded that by adding a measure of human capital in the traditional growth model of Solow (1956), they came to explain some important residues of this early econometric model. Several studies also discuss the role of human capital at the local level (Emery and Flora, 2006; Markey *et al.*, 2005).

Most studies in the literature make reference to the level of education as a factor of economic growth or community indicator. As noted in Markey *et al.* (2005) “education helps to create a productive workforce, effective leadership, and informed citizens.” Among the authors who use an objective measure of educational attainment in a statistical model, Polèse and Shearmur (2007) choose the "percentage of university graduates in the population 15 years and over," Alasia *et al.* (2008) opt for the "percentage of the population aged between 25 - 54 who hold a postsecondary education" and Reimer (2002) distinguishes between the "percentage of women and men with a postsecondary education. Finally, the indicator of quality of community life measuring education as used by the Atlas of Canada (2004) is the "percentage of people who attended a trade school, college or university compared to the percentage of population that has not reached the ninth grade.

Furthermore, the Economic Council of Canada (1990, as cited by Markey *et al.*, 2005) suggests that greater success at the community level can be achieved when the workforce comprises a greater share of workers between the ages of 25 and 44. Moreover, Alasia *et al.* (2008) posits a "relatively high level of population are very young or very old in the community can increase stress." Thus, several authors propose to take into account the age distribution of the local population as an indicator of human capital. Desjardins (2003) suggests using a measure of "age structure of population”, Reimer (2002) calculates the "dependency ratio of population aged 64 and over" and Alasia *et al.* (2008) use the "percentage of population below the age of 15" to represent the young people and "the percentage of population between the ages of 55 and 74 years" to represent an aging population.

However, some researchers (Pritchett, 2000; Wolf, 2002) are now beginning to question whether or not human capital – in terms of higher educational attainment – may be at a surplus, and therefore no longer a growth factor. The overabundance of university graduates in some regions may in fact act as push factors forcing people out of some overly competitive regions. Certainly, general know-how and professional qualifications remain important in the labour market but the higher mobility of university graduates combined with their increased supply is forcing researchers to question assumptions which may have been valid 40 or 50 years ago when post-secondary diplomas were scarcer but which may no longer hold true nowadays.

1.2.4.5.3 Industrial structure

Industrial structure refers to the "mix of industries in an economy; the degree of concentration in a few industries that might affect its growth potential and its vulnerability to economic change" (Wong, 2002).

Polèse and Shearmur (2007) also argue that "industrial structure dominated by a few companies, or subcontractors passive, can slow the local development." For instance, large heavily capitalized enterprises located in smaller areas (e.g. mines, pulp and paper mills, aluminums producers, etc.) can translate into higher wages, this in turn can discourage the

creation or implementation of small and medium sized businesses (SMB), a phenomenon that Shearmur and Polèse have coined in French "*le syndrome du rentier encombrant*" (or instrusive rentier syndrome) (Polèse and Shearmur, 2002; Polèse and Shearmur, 2005). To reflect this factor, they employ several industrial classes for the base year in their econometric model (Polèse and Shearmur, 2007). Alasia *et al.* (2008) also measures the "degree of economic specialization using the concentration index Herfindahl." Other researchers use location quotients (LQ) to measure the over- or under- representation of certain industries in local labour markets compared with regional or national employment levels. Furthermore, Alasia *et al.* (2008) point out that "communities with a greater share of employment in traditional sectors - which are more exposed to global competition - are more likely to be vulnerable to the restructuring of the global market." The latter therefore employ an indicator of the sectoral composition of the community and the surrounding area measured by "the share of employment in agriculture, in other primary sectors and in the traditional manufacturing sector (Alasia *et al.*, 2008) to illustrate that the community feels vulnerable to the pressures of the global economy.

1.2.4.5.4 Economic and labour activity

Given the relationship between several indicators already discussed above, we limit ourselves to the more traditional measures of economic capital. This type of capital can be measured through the employment rate and labour income in the community, but also in light of economic circumstances such as fluctuations in the industry, market forces and economic diversification.

The employment rate of the workforce is often cited as being "a better indicator of local labour market conditions than [unemployment], since the latter ignores hidden unemployment which is not calculated by official statistics and reflected by the low participation rate" (Alasia *et al.*, 2008). However, several studies identified suggest the use of both measures as indicators of labor market (Desjardins, 2003; Connell and Wall, 2004; Reimer, 2002; Alasia *et al.*, 2008).

Researchers have recourse to different metrics related to income to assess local productivity or cost to employers (salaries per worker) and standard of living (average revenue adjusted for cost of living). The former metric is more closely related to local development and would have greater impact on location decisions of businesses whereas the latter can be made up of transfer payments and other non-market sources of income.

Alasia *et al.* (2008) estimates that "access to wealth (individual, company or group) may be an important asset in the adjustment of a community coping with stress". Reimer (2002) and the Atlas of Canada (2004) employ a measure of "average salary or income in their calculation of the capacity and quality of community life. By contrast, according to results of Polèse and Shearmur (2007), the average wage of a region is sometime negatively correlated with employment growth, which is consistent with the classical models of industrial location based on cost. Nevertheless, all the authors identified refer to a form of earned income (excluding transfers and government) as an indicator of community-based.

1.2.4.5.5 Amenities

In this case, amenities refer to the "hedonic", or pleasurable aspects associated with natural and cultural features of an area (Vaugeois and Whitney-Squire, 2010). Several researchers have documented an increase in "hedonic" migration toward amenities rich areas (Rappaport and Sachs, 2003; Cheshire and Magrini, 2006; Rappaport, 2007). Amenity considerations carry greater weight as incomes rise, compared to purely pecuniary objectives (Rappaport 2009). Within richer nations, the growing preference for shorelines and sunny locations is well documented (Rappaport and Sachs, 2003; Cheshire and Magrini, 2006; Rappaport, 2007). In France, Duboys-Fresney (2006) speak of *héliotropisme* (the search of the sun) and *thalassotropie* (the search of water), to qualify the geographic evolution of population movements in France. In the United States, much of the Sunbelt (e.g. Florida, Texas, California, etc.) experienced a significant increase in population beginning around 1960, reversing a

century of outmigration (Partridge *et al.*, 2010). Likewise, rural areas with high endowments of natural amenities began to experience a significant rebound in the early 1970s, reversing decades of decline related to problems associated with the mechanization of labour (Graves and Clawson, 1981).

Culture can also be considered an attractive amenity to potential migrants. It can also lead tourists to discover an area which might later become a potential destination of permanent residence. Bourdieu (1986) distinguishes between three forms of "cultural capital": included, objectified and institutionalized forms. However, only the objectified form (i.e. cultural goods such as books, works of art, monuments, media, etc.) are of interest in the context of this study since other forms are already included in measures of human capital. In fact, it is unlikely that an individual can possess high human capital (i.e. higher education and know-how) without embodying some of the associated cultural norms (i.e. etiquette and codes of conduct which distinguish university graduates and non-graduates) and social networks (i.e. pre-professional connections which may serve in the future professionally). In short, we distinguish between the cultural capital at the local level and human capital embodied by the individual as the former may represent the culture and traditions of some ethnic groups within a community or even the cultural diversity of a community, but it may also occur in museums, festivals, corporate heritage of these communities.

For a long time, few researchers had explicitly quantified the impact of amenities on migration but more and more of this type of research is now being conducted in Canada, the United States and Europe (Halseth, 2004; Boucquey *et al.*, 2012). Ferguson *et al.* (2007) found that economic variables lose some of their influence to natural and modern amenities on population change in rural areas as people age. Booth (1999) set out to establish the spatial determinants of population, employment and income densities in 86 mountain counties in the United States and found that densities were linked to amenities such as ski areas, national parks, and universities or colleges. Similarly, spatial patterns have been shown in the American west where Shumway *et al.* (2001) identified a number of counties with high levels of environmental or natural amenities creating the “New West”.

However, while many researchers accept a role of amenities in local development, they do not necessarily agree on the causes and effects. Florida (2002) postulates that amenities and other community openness factors attract workers who in turn attract businesses and economic activities. Peck (2005), Storper and Scott (2009) and Shearmur (2010) rather suggest that developing local amenities are a result of economic activities and money pouring into a region rather than its initial cause; for example, a mountain is only a mountain until there is enough demand for a ski hill. Nevertheless, Davezies (2008; 2009) puts forward another interpretation of the role of amenities in that they can attract workers, but not necessarily for work. The idea of residential economies, people choose to live where they prefer (i.e. cottage country) but still work where the jobs are located (i.e. larger cities) has developed in recent decades as transportation improved. As a result, long distance commuters will earn their money in one locality to spend elsewhere but the only jobs directly created by these amenities which attracted the workers in the first place are maintenance and personal jobs to service the area.

1.2.4.5.6 Individual and Community Interaction

Finally, community factors will have a different effect on different people. Several researchers in migration have used interaction terms in the literature to explore individual and community effects simultaneously (Bilsborrow *et al.*, 1987; Singh, 2004; Lin 2007); for example, to isolate the effect of certain subgroups of individuals with particular contexts (i.e. young and educated, highly educated and living in a community with low education levels, etc.) on the propensity to migrate. One method for achieving cross-product terms can be obtained by multiplying two independent variables of interest (e.g. age group and education level, immigrant and visible minority status and cultural diversity). Community variables should be centered prior to multiplication as recommended by Keith (2006). Centering is achieved by subtracting the mean score of the continuous variable from that variable; thus

resulting in a mean of 0 with a standard deviation equal to the original standard deviation. This procedure prevents multicollinearity to occur between independent variables when introduced together in the multiple regression models. It should be noted that when combining individual and community level data, it is preferable to used fixed community categories (i.e. non-continuous) as to not confound the error terms, at the individual and community level, into a single model. However, when categorizing communities based on continuous data, the resulting categorical data will have lost some of its precision as communities are no longer placed on a spectrum (e.g. distance from markets) but rather classified in equal boxes when they may, in reality, be quite different (e.g. metropolitan influence zones).

Several other alternatives approaches have thus been used in the literature when considering both community and individual level factors in outcome predictions. In recent years, researchers in many fields have relied on multilevel models for isolating the effects of micro and macro determinants on individual-level outcomes (Angeles, 2005). Such an approach can also help counter the estimation bias stemming from combining both continuous individual and community level data. Examples of the multilevel approach can be found in Helms and Jacobs (2002), a study of criminology; Linnemayr and Alderman (2006), a study of food security and Boyle *et al.* (2006), a study of child health in the developing world. In these cases, the individual behaviour of study is said to be a factor of both personal characteristics and environmental effects.

1.3 Local economic development

Community development can be measured and defined in many different ways. Socially speaking, community development can occur even where there is no growth; for example, if the community becomes more welcoming to immigrants, if municipal governance improves, if there are fewer turf wars, if the environment is better protected, etc. However, for economic researchers and practitioners, employment is typically the key underlying issue. More jobs equal more revenue for communities and their families. This in turn generates more revenue for the municipality for services and amenities. Finally, a healthy job market and community amenities drive more people to migrate toward these areas and the cycle perpetuates itself. In this light, attracting businesses is the key to community development. For other researchers, population is the main determinant of community development. Attract the working age population to your community and they will find or create their own employment opportunities. This will also have the effect of raising living standards and generating income for the municipality. Whether employment opportunities emerge and workers follow, or population leads and jobs ensue, the end result, increased well-being at the local level, is what many researchers try to capture and measure when studying community development.

1.3.1 Local economic development policies

When addressing the issue of local economic development, one speaks of increasing both the living standards of inhabitants of a "small" area and their community of belonging (i.e. labour market). Such results may be reached by several means (i.e. policies supporting local businesses, local development agencies, etc.). Over the past twenty years, emphasis has been placed on the ability of a community to establish, support and sustain a local economy. As Shearmur and Polèse (2007) remind us: "for communities to survive, it is jobs that are needed, not necessarily high income or growth in productivity". Moreover, we must recall that in the last few decades, it is the small and medium businesses (SMBs) that contributed the most to net job creation in Canada (Polèse, 1986). That said, the main objective of local economic development policies "must go beyond creating jobs in the short term. It must be to strengthen the capacity of communities to resist the forces of change in capital and to build vital communities with the power and means to renew and to ensure their survival over time. In other words, to build sustainable communities" (Pell, 1994). Consequently, communities that manage to generate jobs or attract migrants are likely to show characteristics of local community support for a dynamic and entrepreneurial culture. However, not all communities will have what it takes to strive or even survive in the current economic context. Separate policies will need to be devised to help the striving communities reach their potential and other policies will

need to help the people left in communities faced with an inevitable decline, whether this involves displacement or not.

1.3.2 Community development, migration and resource dependency

One of the main tenets of community development is that if people stay and fight long enough for their communities, they will eventually find a solution. It is only when people start leaving in important numbers that community development efforts have failed to save the community. Many cases of community development efforts can be found in coastal communities. Few of these case studies point to a miracle solution for recycling communities once dominated by fisheries or other natural resource extraction industry into vibrant and diversified economies. However, most of these stories have at least one common element: people felt their communities were worth saving. The type of resource dependency may have an impact on the migration (or lack of migration) within these communities.

CHAPTER 2 : OBJECTIVES, RESEARCH QUESTION(S), HYPOTHESE AND PRESENTATION OF ARTICLES

2.1 Objectives

The main objective of this research project is to gain a better understanding of the mechanisms that influence the decision to (re)locate in Canada and to understand its impact on rural and small town development. We study internal migration as an indicator of communities attracting people as well as communities losing population to other localities, thereby examining the link between migration and local development.

In this chapter, we outline the main research question(s) and hypotheses that will guide the work of this thesis and finally, we present the three articles which will comprise this thesis.

2.2 Research Questions

The main questions behind this paper, and most papers in regional science, remains: *Why do some communities grow (employment and population wise) while others do not? Which rural communities or regions in Canada are more likely to decline and cease to exist in the near future? Which ones have a chance of survival?*

Partial answers to such overriding questions can be found in empirical studies of the regional science literature (Rupasingha *et al.*, 2002; Wong, 2002; Erickcek and McKinney, 2006; Shearmur and Polèse, 2007; Alasia *et al.*, 2008). However, the present analysis will more specifically serve to answer the following questions, namely:

- Who is leaving rural Canada (i.e. types of people) and where are they going (e.g. rural or urban areas)? How much of the decision to leave is influenced by place characteristics (etc. remoteness, resource dependency or industrial structure, etc.), and how much is influenced by individual factors (e.g. age, gender, education, etc.)?
    - In other words, are there factors in rural communities which makes “attachment to place” (Florek, 2011) stronger than in others?
- For those who are migrating towards rural Canada, are they migrating for work or pleasure? What is the role of economic and non-economic factors in attracting new citizens from cities to rural communities? At what point in someone’s life do non-economic factors start to play a more significant role in migration decisions (e.g. young families, working age population, pre-retirement age individuals, etc.)?
    - In other words, are there factors in some rural communities which increase “attractiveness” (Niedomysl, 2008) for some sub-groups of migrants?
- Finally, what community level factors are particularly associated with positive migration rates recorded in small towns and rural communities’ labour areas? Do local factors affect younger and older migrants’ decisions similarly or not? Are there exceptions to the general rural development through migration rules (e.g. outliers)?
    - In other words, how do regional development models applied to rural labour areas differ from those applied to urban labour areas?

2.3 Hypotheses

In the first paper, according to the literature, we should expect to find that individuals who are: *younger, more educated, immigrants and visible minorities, living in smaller rural areas* are most likely to migrate

out of their rural communities between 2001 and 2006. However, controlling for these personal factors, we also postulate that people living in the Atlantic region dependent (or formerly dependent) on fisheries will be less likely to migrate out of their communities than say, agricultural regions such as the Prairies – even though unemployment rates may be equally high in both. If this is found, it could be said that coastal communities are "stickier" in terms of mobility or in other words, that "attachment to place" is higher in some communities and in part, influenced in part by industrial legacies and geostructural characteristics. Finally, we expect to find that urban-rural migrants are generally older and less educated, perhaps suggesting that this type of migration is less influenced by economic factors than rural-urban migration patterns.

In the second paper, it is expected that a number of rural and small towns in Canada will have welcomed a significant flow of former urbanites and/or other workers from peripheral areas between 2001 and 2006. Migration flows will likely be affected by basic variables such as distance and provincial barriers (i.e. urbanites moving to rural areas will most likely migrate to a small town close to their city of origin but within the same province). However, it is also expected that the rural labour areas successfully attracting older pre-retirement movers based on "hedonic" or residential type migration – despite the lacking economic opportunities available in the region – will have repulsive effects for younger workers.

In the third and final paper, we expect to find a number of rural labour areas where some age cohorts (e.g. pre-retirement age population) are in-migrating for presumably non-economic reasons (e.g. where net migration rates are higher than predicted). More specifically, we expect to find that industrial legacies have an effect on migration rates - old fishing villages and rural towns are more attractive to retirement age and residential migrants than former pulp and paper mill or mining towns, for example. However, we expect that remoteness - distance from large urban centre and access to public services such as health care - outweighs the attractiveness of place, even for hedonic and older migrants.

2.4 Thesis by Article

A short summary of the papers included in the thesis is presented below:

The first paper will focus on the individual and community determinants of internal migration of working age population in Canada, with a focus on rural-urban migration and urban-rural migration patterns. The analysis will be inspired by an individual migration model used by Statistics Canada researchers (Dion and Coulombe, 2008). This will be based on micro-data from the 2006 Census of population and the time frame conceded for migration will be 2001 to 2006. We will estimate a set of logit models using individual indicators as explanatory variables, which are to be derived from a cost-benefit framework of individual migration decisions. However, we will also include community-level attributes in order to measure the effects of place on the propensity to migrate. We expect individual factors to show the usual outcomes: men are slightly more likely to migrate compared to women, the propensity to migrate decreases with age and increases with education level, etc. However, certain individual factors may differ in terms of their influence on the propensity to migrate when adding the place characteristics.

The second article will use a gravity model to analyze migration flows between rural and urban communities across Canada between 2001 and 2006 (Delisle and Shearmur, 2009) for a series of age cohorts (e.g. young families, working age population, pre-retirement age, etc.). It is expected that population change through migration of workers will be affected by distance, provincial borders, percentage of university degree holders and average income for the base year amongst other factors. That being said, the motivations driving rural-rural migration will likely be different than urban-rural migration; the former based more on economic factors while the latter being founded to a certain extent on non-economic factors.

The third and final paper will focus less on individual migrants (other than by age cohorts) but rather on aggregated net migration rates at the labour area level. It will include all Canadian labour areas but will focus on the determinants of rural labour areas growth rates and for different groups of individuals

between 2001 and 2006. The modelling will be based on the Coffey-Polèse-Shearmur (CPS) regression model which accounts for major geostructural and local factors in determining population and employment change over time. This model also allows us to examine outliers (e.g. predicted – observed values) in order to further examine the underlying causes which dictate why certain rural labour areas fare better than others, despite the lack of economic attractiveness factors, for example.

CHAPTER 3 : METHODOLOGY

The methodology section will be presented separately for each article that constitutes the thesis. It should be noted that the order of presentation is crucial given that the results of the previous study affects the methodological choices made in the subsequent paper.

3.1 Individual migration model

In this theoretical framework[2], a set of individual and community level variables as well as the interaction between the variables will be used to explain the propensity of working age population to migrate. The interaction term between two independent variables implies that the marginal effect of one independent variable varies with the value of the other (Berry *et al.*, 2007). A large sample of localities is strongly recommended when using continuous variables for both individual and community levels in such a model as to avoid encountering estimation problems from confounding error terms between the two levels.

It is widely recognized in the literature, and also accepted as common belief, that migrating involves costs and benefits (see Chapter 1). Potential migrants appraise the costs and returns of moving (Grenier, 2008) and make migratory decisions based on this hypothetical calculation. In short, the proposed framework is based on a cost-benefit calculation involving individual level, community level and interaction variables.

In the present framework, an individual decides to move to community *j* if the present value of the total benefits to move is higher than the present value of the cost of moving (Etzo, 2008).

$$NPVM_{i,j,0} = \sum_{t=1}^{T} \frac{(B_j - B_i)}{(1+r)^t} - \sum_{t=1}^{T} \frac{(C_j - C_i)}{(1+r)^t} \qquad [1]$$

where *i* denotes the region of origin and *j* the destination region, B denotes the total benefits, C the total cost related to the respective region, *r* is the discount rate and T is the lifetime period. We can ignore the discounting factor under the assumption that "it is unlikely that any potential migrants formally discount future earnings to attain their present value before making their decisions" (Speare, 1971; 119), this can be rewritten as:

$$M^*_{i,j} = \Delta B^1_{i,j} + \Delta B^2_{i,j} + ... + \Delta B^n_{i,j} - \Delta C^1_{i,j} - \Delta C^2_{i,j} - ... - \Delta C^n_{i,j} \qquad (2)$$

that is, the net present values of migration (*M*), which influences the decision to migrate, can be decomposed in a set of benefit and cost components, many of which can be related to community factors. These can include the income or employment opportunities offered by a community as opposed to another locality within the country; therefore, the costs and benefits may be transposed into monetary

[2] Several alternatives approaches have been used in the literature when considering both community and individual level factors in outcome predictions. In recent years, several researchers in many fields have relied on multilevel models for isolating the effects of micro and macro determinants on individual-level outcomes (Angeles, 2005). Examples of the multilevel approach can be found in Helms and Jacobs (2002), a study of criminology; Linnemayr and Alderman (2006), a study of food security and Boyle *et al*. (2006), a study of child health in the developing world. In these cases, the individual behaviour of study is said to be a factor of both personal characteristics and environmental effects.
In the case of migration studies, researchers often include higher level variables (i.e. province, region, community, etc.) and individual level factors into models attempting to explain the decision to migrate; where individual and higher-level characteristics are analyzed simultaneously to isolate the effect of each variable in the propensity to migrate as well as the interaction effect between each level (Bilsborrow *et al*., 1987; Lin 2007).

units (Grenier, 2008). However, as the migrant selectivity problem states, the costs and benefits of migrating, and consequently the decision to migrate, are also simultaneously being influenced by individual factors. As a result, both local and personal factors are integrated in the costs and benefits of the calculation as they each play a role in determining migration outcomes.

$$M^* = f(\Delta B^n) - g(\Delta C^n) \quad (4)$$

Typically the relationship between migration and factors entering the cost-benefit calculation is estimated using a categorical dependent variables model and a series of explanatory variables. In our model, *M* is unobservable; that is, the preference to migrate given the net present value of migrating can be thought of as a latent unobservable variable *M** (Grenier, 2008) which is related to the observed independent variables by the structural equation:

$$M_i^* = x_i\beta + \varepsilon_i \quad (3)$$

where *i* indicates the observation and *ε* is a random error.

In our case, we only observe the decision outcome, *ex-post*, which is migration or non-migration. Consequently, we can only assume that migration occurs if *M*, the net present value of migrating, is greater than 0 and does not occur if M is equal of inferior to 0. The link between the observed binary *M* and the latent *M** is made with a simple measurement equation:

$$M = \begin{cases} 1 \ if \ \ M^* > 0 \\ 0 \ if \ \ M^* \le 0 \end{cases} \quad (5)$$

Cases with positive values of *M** are observed as *M*=1, while cases with negative or zero values of *M** are observed as *M*=0.

The latent variable model for binary outcomes can be expressed in the following way, given value of *x*, we see that:

$$\Pr(M = 1 \mid x) = \Pr(M^* > 0 \mid x) \quad (6)$$

In other words, the probability of migrating (*M* = 1) is a function of *x*. Using the cost-benefit framework, *x* represents the factors weighting in as costs and benefits of migrating. Therefore, we can express equation (6) as follows:

$$\Pr(M = 1) = \Lambda(\beta B + \delta C) \quad (7)$$

However, we do not observe a binary outcome in our case but rather three possible outcomes[3]. Consequently, we use a multinomial logit, in which the non-mover outcome is compared with alternative destination outcomes. Specifically, three migration outcome categories are used *non-mover*, *move to same type of region* (i.e. rural-rural); *move to different type of region* (i.e. urban-rural).

M = 0, if the individual does not migrate

M = 1, if the individual migrates to the same type of region (8)

M = 2, if the individual migrates to a different type of region

This means that each individual is faced with three mutually exclusive outcomes, each offering its own net present value calculation, M_0*, M_1* or M_2*. The chosen alternative (*k*) can then be interpreted to imply the following (Pekkala, 2003):

$$M_k^* > \max M_j^* \text{ for all } k \neq j \quad (9)$$

[3] It is also plausible to conceptualize the decision to migrate in a two steps model: 1) the decision, whether or not to migrate and 2) if decision to migrate is made, choosing between alternative destinations. However, in this case, we choose to integrate the two decisions in a single model.

Following Long and Freese (2001), the multinomial logit model can be thought of as simultaneously estimating binary logits for all comparisons among the dependent categories. Formally, the multinomial logit model can be written as:

$$\ln \Omega_{m|b}(x) = \ln \frac{\Pr(y = m \mid x)}{\Pr(y = b \mid x)} = x\beta_{b|m} \quad \text{for } m = 1 \text{ to } J \quad (10)$$

where *b* is the base category, in our case the *non-movers*, which is also referred to as the comparison group. Since $\ln\Omega_{b|b}(x) = \ln 1 = 0$, it must hold that $\beta_{b|b} = 0$. That is, the log odds of an outcome compared to itself is always 0, and thus the effects of any independent variables must also be 0. There *J* equations can be solved to compute the predicted probabilities (Long and Freese, 2001):

$$\Pr(y = m \mid x) = \frac{\exp(x\beta_{m|b})}{\sum_{j=1}^{J} \exp(x\beta_{j|b})} \quad (11)$$

The base category *b* refers to outcome 0, and we obtain estimates for $\hat{\beta}_{1|0}$ and $\hat{\beta}_{2|0}$, where $\beta_{0|0} = 0$. The general specification of the multinomial logit model can be adapted using our previous cost-benefit framework to read as follow:

$$\Pr(M = 1,2) = \Lambda(\beta B^{icx} + \delta C^{icx}) \quad (12)$$

In this multi-outcome migration model, B^{ic} and C^{ic} represent sets of explanatory variables that enter in cost-benefits calculations: (i) individual characteristics (e.g. age, gender, education, immigration and visible minority status, etc.) and (c) community factors (e.g. geographic context of the community of origin – macro region and distance from a major metropolitan area). A detailed discussion on data and variable specification is presented in the next section.

The coefficients of the multinomial logit model can be more easily interpreted by estimating the relative risk ratio (RRR). The RRR can be calculated as:

$$RRR = \frac{P(y = 1 \mid x+1) / P(y = \text{base category} \mid x+1)}{P(y = 1 \mid x) / P(y = \text{base category} \mid \text{x})} \quad (13)$$

The RRR ranges from 0 to infinity. It reports the effect that a change in the variable of study has on the probability of the outcome falling in the comparison group to the probability falling in the referent group. A value of 1 implies that there is no association between the dependent variable and the explanatory variable. When the ratio is greater than 1, this indicates that the risk of the individual falling in the comparison group (i.e. migrant) relative to the risk of the outcome falling in the referent group (i.e. migrant) increases as the explanatory variable increases (i.e. age groups). On the other hand if the ratio is less than 1, the risk of the individual falling in the comparison group (i.e. non-mover) relative to the risk of the individual falling in the referent group (i.e. migrant) decreases as the explanatory variable increases (i.e. education level).

3.1.1 Econometric model

Data and variables specification

The data is accessed through the Carleton Ottawa Outaouais Local Research Data Centre (COOL-RDC) and stems from the long questionnaire of 2006 Census of population, which covers 20% of all Canadians. Only the working age population; 25 to 54 years of age in 2001 (30 to 59 in 2006), living in Canada in 2001 (outside of the Territories) and non-institutional residents are retained for this analysis.

Geographic unit of analysis

Areas of residence (current and 5 years ago) for individuals are provided at the Census Subdivision (CSD) level in 2006 boundaries. Statistics Canada identified 5418 CSD in 2006. The database used for

this analysis contains 4658 CSD which have a sample size sufficient to estimate community average. Furthermore, 10 CSD which are classified as Indian reserve have been suppressed from this sample. Individuals living in the Territories (Northwest Territories, Yukon Territory and Nunavut) are also excluded due to the 100km threshold for migration distance and the large area size of CSD in Territories (25,060 individuals). Finally, 4638 additional individuals are excluded from the analysis due to mismatching geographies.

3.1.2 Dependent variable - Migration status

According to Statistics Canada, a *mover* is a person who, on Census Day, was living at a different address than the one at which they resided five years earlier. *Internal migrants*, on the other hand, are movers who, on Census Day, were residing in a different CSD five years earlier (external migrants being persons who were living outside Canada five years earlier). The definition of *internal migrant* used in the present analysis again relies on two criteria, 1) change of place of residence between 2001 and 2006 as defined by Statistics Canada and 2) distance of at least 100 km between area of residence in 2001 and area of residence in 2006.

The reason for including a distance criterion is to isolate work-related migrations. In this sense, some researchers define migration as occurring whenever the distance involved in a residential move (change in homes) is so large that it is no longer possible for the mover to commute to the old place of work (Goetz 1999). “This definition can be turned around to argue that migration has occurred when a change in jobs involves such a large distance that the individual also has to move to a new home closer to the new job”.

The definition of the regional type (rural and urban) is based on the place of residence in 2001 and 2006. Following the Standard Area Classification (SAC) of Statistics Canada, we set the main divide between core urban areas and what has been defined Rural and Small Town[4] (see du Plessis *et al.*, 2001). In sum, geographical units falling within a Census metropolitan area (CMA) or Census agglomeration (CA) are classified as urban areas while rural and small towns (i.e. rural) are the residual geographic units which do not fall into an urban category.

We isolate migrations crossing the rural-urban regions by combining the definition of migrants with the rural-urban classification; each individual can be assigned to either one of six migrant categories: (1) rural non-mover, (2) rural-rural migrant, (3) rural-urban migrant, (4) urban non-mover, (5) urban-urban migrant and (6) urban-rural migrant (see Table 2).[5] The dependent variable is expressed in either binary or multinomial form. In a first model, to asses the strength and effectiveness of our independent variables, all individuals are included where all non-movers equal (0) and all migrants equal (1). In a second model, only rural population in 2001 are included; rural non-movers equal (0), rural-rural migrants equal (1) and rural-urban migrants equal (2). In a third model, only urban population in 2001 are included; urban non-movers equal (0), urban-urban migrants equal (1), urban-rural migrants equal (2) (see Table 2 for descriptive flows of migrants by category).

3.1.3 Independent variables - Personal factors

The choice of individual level variables is constrained by the availability of data in the 2006 Census of Population.[6] While there are many variables collected through the Census, it is not possible to know

[4] du Plessis *et al*. (2001) further classify Rural and Small Town into five types of zones based on the degree of influence of urban areas. These zones are Census Metropolitan and Census Agglomerated Influenced Zones (MIZs) (Statistics Canada, 2007). The five zones are: Strong MIZ, Moderate MIZ, Weak MIZ, No MIZ and the non-CMA/CA part of the Territories.

[5] Both non-mover categories are coded using the area type in 2001 (rural or urban) and include all individuals who had not migrated between 2001 and 2006. All migrant categories are constructed using the area type of origin followed by the area type of origin (i.e. rural-urban migrant). This classification includes all individuals in the sample.

[6] The limits and advantage of using micro-data from the Census of population have been outlined in the literature (Finnie 2004; Robinson and Tomes 1982.): The Census identifies only the current place of residence and that of the previous census, while migration occurs over time (e.g., return moves and multiple moves, etc.). Second, there is little information on the earlier situation. On the other hand, Census data includes the individual’s province of birth, education level, and other demographic

each individual's situation before the move and after the move. In the case of Census micro-data, only the description of the individual after the move (e.g. 2006) is reported. Consequently, the variables selection is further restricted to those applicable in the beginning of the studied period (2001); those that we can assume are relatively unchanged since the time of migration. This being said, it is possible to track certain individual characteristics of these migrants back to 2001 (e.g. gender, age, education level, aboriginal identity, immigration status and visible minority status). These indicators are presented below:

Gender

The effect of gender in migration decisions is not uniform in the literature. In earlier years, it could have been said that women were more likely to be 'tied movers', as they would follow the migration pattern of their husband as his employment was more important in terms of family income (Pekkala, 2003). In certain parts of the world, this may still hold true. However, some authors have commented on the feminization of migration (Mendola, 2006) and question whether or not there is still a difference between male and female migration patterns in moderns developed countries.

Age

Age at the time of migration (in 2001) is the single most important individual determinant indicated in the literature; human capital theory sees this attribute as key factor determining the economic return and cost recovery of migration (Sjaadtad, 1962). Generally speaking, younger individuals are more likely to migrate. However, this is also a relevant attribute in migration that is not driven primarily by economic factors. For instance, older and return migrants may decide to migrate, not necessarily for economic reasons, but rather driven by the presence or absence of certain amenities or services in the community.

Education level

Along with gender and age, education and skills of the individual are key factors that enter in the cost-benefit computation. Both theory and empirical evidence provide strong evidence of the linkage between human capital and increased mobility; that is, the higher the educational attainment, the greater the propensity to migrate (Dion and Coulombe, 2008). In our model, the educational attainment in 2006 will be used as a proxy for the initial level of individual human capital and entered using four dummy variables, ranging from low to high educational attainment. The level of education of an individual may vary between the time of the initial change in residence and the Census year but given that we are using only individuals aged 30 to 54 years in 2006, and that the highest human capital level category is 'university degree, bachelor degree or higher', this variation is most likely minimal.

Cultural identity

In addition to these key individual attribute, we also explore the use of Aboriginal identity and several categories for immigrant status or visible minority status (see Table 4). Aboriginals have been found to be more likely to migrate (Dion and Coulombe, 2008) while the results regarding immigration and minority status are still unclear. For instance, immigrants are said to be less mobile than Canadian-born citizens who had migrated before but more mobile than those who were still residing in their province of birth (Grenier, 2008).

Migratory antecedents

Migratory antecedents refer to past migratory behaviour; that is, whether or not the person was living in the province birth before migrating. In the case of immigrants, they were also classified as having migrated at least once before. Migratory antecedents can affect future migration decisions as it has been reported that repeat migrants have a higher propensity to move than others as the initial ties have already been broken and the psychical costs associated with relocation are lower. (Pekkala, 2003).

Macro-region of residence

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attributes which are not available from tax files. It also provides data with high geographic detail and allows a detailed rural-urban break down as well as an adequate sample for rural areas.

Geographic variables were derived from the place of residence in 2001 such as the macro-region of residence (Atlantic Provinces, Quebec, Ontario, Prairies and West). Certain regional and cultural tendencies affecting migration patterns have been observed in different parts of the country. For example, francophone Québécois were less likely to migrate outside of Québec, presumably due to language and cultural barriers (Finnie, 2004).

3.1.4 Independent variables – Community characteristics

All the community indicators used in this analysis are generated from the 2001 Census of population. However, all of these indicators are coded in 2006 geographic boundaries. The 2006 Census Subdivision (CSD) is used as the operational definition of community (in the remainder of the paper the term CSD and community are used as synonymous).[7] The community attributes used in the analysis are outlined below.

Total population

The *natural logarithm* of the total population is used to describe the community's size in 2001. Recent urbanization trends in Canada and worldwide suggests that a greater share of individuals is now living in cities than ever before (World Bank, 2005). Audas and McDonald (2004) also report that the size of community of origin affects the average annual out-migration rate for various types of migrants.

Population density

Population density is one of the main attributes differentiating rural areas from urban areas. Furthermore, density can vary dramatically within each regional type and consequently, influence the perceived quality of life of places amongst individuals who choose to live in either rural or urban areas. Younger individuals may be looking for highly dense regions while more mature and pre-retirement workers may be looking for less dense communities to raise a family or retire.

Distance from metropolitan area

The distance between the location of origin and the closest CMA/CA is used to proxy access to major markets. Distance is an important factor in attracting and retaining residents in a community as population and employment growth in rural regions across Canada between 1971 and 2001 have been found to be strongly linked to proximity and connectedness with a major metropolitan area (Shearmur and Polèse, 2007).

Interaction terms – Individual and community factors

In addition to the individual and community indicators, we use a set of interaction terms to isolate the effect of certain subgroups of individuals with particular contexts (i.e. young and educated, highly educated and living in a community with low education levels, etc.) on the propensity to migrate. As discussed in the previous section, there are several examples of interaction terms used in the literature to explore individual and community effects simultaneously (Bilsborrow *et al.*, 1987; Singh, 2004; Lin 2007). In this case, the cross-product terms are created by multiplying two independent variables of interest (e.g. age group and education level, immigrant and visible minority status and cultural diversity). It should be noted that all community variables are centered prior to multiplication as recommended by Keith (2006). Centering is achieved by subtracting the mean score of the continuous variable from that variable; thus resulting in a mean of 0 with a standard deviation equal to the original

[7] A CSD is a geographic area that is a municipality or an area that is deemed to be equivalent to a municipality for statistical reporting purposes (e.g., as an Indian reserve or an unorganized territory). Municipal status is defined by laws in effect in each province and territory in Canada. For a detailed definition of Census Subdivision, see the Statistics Canada web site at: http://geodepot.statcan.ca/Diss/Reference/COGG/Index_e.cfm

standard deviation. This procedure prevents multicollinearity to occur between independent variables when introduced together in the multiple regression models.

Age/Education and Population Size

It has been suggested that younger and more educated individuals are attracted to larger cities which generally offer a wider array of employment opportunities as well as entertainment and cultural activities (Florida, 2002), and thus, are more likely to leave smaller cities and rural areas. Given that younger educated individuals are generally more mobile, this set of interaction variables between age groups, level of education and population size serve to examine if the effect of age and education on the propensity to migrate also varies with the size of the city of origin.

Age/Education and Population Density

It could also be postulated that younger and more educated individuals residing in sparsely populated communities will be more likely to move out of these areas in search for greater employment opportunities and a different lifestyle (i.e. amenities not offered in rural areas). This set of interaction variables examine the link between age groups, level of education, population density and the propensity to migrate.

Age/Education and distance from small CMA

Younger and more educated individuals are more likely to migrate out of a community which is isolated from small and medium sized labour markets given that these centres offer greater employment opportunity to the young and educated. This set of interaction variables examine the link between age groups, level of education and the distance from a small CMA on the propensity to migrate.

Age/Education and distance from large CMA

Younger and more educated individuals are more likely to migrate out of communities that are located farther away from a large CMA and towards communities located closer or as part of these larger labour markets where employment opportunities are even more plentiful than in smaller urban areas and remote communities. This set of interaction variables examine the link between age groups, level of education and the distance from a large CMA on the propensity to migrate.

Logit model of internal migration

Finally, the internal migration model used in this section will be the following:

$$\Pr(Migrant = 1 \mid x) = \Lambda(\beta\, indiv_i + \beta\, com_i^d) \qquad [1]$$

Where Pr(Migrant) = the propensity of migrating outside of a community between 2001 and 2006, and:

Personal factors in 2006

- Gender
- Age
- Education level
- Cultural identity
    - Aboriginal
    - Immigration and visible minority
- Migratory antecedents
- Macro-region of residence
    - Atlantic
    - Quebec

- Ontario
- Prairies
- West

Community Characteristics in 2001

- Total Population
- Population Density
- Distance from urban centre and large urban centre (km)

Interaction Terms

- Age * Total Population
- Age * Population Density
- Age * Distance to CMA/CA
- Age * Distance to CMA500+
- Education * Total Population
- Education * Population Density
- Education * CMA/CA
- Education * CMA500+

3.2 Migration flows model

In order to study rural-rural and urban-rural migration flows, we propose a migration gravity model adapted from Delisle and Shearmur (2009):

$$M_{ij} = A\frac{P_i^a P_j^b}{d_{ij}^d} \quad (1)$$

to which certain control variables are subsequently added

$$M_{ij} = A\frac{P_i^a P_j^b}{d_{ij}^d} + V_i + V_j + V_{ij} \quad (2)$$

Where:

M_{ij} = migration flows between origin *i* and destination *j*;

P_i = population at origin;

P_j = population at destination;

d_{ij} = distance between origin and destination;

A = a constant;

V_i = vector of characteristics of the origin self-contained labour area (SLA);

V_j = vector of characteristics of the destination SLA;

V_{ij} = series of differentials between the origin and destination SLAs.

Delisle and Shearmur (2009) have shown that such a gravity model fits Canadian internal migration

data relatively well.

3.2.1 Data and variables specification

Micro-data was accessed through the COOL-RDC and stems from the long questionnaire of 2006 Census of population, which covers 20% of all Canadians. We analyze three age groups: 18 to 24 years of age (young adults), 25 to 54 years of age (core working age population), and seniors (55 years of age and over), living in Canada in 2001 (outside of the Territories).

3.2.1.1 Migration flows

We follow the initial migration definition of Statistics Canada, according to which, a *mover* is a person who, on Census Day, was living at a different address than the one at which they resided five years earlier (Statistics Canada). *Internal migrants* are movers who, on Census Day, were residing in a different Census subdivision (CSD) five years earlier (external migrants being persons who were living outside Canada five years earlier). In our case, the definition of *internal migrant* used will rely on two criteria, 1) change of place of residence between 2001 and 2006 as defined by Statistics Canada and 2) change of residence outside geographical unit representing a self-contained labour area (SLAs are defined in the next section – Geographic unit of analysis) and greater than 50km, as the geographic units are larger and changing of residence outside an SLA already implies a major migration decision (work-related, retirement, post-secondary education, etc.). These criteria allow us to isolate life-altering migrations (e.g. change of job and/or school outside original commuting zone). In this case, the migration data is aggregated into flows (i.e. total number of migrants) between origins (e.g. urban or rural) and destination (e.g. rural) communities.

3.2.2 Geographic unit of analysis

Areas of residence (current and 5 years ago) for individuals are first provided at the Census Subdivision (CSD) level in 2006 boundaries. The Self-contained[8] Labour Areas (SLA)[9], constructed by Statistics Canada and defined as smaller (or rural) SLA (population under 100,000) and larger (or urban) SLA (population equal or over 100,000), are then applied to the computed migration data. There are 349 SLAs in Canada. There are between 197 and 229 self-contained labour areas that can be described as "rural self-contained labour areas", depending on the way "rural" is defined. For the purpose of this study, all dependent (i.e. migration) and independent variables (i.e. all indicators in 2001) were computed using the 2006 SLA geography.

Since the self-contained labour areas used in this analysis are, on average, 96% self-contained in terms of people living and working in the same area, the migration figures provided here reflect a substantial change in the life of these individuals. Specifically, these changes are likely related to either a new job (in a different labour market area) or a major transition in the individual/family's life cycle, such as the start or completion of an educational program, a search for new or first employment, retirement, etc.

3.2.3 Data manipulation

As is customary for a gravity model, the data is set in matrix form that integrates both the characteristics of SLA and flow information (Delisle and Shearmur, 2009). Thus, each flow of migrants is associated

[8] "Self-containment" is a measure of the degree to which the workers living in "A" are also working in "A". Thus, by clustering areas with a high reciprocal importance of commuting flows and a low level of self-containment, new areas were created with increasingly higher degrees of self-containment. Once a certain threshold for self-containment has been reached, this would then be considered a self-contained labour market because most residents with jobs are working in the given labour area and most individuals living in the given labour area are also working in the given labour market area.

[9] The delineation of self-contained labour areas (SLAs) was based on a clustering procedure using data on the reciprocal flows of commuters. The method is derived from the algorithm developed by Bond and Coombes (2007). The main features of the method are outlined in Munro *et al*. (2011) while the details are presented in a forthcoming technical paper (Munro *et al*., forthcoming). http://www.statcan.gc.ca/pub/21-006-x/2008008/section/s2-eng.htm

with an origin and a destination SLA, as well as with the characteristics of the respective SLA at the beginning of the period (2001). In total, 121,452 observations are available (349 x 349 from which we omit the diagonal, therefore excluding intra-SLA migrations), many of which are zero (no flows between two SLA between 2001 and 2006). Of the total available SLA combinations for the total population, only 20,037 origin-destination combinations reported flows. Furthermore, migrations between SLA less than 50 kilometres apart are being excluded from this analysis, leading to a total of 121,226 pairs of SLA. This distance restriction ensures that we only isolate "life-altering" migration flows for all age cohorts: i.e. education related moves for young adults, employment related for core working age populations; retirement or non-economic related moves for seniors. Using both the geographic boundaries of SLA, which are already computed based on commuting flows and self-containment, as well as the 50 km threshold allows us to make the assumption that the majority of moves correspond to a change in labour market. It is worth noting that the largest flows contained in the data, as expected, are intra-SLA flows, excluded from the analysis.

3.2.4 Limitations

The data have a number of limitations. Migration flows do not take into account individual factors except for age (groups). The data does not account for multiple or return migrants (migration between 2001 and 2006). As Delisle and Shearmur (2009) point out, return migrations that occurred within the five-year period are not recorded in the census, and neither are chains of migrations over the period: only the point of origin in 2001 and the point of residence five years later (2006) are recorded. The fact that migration is accounted for on a 5 year period necessarily limits us to internal migration for one period at a time (unlike the, albeit imperfect, indicator of population change over a series of census periods, for example). Finally, international out-migrants are excluded by virtue of the fact that they are no longer present in Canada to complete the census, and international in-migrants cannot be assigned to an SLA of origin.

3.2.5 Variables in the gravity model

Population variable.

Population size effects in the gravity model differ from individual migration model in some respect. Whereas in the previous model, population was being used as a community level variable to represent urban agglomeration and its resulting amenities, services, attractiveness, etc. between destination options, population size in the gravity model first acts as the size of the "pool" of potential migrants, thus determining the initial quantity of out-flows from origin SLAs (Delisle and Shearmur, 2009). Generally speaking, there will more potential people migrating out of highly dense cities than sparsely populated rural areas.

However, population size also has a non-mechanical effect in the gravity model, especially at the destination. Consistent with classic "laws" of migration put forth by Ravenstein (1885)[10], larger metropolitan areas and their agglomeration economies (Pred, 1977; Krugman, 1991) have a stronger attractive pull than smaller regions but also attract migrants from other large urban centres over a longer distance. However, given that urban-rural migrants will necessarily be migrating toward a smaller SLA than their origin, in our case, we use the population variable to control for the attractiveness effect of larger SLAs. That being said, migrants that are making the move to rural SLA, despite the pull from either their origin or other potential destinations, are consistent with Ravenstein's (1885) laws of migration in that people can be "pushed" away from unattractive localities, metropolitan areas and the ensuing problems (e.g. congestion, crime, pollution, etc.). Thus, the parallels from the gravity model used in Newtonian physics can only be made to a certain extent in social sciences.

[10] 2) There is a process of absorption, whereby people immediately surrounding a rapidly growing town move into it and the gaps they leave are filled by migrants from more distant areas, and so on until the attractive force [pull factors] is spent; 3)There is a process of dispersion, which is the inverse of absorption (people [pushed] away from unattractive localities). (Ravenstein, 1885).

We also expect a different reaction to destination options by different age groups. For example, we would expect that young adults and core-working-age migrants who choose to relocate to a new rural (from an urban or other rural SLA) will choose a larger rural SLA - which still retains some aspects of agglomeration economies and its employment opportunities - than would seniors who are no longer limited by such choices. However, seniors at a later stage may also be more likely to choose urban destinations that offer long-care facilities and access to specialized medical services.

Distance variables.

Distance in migration is also consistent with the Newtonian physics gravity model as the attractive force of a place (or planet) dissipates over distance. Again, as pointed out in early laws of migration, long-distance migrants are more likely to choose an urban area (i.e. larger centre) than a rural area as a destination. However, in migration, distance is more complex as it represents an economic and non-economic cost (Delisle and Shearmur, 2009). A very short migration, migrating within a same SLA, for example, will represent the lowest cost to a migrant (i.e. cost of selling and purchasing property but no need to change employment or leave friends and family) while migrating across the country will have even more implications (i.e. the psychological cost of leaving familiar surroundings compounded by the incomplete information regarding the destination) (Sjaastad, 1962; Vanderkamp, 1968; Greenwood, 1975).

Again, in the context of our analysis, more urban-rural migrants should be expected to migrate towards neighbouring cottage country SLA, some perhaps owning a secondary home in the case of seniors who relocate permanently, winterizing their cottage. For example, Torontians who move permanently to the Muskokas lakes or Montrealers who move to the Laurentides hills upon retiring. That being said, the effect of distance should be different for young adults who move to smaller university towns than say, core-working-age migrants who moves to a rural SLA for employment in a resource extraction community or again, a senior who migrates outside of the commuting zone of their city to the nearby countryside.

Income levels.

Generally speaking, higher income differentials act as an attractive factor for potential migrants, from low income to higher income regions and intra-regionally, and may also signal a greater number of employment opportunities as employers compete for labour (Crozet, 2004). In our gravity model, we use the ratio of average income between origin and destination as a measure of this differential. However, Ferguson *et al.* (2007) show that older migrants are not as responsive to economic factors such as income differentials when making migratory decisions. We would expect young adults and core-working-age migrants from rural-to-rural to move to SLAs with higher incomes but not necessarily urban-to-rural migrants, especially in the case of seniors.

Border effects.

A permanent resettlement across a provincial border in Canada implies a major change in lifestyle in various ways: changing driver's license, often times switching telecommunications providers, banks (especially Credit Unions), and other logistical costs. Each province and region also has its own culture, medical system, governments, and in many cases, professional accreditation standards. Therefore, we introduce dummies for cross-provincial (regional) border effects. Canada is divided into six provincial or macro-regions (Atlantic Canada, Québec, Ontario, Prairies (i.e. Manitoba and Saskatchewan), Alberta and British Columbia). We introduce a series of six dummies to identify migrations flows crossing these provinces and/or macro-regions.

Again, we expect urban-rural migrants to relocate to a greater extent to rural SLA with which they are already more familiar, thus within their own provinces or at least within their macro-regions (i.e. migrating from New Brunswick to a cottage in PEI, but remaining in Atlantic Canada). Younger rural-rural migrants may, however, be more willing to relocate across provincial boundaries in search of employment opportunities, even if information is relatively scarce (i.e. Newfoundlanders migrating to Fort McMurray, Alberta, with the only knowledge being "jobs in the oil industry" and fellow expatriates

as social networks).

3.2.6 Econometric Estimates

In a migration gravity model, such as described above, the dependant variables analyzed will be counts - migration flows between origin and destination. Unlike population change in percentage, for example, Boyle and Flowerdew (1993) argue that an ordinary least squares regression would be inappropriate in our case. One solution to modeling count data with a large number of zeros[11] is to use Poisson estimations. This approach assumes a non-normal distribution of observations, a Poisson distribution, with count data as the dependent variable. Even if more appropriate, there are some issues with applying Poisson estimations to our data. Having the majority of observations being zeros is problematic, as the conditional variance is greater than the conditional mean, also known as "over-dispersion". Delisle and Shearmur (2009) have used a negative binomial regression technique to account for the large number of zeros in migration flows. However, their Poisson and negative binomial estimations were similar and in this case, only the Poisson results are presented below.

3.3 Migration rates model

The third and final article will serve to analyze determinants of migration rates specific to rural Canadian communities between 2001 and 2006.

3.3.1 Data and variables specification

The micro-data at the basis of this analysis was accessed through the COOL-RDC and stems from the long questionnaire of 2006 Census of population, which covers 20% of all Canadians. In the case of this paper, several age groups are retained: **young adults** (18 to 24 years of age), **core working age** (25 to 54 years of age) and **seniors** (55 years of age and over), living in Canada in 2001 (outside of the Territories) and non-institutional residents. Studying these different populations groups allows for the differential effect of certain explanatory variables to be investigated. All other community indicators used in this analysis are generated from the 2001 Census of Population.

3.3.1.1 Migration rates

We follow the initial migration definition of Statistics Canada, according to whom, a *mover* is a person who, on Census Day, was living at a different address than the one at which they resided five years earlier (Statistics Canada). *Internal migrants*, on the other hand, are movers who, on Census Day, were residing in a different Census subdivision (CSD) five years earlier (external migrants being persons who were living outside Canada five years earlier). In our case, the definition of *internal migrant* used will rely on two criteria, 1) change of place of residence between 2001 and 2006 as defined by Statistics Canada and 2) change of residence outside geographical unit representing a self-contained labour area. This allows us to isolate life-altering migrations.

The migration rates are calculated for use as the dependant variables in this analysis as follows:

$$\text{Net migration rate}\,(2001\text{-}2006) = \text{In - migration} - \text{Out - migration} \qquad [2]$$

where:

$$\text{In - migration rate} = (\text{In - migrants } 01\text{-}06)/[(\text{Out - migrants } 01\text{-}06) + (\text{Non - movers } 01)] \times 100$$

$$\text{Out - migration rate} = (\text{Out - migrants } 01\text{-}06)/[(\text{Out - migrants } 01\text{-}06) + (\text{Non - movers } 01)] \times 100$$

[11] In our study, only approximately 1/6 of possible origin-destination pairs reported migration flows (20,037 out of 121,452).

3.3.2 Geographic unit of analysis

As mentioned above, areas of residence (current and 5 years ago) for individuals are first provided at the Census Subdivision (CSD) level in 2006 boundaries. The Self-contained[12] labour areas (SLA)[13], constructed by Statistics Canada and defined as smaller (or rural) SLA (population under 100,000) (n = 303) and larger (or urban) SLA (population equal or over 100,000) (n = 46), are then applied to the computed migration data. For the purpose of this study, all dependent (i.e. migration) and independent variables (i.e. all indicators in 2001) were computed using the 2006 SLA geography.

Since the self-contained labour areas used in this analysis are, on average, 96% self-contained in terms of people living and working in the same area, the migration figures provided here reflect a substantial change in the life of these individuals. Specifically, these changes are likely related to either a new job (in a different labour market area) or a major transition in the individual/family's life cycle, such as the start or completion of an educational program, a search for new or first employment, retirement, etc.

3.3.2.1 Community factors

The choice of community level variables is inspired by a series of common indicators used in different regional models (Shearmur and Polèse, 2007; Alasia *et al.*, 2008). The variables retained for this analysis are those found in the 2001 Census of Population with the exception of "distance" variables, which are calculated using ArcGIS software.

Total population

The natural logarithm of the total population is used to describe the community's size in 2001. Recent urbanization trends in Canada and worldwide suggests that a greater share of individuals is now living in cities than ever before (World Bank, 2005). Audas and McDonald (2004) also report that the size of community of origin affects the average annual out-migration rate for various types of migrants.

Human Capital

The level of human capital in a community has been positively associated with higher population and employment growth rates (Shearmur and Polèse, 2007). Higher human capital levels can thus influence the migration decisions of potential migrants, especially the more educated work force. The percentage of the population holding a bachelor degree or higher is used as proxy for human capital at the community level.

Diversity

One of the main stressors on communities is sector restructuring due to changes in global trade relations and the relative prices of labour and capital (Alasia *et al.* 2008). These changes have had particularly strong effects on the traditional sectors within developed countries. Agriculture, other primary sectors, such as forestry, and traditional manufacturing has experienced significant restructuring. A diversified economic base is likely to provide a wider variety of options for responding to the forces of global restructuring (Alasia *et al.*, 2008) and offers greater employment opportunities for a diverse work force; thus, a more economically diverse community can help mitigate depopulation. The degree of economic specialization in a community is represented by the Herfindahl Index in the present study.

[12] "Self-containment" is a measure of the degree to which the workers living in "A" are also working in "A". Thus, by clustering areas with a high reciprocal importance of commuting flows and a low level of self-containment, new areas were created with increasingly higher degrees of self-containment. Once a certain threshold for self-containment has been reached, this would then be considered a self-contained labour market because most residents with jobs are working in the given labour area and most individuals living in the given labour area are also working in the given labour market area.

[13] The delineation of self-contained labour areas (SLAs) was based on a clustering procedure using data on the reciprocal flows of commuters. The method is derived from the algorithm developed by Bond and Coombes (2007). The main features of the method are outlined in Munro et al. (2011) while the details are presented in a forthcoming technical paper (Munro *et al*., forthcoming). http://www.statcan.gc.ca/pub/21-006-x/2008008/section/s2-eng.htm

Resource reliance

Furthermore, we also use the natural resource reliance[14] definition by Natural Resource Canada to identify SLAs who rely heavily (30% or more) on a single primary industry: agriculture, energy, fisheries, forestry and mining and metals. The economic base for a particular community is defined as the total employment income within a local economy that is generated by demand from outside the community. Economic base is of crucial importance to most communities because their economic well-being (and, in some cases, even their viability) is based on the local employment income generated from selling products outside of the community. The employment income of the base subsequently supports other industries (primarily local services) that generate income solely from the local area (Natural Resources Canada).

Average income

The natural logarithm of the average income in the community is used as a proxy of wage potentials offered by a given community relative to what is being offered in other communities of the same regional type. Wage rate or income differentials between place of origin and destination are often used in migration models to account for push and pull factors from alternative migration decisions (Dorigo and Tobler, 1983).

Employment

According to Alasia *et al.* (2008), unemployment rate is an indicator of stress for a community. Given that young adults may be interested in migrating to rural areas but often choose not to due to uncertainty of employment opportunities (Halseth and Ryser, 2006), unemployment rate would signal lack of opportunities and be a deterrent to migration, especially for younger cohorts but less for retirement age migrations. Unemployment rate for the base year (2001) is computed for all SLAs.

Distance from metropolitan area

Distance is an important factor in attracting and retaining residents in a community as population and employment growth in rural regions across Canada between 1971 and 2001 have been found to be strongly linked to proximity and connectedness with a major metropolitan area (Shearmur and Polèse, 2007). The distance between the location of origin and the closest CMA is used to proxy access to major markets and the closest CMA with a population of 500,000 inhabitants or greater.

Distance from markets

Shearmur and Polèse (2007) use north-south coordinates in degrees as a proxy for access to US markets. In this study, we calculate the distance from the centroid of the SLA to the closest south border of the US.

3.3.3 The model

In a first part, we test an econometric model of regional growth (based on a modified version of the *Coffey-Polèse-Shearmur* (CPS) model) (Shearmur and Polèse, 2007) and assess its effectiveness in explaining migration rate differences between regions. For this article, the sample includes all Canadian communities (i.e. Self-contained Labour Areas). The dependant variable is the net migration rate between 2001 and 2006 for different age groups (young adults, core working age and seniors) and the independent variables are regional geostructural and local factors for the base year (2001). Finally, the model will be applied to two groups of SLA: all SLA (n = 349) and smaller (or rural) SLA (<100,000 population) (n = 303). The larger (or urban) SLA (>=100,000 population) sample size is too small (n = 46) for a regression analysis and not relevant to the object of this particular study.

[14] The Natural Resources Canada website provides details about the origins of the resource-reliance mapping project and also expands upon the concepts, methodology and data sources used to obtain the resource-reliant values for 2001. http://atlas.nrcan.gc.ca/auth/english/maps/economic/rdc2001/dataandmappingnotes.html

$$y_i = \beta_1 x_{i1} + ... + \beta_p x_{ip} + \varepsilon_i \quad [1]$$

The relationship between dependent and independent variables included in this version of the CPS model reads as follows:

$$G = A + aS + bE + cW + dE + eD + fR + gU + hP + iC + \varepsilon \quad [2]$$

where **A** = constant

G = net migration rate between 2001 and 2006

S = logarithm of population size in 2001

E = percentage of university graduates in the 15 years and over population in 2001

W = average employment income in 2001

E = unemployment rate in 2001

D = diversity index in 2001 (Herfindahl Index). A low diversity index indicates high diversity

R = resource reliance as dummy variables for each category: agriculture, energy, fisheries, forestry and mining and metals in 2001

U = Distance to US border

P = Prairie dummy, fixed to 1 for Saskatchewan and Manitoba, otherwise 0, as to reflect the concept of *empty quarters* (Garreau, 1981), also observed in the Midwest region of the United States, in relative decline since the 1930s.

C = Distance to urban area (CA/CMA)

Note: a variance inflation factor (VIF) analysis was conducted to assess that there was no multicollinearity issues between explanatory variables.

3.3.4 Residuals

Multiple regression models, such as the one employed in this analysis, allow for the option of obtaining residuals for each observation. This is can be calculated as the difference between the predicted outcome and the observed outcome (i.e. Residual = Observed – Predicted). This allows us to isolate communities based on their position relative to the model average. Thus, communities who are expected to decline and manage to attract more migrants in reality, or who declined but less than expected, are considered to have surpassed expectations. Alternatively, communities who are expected to grow given their community characteristics in 2001 and do not live up to these expectations are under-performing the model.

3.3.5 Limitations

As previously noted, there are also important limitations to this type of analysis. First, migration rates do not take into account individual factors except for age (cohorts). Secondly, the data also do not account for multiple or return migrants (migration between 2001 and 2006). However, migration rates are preferable to population change, which can result from non-economic or non-decisional factors (i.e.

birth, death). Third, the fact that migration is accounted for in the 2006 census on a 5 year period limits us to analyze internal migration for one period at a time (unlike the, albeit imperfect, indicator of population change over a series of census periods, for example). Fourth, there is always a danger of multicollinearity between explanatory variables when using many locational factors. A variance inflation factor (VIF) analysis was conducted, revealing that there was no issue in these regression models. Fifth, the geography of our primary spatial units (rural SLA), often discontinuous and non-contiguous, precludes the use of Moran type indexes of spatial autocorrelation. Sixth, the period of study (2001-2006) was characterized by resource-led growth, a rapidly-rising Canadian dollar (low point was January 2002, about 0.60$US), and falling employment in manufacturing, not necessarily representative of pre-2001 trends. Thus, we would expect many of the most positive residuals to be for resource-based communities, especially in oil and gas. Finally, as stated earlier, the interpretation of what lies behind residuals necessarily entails an element of subjective/qualitative analysis.

CHAPTER 4 : MOVING IN AND OUT OF RURAL: INDIVIDUAL AND COMMUNITY DETERMINANTS, 2001 TO 2006

Jean-François Frenette, Alessandro Alasia and Ray D. Bollman

4.1 Introduction

Executive summary

Internal migration plays a significant role in the demographic dynamics of communities. While natural determinants of population changes (birth and death rate) tend to have slow and long terms effect on population dynamics, migratory flows can rapidly change the demographic outcome of a single community. According to the 2006 Census of population, approximately 15 percent of Canadians, aged 5 years or older, had changed municipality of residence between 2001 and 2006. A substantial part of this population relocation occurred across rural and urban areas, with relatively large flows in both directions and both rural and urban communities experiencing net gains or net losses.

These patterns make it particularly interesting to focus on the determinants of out-migration for both rural and urban residents. Our paper focuses on the determinants of internal migration of working age population - from and to - these two types of regions. A specific attention is paid to individual and community level factors, as well as to the interactions between these two types of factors. The analysis is based on data from the 2006 Census of population, while the time frame conceded for migration is 2001 to 2006. We estimate a set of multinomial logit models, including both individual and community level indicators and their interaction as explanatory variables, which we derive from a cost-benefit framework of individual migration decisions.

This procedure allows for an identification and profiling of communities that are more likely (more vulnerable) to experience out-migration along with the characteristics of individuals who have migrated between different types of communities. The main findings of this research are the following.

Rural communities in Canada have experienced a positive net migration rate for the period 2001 to 2006. Migration within the same province accounts for more than 60% of the migration across the rural-urban gradient. For the period of time considered, rural-to-urban migrants tended to leave rural communities which had greater population size but which were located further away to a large urban area. Urban-to-rural migrants differ from urban-to-urban migrants in that they are more likely to be: older, less educated, less mobile, non-immigrant and non-visible minority.

These findings point to the following implications: policies looking to attract Canadians into rural areas should target those with the highest propensity to migrate towards these regions; that is, mature professionals who have been working in smaller sized agglomerations for the greater part of their adulthood and who are now looking for a quieter, better quality of life setting. In return, such policies should not target the youngest, most educated workforce, who is very unlikely to move out of metropolitan areas where agglomeration economies make the best use of their skills and increases the country's overall productivity.

In sum, free-flowing migration and mobility are essentials in today's ever changing economy. Efficiently allocating resources across the rural-urban gradient where they are most needed constitutes a comparative advantage for the country as a whole. Migration and mobility should not be hindered but rather facilitated. For every working individual classified as migrant, there is most likely a non-migrant who has given serious consideration to relocating towards a community where they would be better off but perhaps as not chosen that route due to the high costs of moving or the lack of information. By helping to decrease these costs associated with migrating through social and economic policy and providing more accurate information with regards to opportunities across the rural-urban gradient, more

people would end up where they want to be; for some people this would mean living in dense cities while for others this would mean a smooth transition back to their rural roots, but in the end, everyone would be made better off.

Keywords: Rural development; migration; working age population

Introduction

In recent decades, internal and external migration has been the most important contributing factor to population growth or decline of Canadian communities. Communities that attract in-migrants, from within and from outside Canada, are those recording high population growth rates, while communities that experience migratory out-flows are typically those experiencing rapid population declines (Malenfant *et al.*, 2007). These in-coming and out-going migratory flows represent both an opportunity and a challenge for rural areas of Canada, as rural development is essentially a demographic phenomenon (Rothwell *et al.* 2002). For many rural areas, typically metro-adjacent, migratory inflows have been the driver of a rural renaissance. For many other rural communities, typically rural remote, migratory out-flows have represented one of the greatest challenges to their economic sustainability and viability.

Given the impacts that these demographic dynamics have at the community and regional level, issues surrounding migration and mobility have received considerable attention in recent applied research. Much of this research has focused on the effect of individual determinants on migration decisions (Dion and Coulombe 2008, Bernard *et al.*, 2008); in other cases they focus on specific groups such as youths (Tremblay, 2001; Dupuy *et al.* 2000; Walsh, 2007); typically migratory flows are defined at the inter-provincial level (Breguet 2008; Coulombe 2006; Finnie 2004; Vachon and Vaillancourt 1998, Lin 1998; Robinson and Tomes, 1982; Vanderkamp 1971; Courchene 1970). Furthermore, although there is a relatively large literature surrounding rural to urban migration (Speare 1971; Bilsborrow 1987; Lao 2000), little research has focused on inter-community migration across the rural-urban gradient using country-wide statistics and a quantitative framework.

Since the early seminal work on migration theory, largely driven by the analysis of flow from disadvantaged (rural) areas to more dynamic (urban) areas, individual factors and locational characteristics were brought together in attempting to explain migration decisions (Lee 1966). “The factors which enter into the decision to migrate and the process of migration may be summarized under four headings, as follows: 1) Factors associated with the area of origin. 2) Factors associated with the area of destination. 3) Intervening obstacles. 4) Personal factors.” (Lee 1966: 50)

Due to data constraints and in part to modeling considerations, most migration studies can be categorized as focusing on either the personal factors that influence migration behaviour or the characteristics of places which determine migration patterns (Goetz, 1999). Some of the personal factors most commonly found to influence the likelihood of migration include: age, gender, skills, education, income, ethnicity (Mendola 2006) as well as life-cycle factors such as changes in marital status, educational attainment or labour force status (Goetz 1999). Place-based factors at the origin or destination areas which may also influence migratory patterns by pushing or pulling potential migrants commonly include: labour market conditions such as employment rates, income growth, industrial structures and commuting features (Nakosteen and Zimmer, 1980), as well as natural (Cromartie 1998) and built amenities (Florida 2002).

The present paper focuses on migration patterns of the working age population (25 to 54 years of age) across the rural-urban spectrum. First, individual and community determinants, as well as the interactions between the two levels of factors are used to determine the propensity of migrating out of a given community type between 2001 and 2006. Second, rural-to-urban and urban-to-rural migrations are explicitly distinguished, as these flows are considered to implicate fundamentally different underlying motivations and thus, determinants. As a result, a series of multinomial logit models are estimated using individual and community level indicators along with their interactions, as variables explaining the types of migration decisions. The main data sources in this study are the 2006 Census of

Population micro-data, used to explore the characteristics of individual migrants and the 2001 Census of Population data to isolate the effect of community level data in the communities of origin. The definition of rural to urban areas is based on the statistical area classification (SAC) of Statistics Canada, and the Rural and Small town definition (see du Plessis et al 2001).

The key insights that emerge from our study are the following. Rural communities in Canada have experienced a positive net migration rate for the period 2001 to 2006. Migration within the same province accounts for more than 60% of the migration across the rural-urban gradient. Rural-to-urban migrants tend to leave rural communities which display greater population size and are located further away from large urban centres. Urban-to-rural migrants differ from urban-to-urban migrants in that they are more likely to be: older, less educated, aboriginal, less mobile, non-immigrant and non-visible minority.

These results have certain implications for rural policy looking to attract or retain working aged population in rural areas. Given that most of the migration between labour markets across rural and urban Canada occurs within the same province, federal and provincial policies encouraging urban-to-rural migration should target individuals with the highest propensity to migrate towards those areas (i.e. mature workers, non-immigrant, aboriginal, etc.) in a way to facilitate their decision making process. These policies should not target those with the highest propensity to migrate out of rural areas (i.e. younger, more educated, recent immigrants, etc.) as they are more likely to leave for the city once incentives have run out. In sum, internal migration policies aimed towards encouraging urban-to-rural and rural-to-urban migratory flows should play on the natural tendencies and preferences of individuals and should facilitate those types of flows with the greatest likelihood of occurring.

The paper is organized in six major sections. Following this introduction, Section 2 present the stylized facts about recent migratory patterns observed in Canada, with a specific focus on the flows along the rural-urban gradient. Section 3 summarizes some of the theoretical and methodological literature regarding internal migration. Section 4 outline the theoretical model used in this analysis. The following Section 5 presents the findings of this paper, starting with a discussion of the descriptive statistics and moving on to the results of the econometric models. The last section presents our concluding remarks.

Migration flows in Canada: some stylized facts

Over the last two decades, about one third of Canadian communities experienced continuous population decline. Although rural communities, including many agricultural based communities, are more likely to be situated within declining regions and vulnerable to population decline, research shows a great variety of rural conditions, some rural areas presenting the most dynamic demographic trends of Canada (Alasia *et al.*, 2008; Malenfant *et al.*, 2007; Mwansa and Bollman 2005).

Demographic changes and migratory patterns across the rural-urban gradient in Canada and over recent years have been presented in several studies (Dion and Coulombe 2008; Malenfant *et al.*, 2007; Audas and McDonald, 2004; Rothwell 2002; Rothwell *et al.* 2002). Between 2001 and 2006, the migration patterns of the working age population across labour markets distance thresholds, as presented in ***Table 1***, were such that approximately 6% of individuals aged between 25 and 54 in 2001 change place of residence and moved over 100km between the intercensal period. Furthermore, while the greater proportion of migrants was found in the urban-to-urban category (3.6%), the absolute numbers of urban-to-rural migrants (138,800) outweigh the number of rural-to-urban migrants (118,000) by approximately 20,000 working age individuals (see ***Table 2***). Finally, ***Table 3*** illustrates that intra-provincial migrants (421,000) outnumbered inter-provincial migrants (370,400) by roughly 50,000 working age individuals.

The literature cited above, together with additional descriptive statistics presented for the period 2001 to 2006, evidence five major and interlinked patterns: first, the importance of migration flows of working age individuals in determining demographic outcomes at the community level; second, a considerable regional variation in the net gains and net losses over time; third, the greater mobility in rural communities, fourth, the importance of within-province migratory flows as compared to between-

province migration; and fifth, the importance of reverse flows from urban to rural communities.

The importance of internal migration flows in determining demographic outcomes at the community level should not be understated. Demographic changes at the community level are determined by five major components; namely, birth, death, immigration, emigration and internal migration (Malenfant *et al.*, 2007). While natural determinants of population changes (birth and death rate) tend to have slow and long terms effect on population dynamics, migratory flows can rapidly change the demographic composition of a single community. This paper focuses on *internal migration*; that is, migration between communities within the country. Although this relocation of population within the national boundary has no direct effect on the national population figures, it does have a significant impact on the demographic dynamics of individual communities (Malenfant *et al.*, 2007). Internal migration is the key variable that drives provincial population change (Edmondston, 2004), and has a significant impact on the distribution of population across Canada's rural and urban communities.

At the regional level, net population gains and net population losses due to internal migration have varied considerably both geographically and temporally. For instance, rural areas experienced net in-migration between 1971 and 1981, net out-migration between 1981 and 1991, and net in-migration again between 1991 and 1996 (Rothwell 2002; Rothwell *et al.* 2002). More recently, rural areas close to urban centres reported net gains in population while remote rural areas experienced negative net migration rates (Dion and Coulombe, 2008). In terms of inter-provincial migration in Canada, Finnie (2004) finds that, between 1982 and 1995, the proportion of individuals who left the Prairie Provinces and Prince Edward Island but then eventually returned was relatively low. Several authors have also commented on the massive migration outflows from Alberta in the 1980's, when oil prices went down (Breguet, 2008), while recognizing the recent inflows toward the same province as prices rose again. Regional variations in migratory flows can also be attributed to policy or cultural factors such as in the case of Quebec and its language restrictions or Newfoundland and the closing of the cod fishery in 1992 (Vachon and Vaillancourt, 1998; Day and Winer, 2005). Finally, between 2001 and 2006, all provinces and territories except Alberta, British Columbia and Prince Edward Island experienced net migration losses (Dion and Coulombe, 2008).

Many studies in Canada have pointed to the fact that people living in rural areas are more mobile than those living in urban areas (Dion and Coulombe, 2008).

While much of the empirical migration research has focused exclusively on migration across provincial boundaries, internal migration is to a large extent an intra-provincial phenomenon. ***Table 3*** shows that amongst those who had migrated over 100 kilometres, more migrants remained within the same province compared with migrants who crossed a provincial boundary in all categories (421,000 and 370,400 respectively) except in the same urban to urban category; where the inter-provincial migrants exceeded the number of intra-provincial migrants (190,800 and 127,000 respectively). Such findings are supported by specific instances such as the census metropolitan area of Moncton, NB, where the net population gain from internal migration was in great part due to subprovincial exchanges from other non-CMA communities in the province rather than inter-provincial migration (Dion and Coulombe, 2008). Consequently, while demographic growth has been found to be distributed unevenly across provinces between 1993 and 2004 (Bernard *et al.*, 2008), from a local perspective, the disparities between growth rates of communities within a same province is equally, if not more, important. Furthermore, this greater share of intra-provincial migrants compared with inter-provincial migrants suggests that if migration is "wage/income" driven, then there is evidence that, over time, within province income disparities have become more important than between province disparities. Consequently, a greater focus should be given to within province migration in internal migration studies as these flows are at least as important as between province migration.

As mentioned above, rural areas in Canada have experienced both positive and negative net migration rates over the years (Rothwell, 2002; Rothwell *et al.* 2002). Between 2001 and 2006, Dion and Coulombe (2008) report that within census metropolitan areas, central municipalities reported losses to peripheral municipalities. ***Table 3*** illustrates that the flows of approximately 118,000 individuals who migrate from a rural community to an urban community was contrasted by a flow of about 138,800

individuals who migrated from an urban to a (mainly metro-adjacent) rural community. The table also shows that rural inhabitants migrating towards urban areas predominately chose larger urban communities (74,000) as destinations compared to smaller urban categories (43,900). This contrasts the inter-provincial urban to urban flow of migrants (253,000) who chose to migrate towards smaller urban communities to a greater extent (34,700) than larger urban communities (27,900), suggesting that agglomeration economies effects may differ at the intra- and inter-provincial levels. In sum, theoretical considerations suggest that the fundamental determinants of the different types of flows across the rural-urban gradient could be different. While the migration for rural to urban areas is likely to be driven by economic consideration (higher incomes, employment opportunities, etc.), the migration from urban to rural or from large urban to smaller urban in the same or another province is more likely to be driven by other non-economic factors (return migrants, retirement, amenities, and life style choices).

In the next section, we present some theoretical models which have been used to explain migration and applied research stemming from such theories.

4.2 Theoretical framework: Migration

Selected theoretical perspectives and applied research

Why do people migrate? Motivations to migrate vary largely, depending on the economic context and conditions in which migrants are located as well as the personal characteristics of the migrants themselves. Typically, migratory flows analysis has focused on migration from disadvantage or backward (rural) areas to wealthier or more dynamic (urban) areas (Taylor and Martin, 2001; Todaro, 1980; Mendola, 2006; Goetz, 1999). This type of migration has been largely driven by sector restructuring and economic factors. More recently, the focus of migration studies has extended to the analysis of migratory flows driven by factors that are not strictly economics or not merely reflected in "classical" migration models; these include returning to region of origin, retirement, amenities, and life style choice driven migration. Migratory flows between rural and urban areas, particularly in countries such as Canada, are today a mix of these factors.

Furthermore, the individual decision to migrate has been largely studied to be a function of several key personal characteristics (e.g. age, gender, skills, education, income, ethnicity, etc.) (Mendola, 2006) as well as life-cycle factors (e.g. marrying, divorcing, graduating from school, entering the labour force or retiring) (Goetz, 1999) which influence the propensity to migrate. Needless to say, these personal attributes interact with the aforementioned place-based conditions. Migration decisions across the rural-urban spectrum in Canada should thus be analyzed as a function of both community and individual level factors.

In this section we review and summarize some of the theoretical and applied literature on migration, with particular reference to the Canadian context. Far from being an exhaustive review, we focus on the key elements of relevance for our analysis. There are several extensive reviews of migration research upon which these summary insights are based (Taylor and Martin, 2001; Goetz, 1999; Mendola, 2006).

Insights from theory

Through seminal theoretical works in migration conducted in the 1960s (Sjaadtad, 1962; Lee, 1966), four major type of factors have been associated with the decision to migrate: personal factors, migration factors associated with the area of origin, factors associated with the area of destination, and intervening obstacles. Following such insights, theoretical frameworks have consolidated these factors in what has since become known as the cost-benefit or human capital investment framework to migration (Sjaadtad, 1962; Taylor and Martin, 2001). In broad terms, the migration decision using the cost-benefit framework implies that each individual moves to another region if the present value of the total benefits to move is higher than the present value of the cost of moving (Taylor and Martin, 2001; Etzo, 2008). In this framework, migration is treated as an investment which constitutes a sacrifice of

current consumption in exchange for (presumably higher) future consumption (Kremarik, 1999).

Vanderkamp (1971) further elaborated on some major conceptual basis of migration flows by suggesting that the degree of migration between two regions is determined primarily by the average incomes in the two regions and by the distance between them. Subsequent works emanating from this tradition helped identify and estimate some of the important costs and returns of migration (employment opportunities, wage rates, distance, etc.) linked to the origin and potential destination regions. Analyzing aggregated migratory flows rather than individual micro-data level migration information, this research stream has taken a more place-based oriented approach to the study of migration. This approach suggests that in every area there are factors which facilitate retention of people within the area or attract people to it, and there are others which tend to repel them (Lee, 1966). Some authors have conceptualized these regional or community level factors as *push* or *pull* factors to potential migrants. Dorigo and Tobler (1983) describe the push factors as those life situations that give one reason to be dissatisfied with one's present locale while the pull factors are those attributes of distant places that make them appear appealing. In sum, the relative attractiveness of a region or community can be calculated as the difference between its push and pull factors (Dorigo and Tobler, 1983). Evidently, push and pull factors can vary in terms of migratory inducing influences, depending on the individuals, while some are more generalized and consistent across the population (i.e. economic or labour market conditions). There are amenities, such as cultural amenities, that can be particularly attractive for certain subsets of the population (Florida 2002). Amenities can take the form of cultural activities, climate as well as a welcoming social environment for new comers with diverse lifestyles.

Notwithstanding the local effects, individuals moving from disadvantaged areas to more dynamic economic areas, whose migration decision is largely driven by economic reason, are also simultaneously influenced by attributes such as education and skills level, age, risk taking capacity, capacity to face new situations, entrepreneurship and ethnicity (Todaro, 1980; Mendola, 2006). In this sense, it can be postulated that characteristics of migrants also interact with place-based factors in the decision to migrate. Liao (2000) suggests that older people are more likely to be affected by non-economic determinants of migration, such as scenic amenities or retirement reasons, while younger people tend to change residences for economic opportunities or educational reasons. In sum, the cost-benefit calculation, theoretically estimated by each individual, incorporating the elements of place as well as distance and personal factors, explains why some people migrate while others do not.

While the cost-benefit/human capital framework along with the place-based oriented approaches to studying migration explains a large part of migration, it has become evident that the nature of the migration flows is more complex and motivations underlying migration decisions might vary greatly between individuals (Robinson and Tomes, 1982). In fact, if all inhabitants of a country held equal perceived costs and benefits regarding migration, all utility maximizing economic agents would, for example, migrate towards the single highest wage region of that country. This is clearly not the case in practice and the existence of heterogeneity in the population and disparities across geographies offer an interesting twist to the study of migration patterns. Contrary to simple choice models, it is assumed that “each individual faces a set of profiles defined over alternative locations unique to him, rather than the average profiles for a person of his type, thus allowing for heterogeneity in the population” (Robinson and Tomes, 1982:477). Robison and Tomes (1982) argued that this heterogeneity is one of the factors that may explain sizable reverse migration flows from ‘attractive’ areas (higher income) to less attractive ones (lower income) (or from urban to rural).

Amongst the urban-to-rural migratory flows, we may identify *return migrants*; individuals growing up in a particular region (i.e. rural areas), eventually moving to a larger urban centre for education or employment purposes and subsequently moving back into a smaller community in the region of origin; that is, people disappointed about their original move and/or those who planned to return from the start (Vanderkamp, 1971). Another sizeable portion of the flow can be attributed to *neo-rural migrants*, urbanites who, later in life, decide to migrate towards the countryside, often attracted to qualities of rural communities not found in larger urban centres (Guimond and Simard, 2008). The important distinction with these two types of migrants is that they are not necessarily influenced by incomes and distance to the same extent as “typical” migrants. Their migration decision may be more influenced by non-

traditional attractive factors. Rural areas may offer unique amenities that are relevant for urban to rural migrants.[15] Quality of life in rural areas are generally perceived as having quiet and peaceful neighbourhoods, a good natural environment, providing more living space, all of which contributes to making rural places attractive (Liao, 2000; Guimond and Simard, 2008). Agglomeration diseconomies can also play a role in determining migration decisions (i.e. congestion). Studies have indicated that many people are dissatisfied with crowded environments and the impersonal relationships common in urban areas; consequently, that they would prefer a rural life (Liao, 2000). Nonetheless, the bulk of the research on urban-to-rural migration remains theoretical and limited by the analysis of aggregate regional flows (Robinson and Tomes, 1982) as well as the use of case studies (Guimond and Simard, 2008); thus, suggesting the need to explore the pertinence of using micro-data and community level data in studying urban-to-rural migration and new-rural population trends.

Findings from existing applied research in Canada

Several Canadian researchers have studied internal migration over the past few decades and have empirically tested different hypothesises using various methods and databases. Two approaches are generally opposed in most empirical literature: first, the use of regional flows; second, the use of micro data (generally individual level). This opposition often leads to the classification of migration studies in which some look at the individual characteristics which influence migration and place-based factors. Multinomial logit, probit, tobit, two-stage (Heckman) for estimating discrete-continuous models, have been widely used to estimate migration-decision models at a micro level. Regardless of the type of data, in most cases, the studied level of geography is inter-provincial migration. Even the few studies which introduce a "rural" dummy have rarely focused on rural-to urban flows (they were still defining migration as change of residence from one province to another one.

Migratory flows

Among the studies that use aggregate flows, one of the first applied contributions to empirical migration research using Canadian data is that of Courchene (1970); he studies inter-provincial migration using aggregate data from the 1961 Census of Canada. The cross-section regression analysis models and time-series results explains a significant portion of the variance in migration rates over the period 1952-67 and shows that migration is positively related to relative wage or income differences and negatively related to distance, the higher the level of education or the greater percentage of the labour force employed in agriculture in province [of origin] the greater is the outmigration for that province (Courchene, 1970). These findings support some of the theoretical underpinning regarding human capital investment in the migratory decision and that the distance between origin and destination increases both the financial and psychological costs of migrating.

Vanderkamp (1971) looks at new mover, return and autonomous migration flows in Canada between seven regional aggregates (Atlantic regions and the remaining six provinces) which amounts to 42 cross-section observations on migration flows. Running various regression models for each year between 1947 and 1966, Vanderkamp (1971) explores the link between migration, income differentials between origin and destination and distance of the moves. The expected trends ensue, new and repeat migrants are attracted to higher income destinations and negatively affected by distance involved in the move, but it is also found that these variables vary strongly with business activity in such a way that overall migration slows down along with the economy. However, it is also reported that return migrants may respond differently to migration incentives than other migrants as their flow varies negatively with the state of labour markets.

More recently, Coulombe (2006) examined net migration flows across age groups between the ten Canadian provinces since 1977 and found interprovincial migration to be driven by "structural factors such as the long-run regional differential in unemployment rates, labour productivity, and the rural/urban differential structure of the provinces".

[15] In this paper, the use of a 100km threshold between place of residence in 2001 and 2006 should result in an exclusion of most migration between urban and rural areas that is part of the labour market of the urban center.

Delisle and Shearmur (2009) are also one of the few researchers in Canada to analyze migration flows at the sub-provincial level in recent years. Using Census of Population data from 1996-2001, they observe different behaviour by age and education level of migrant groups at various scales of analysis. Higher wages, as expected, attract young nongraduates and graduates across provinces and regions but at the intraregional level, local factors (e.g. agglomeration economies, concentration of other graduates) seem to play a bigger role in attracting graduate migrants. This suggests that migration dynamics change not only depending on the time scale (Simmons, 1982) but also at the space scale.

Individual characteristics

Of great importance to our analysis are migration studies that use micro data (individual or household level); offering the benefit of controlling for individual factors associated with the propensity of migrating. Robinson and Tomes (1982) uses 1971 Census of Population data to investigate self-selectivity of migration. Using structural probit equations estimated with and without selection allows them to address a key point recognized in the literature; that is, estimates of the returns to migration are subject to selectivity bias. Previous migration models suggest that permanent income differentials between provinces, net of moving costs, will dictate the propensity to migrate between these provinces. Robinson and Tomes (1982) find that controlling for self-selection using personal factors such as age, educational level, language, family size, marital status, etc. the coefficients of variables associated with migration such as wage gain differentials, language and education levels are significantly altered. This supports the claim that heterogeneity in a population results in differentiated levels of return amongst migrants and non-migrants. This selectivity of migrants has been tested empirically in many of the studies using micro-data.

Using data derived from the 1986 Census of Canada, Newbold (1996) studies the determinants of return and onward migrants for nonnative adults aged 20 to 64 years. After controlling for self-selection effects of individual characteristics which influence the propensity to migrate, Newbold (1996) finds that migrants returning to their province of origin are negatively selected in such a way that their migration is not primarily determined by provincial economic variables such as average employment growth and income levels in the same manner as onward migrants.

Other individual factors such as immigration and visible minority status can also have implications for migration propensity. Lin (1998) investigates the different mobility of foreign born and native born Canadian across provinces. The analysis uses micro-data from the Labour Market Activity Survey to analyze interprovincial mobility of foreign-born and native-born between 1989 and 1990. Using a probit and logit specification to estimate the propensity of out-of-province migration and using a dummy variable to distinguish immigrants from native-born Canadians, Lin (1998) finds that overall, there are no structural differences between the two groups in interprovincial migration behaviour when controlling for labour market outcomes/conditions, personal and job-related characteristics, and policy interventions. However, a lower mobility rate found among foreign-born Canadians can be attributed to compositional differences between the immigrants and non-immigrant populations.

Vachon and Vaillancourt (1998) use data from family allowances/child tax benefit recipients and income tax filers to describe annual interprovincial mobility and report that the decision to migrate can also be influenced by policy or singular events in market economies. For example, it was reported that national mobility patterns were influenced by local issues such as the collapse of the cod fisheries in Newfoundland, the victory in 1976 of the Parti Québécois in Québec and the fluctuation of wheat prices in Saskatchewan and oil in Alberta.

Finnie (2004) applies a panel logit model to the Longitudinal Administrative Data (LAD) which includes data covering ten percent of Canadian tax filers over the years 1982 to 1995. The findings show that inter-provincial migration is influenced by various personal attributes (i.e. age is negatively related to mobility, presence of children increases the costs of migrating) as well as the size of the province and area of origin (i.e. smaller provinces experience higher out-migration rates but living in a rural area was negatively related to inter-provincial mobility), cultural factors such as language (i.e. francophone

Québécois are less likely to migrate out of Québec), labour market conditions in province of origin (i.e. mobility is greater in province with higher unemployment rates) as well as the employment status of the migrants (i.e. individuals having received unemployment insurance were more likely to move).

More recently, Dion and Coulombe (2008) apply a multinomial logistic model to individual level data from the Census of Population 2006. This analysis confirms the earlier ideas that migrants have specific features that distinguish them from people who did not migrate and that these trends still apply in recent years. Specifically, it is reported that: people aged 20 to 29 are more likely to migrate, the presence of children reduces the probability of migrating, individual reporting aboriginal identity are also more likely to migrate and finally, the analysis shows that persons living in rural areas are more mobile than those living in urban areas. These cited analysis show how micro-data can be valuable in isolating the effects of personal factors in decisions and can also serve as control variables to isolate the regional effects in migration outcomes.

Rural and urban migration

Other researchers have focused mainly on migration across the rural-urban gradient. In Canada, the rural-urban gradient can be understood through the Statistical Area Classification (SAC). This classification groups census subdivisions according to whether they are a component of a census metropolitan area, a census agglomeration, a census metropolitan area and census agglomeration influenced zone (strong MIZ, moderate MIZ, weak MIZ or no MIZ), or the territories (Northwest Territories, Yukon Territory and Nunavut).

Using a combination of Census data, T1 tax records and the Survey of Labour and Income Dynamics (SLID) covering the period between 1986 and 1996, Dupuy *et al.* (2000) have documented migration patterns in the 1990s between rural and urban areas in Canada. Although rural areas across Canada tend to lose 12-16% of their population aged 15-19 during a 5-year period, migration patterns in rural areas are not necessarily homogeneous across the country. For instance, Newfoundland, New Brunswick and Saskatchewan had experienced net losses of their rural population aged 15 and over while Quebec, Ontario, Alberta and British Columbia were net gainers for the period 1991-1996. Furthermore, the greater part of youth rural out-migrants choose a destination urban area in their province of origin except in the case of Newfoundland where rural out-migrants end up in urban areas outside the province. The research using this data also reports that while university graduates represent only a minority of rural leavers, they have a high propensity to leave rural areas.

Audas and McDonald (2004) also make use of SLID data from three overlapping panels covering the period between 1993 and 2000 to study rural-urban migration in the 1990s. They also state that young, single and university-educated individuals have a higher propensity to migrate out of rural areas but they also report that the flow of people moving from urban to rural area more than offsets the rural out-migration.

More recently, Guimond and Simard (2008) have examined the case of urban to rural migrants in select Quebec regional municipalities (i.e. Arthabaska, Brome-Missisquoi**)** using case studies and interview data. From these isolated cases, it is reported that the “neo rural” (*néo-ruraux*) population is heterogeneous. In the case of Brome-Missisquoi, neo rurals are comprised of individuals who are generally older and retired individuals who have lived the greater part of their adulthood in urban areas whereas in the Arthabaska region, the new rural migrants are younger adults who are still active in the labour force.

International studies

Finally, some empirical studies deserve some attention, even if not conducted with Canadian data, as some of their methodological approaches and general findings would also apply to the case of Canadian migration. For instance, in the case of developing countries, Bilsborrow at al. (1987) focuses on the impact of origin community characteristics on rural-urban out-migration in Ecuador during the

period 1977-1978. The probit model estimated in this research accounts for individual, household, and origin area level characteristics; the latter variables being: distance to capital, agricultural related indicator, size of the local urban labour market and an indicator of level of services or amenities in the area. They find that the distance from the capital has a negative effect on the out-migration of a rural community but only for sons. Furthermore, the availability of electricity in the community is found to have a mitigating effect on out-migration. Moreover, they examined a wide range of theoretically plausible interaction effects involving model variables. Only one interaction term, indicating the interaction of land owned and distance to Quito, appeared consistently enough to be included in the final model. This implies that while sons living farther from the capital are less likely to migrate, those with no farm land are more likely to leave than those with farm land but living in more remote areas.

In the case developed nations, Pekkala (2003) studies the regional flows of migrants in Finland during 1985-1996 using micro-data covering a one percent sample of the population representing approximately 300,000 individuals. Using a multinomial logit model with classification for migration type (e.g. first move, repeat migration, return migration) and regional type for destinations (e.g. growth centers, declining region, other region), the evidence supports the claim that human capital tends to migrate towards growth centers while some return migrants, especially older and less educated, move back to their original home regions even though these destination regions may be classified as declining.

4.3 A theoretical model: Linking individual and community characteristics[16]

In the present theoretical framework, a set of individual and community variables as well as the interaction between the variables is used to explain the propensity of working age population to migrate. The interaction term between two independent variables implies that the marginal effect of one independent variable varies with the value of the other (Berry *et al.*, 2007).

It is widely recognized in the literature, and also accepted as common belief, that migrating involves costs and benefits. Potential migrants appraise the costs and returns of moving (Grenier, 2008) and make migratory decisions based on this hypothetical calculation. In short, the proposed framework is based on a cost-benefit calculation involving individual level, community level and interaction variables.

In the present framework, an individual decides to move to community *j* if the present value of the total benefits to move is higher than the present value of the cost of moving (Etzo, 2008).

$$NPVM_{i,j,0} = \sum_{t=1}^{T} \frac{(B_j - B_i)}{(1+r)^t} - \sum_{t=1}^{T} \frac{(C_j - C_i)}{(1+r)^t} \qquad (1)$$

where *i* denotes the region of origin and *j* the destination region, B denotes the total benefits, C the total cost related to the respective region, *r* is the discount rate and *T* is the lifetime period. We can ignore the discounting factor under the assumption that "it is unlikely that any potential migrants formally

[16] Several alternatives approaches have been used in the literature when considering both community and individual level factors in outcome predictions. In recent years, several researchers in many fields have relied on multilevel models for isolating the effects of micro and macro determinants on individual-level outcomes (Angeles, 2005). Examples of the multilevel approach can be found in Helms and Jacobs (2002), a study of criminology; Linnemayr and Alderman (2006), a study of food security and Boyle *et al*. (2006), a study of child health in the developing world. In these cases, the individual behaviour of study is said to be a factor of both personal characteristics and environmental effects.
In the case of migration studies, researchers often include higher level variables (i.e. province, region, community, etc.) and individual level factors into models attempting to explain the decision to migrate; where individual and higher-level characteristics are analyzed simultaneously to isolate the effect of each variable in the propensity to migrate as well as the interaction effect between each level (Bilsborrow *et al*., 1987; Lin 2007).

discount future earnings to attain their present value before making their decisions" (Speare, 1971; 119), this can be rewritten as:

$$M^*_{i,j} = \Delta B^1_{i,j} + \Delta B^2_{i,j} + ... + \Delta B^n_{i,j} - \Delta C^1_{i,j} - \Delta C^2_{i,j} - ... - \Delta C^n_{i,j} \quad (2)$$

that is, the net present values of migration (*M*), which influences the decision to migrate, can be decomposed in a set of benefit and cost components, many of which can be related to community factors. These can include the income or employment opportunities offered by a community as opposed to another locality within the country; therefore, the costs and benefits may be transposed into monetary units (Grenier, 2008). However, as the migrant selectivity problem states, the costs and benefits of migrating, and consequently the decision to migrate, are also simultaneously being influenced by individual factors. As a result, both local and personal factors are integrated in the costs and benefits of the calculation as they each play a role in determining migration outcomes.

$$M^* = f(\Delta B^n) - g(\Delta C^n) \quad (4)$$

Typically the relationship between migration and factors entering the cost-benefit calculation is estimated using a categorical dependent variables model and a series of explanatory variables. In our model, *M* is unobservable; that is, the preference to migrate given the net present value of migrating can be thought of as a latent unobservable variable *M** (Grenier, 2008) which is related to the observed independent variables by the structural equation:

$$M_i^* = x_i\beta + \varepsilon_i \quad (3)$$

where *i* indicates the observation and **ε** is a random error.

In our case, we only observe the decision outcome, *ex-post*, which is migration or non-migration. Consequently, we can only assume that migration occurs if *M*, the net present value of migrating, is greater than 0 and does not occur if M is equal of inferior to 0. The link between the observed binary *M* and the latent *M** is made with a simple measurement equation:

$$M = \begin{cases} 1 \ if \ \ M^* > 0 \\ 0 \ if \ \ M^* \le 0 \end{cases} \quad (5)$$

Cases with positive values of *M** are observed as *M*=1, while cases with negative or zero values of *M** are observed as *M*=0.

The latent variable model for binary outcomes can be expressed in the following way, given value of *x*, we see that:

$$\Pr(M = 1 | x) = \Pr(M^* > 0 | x) \quad (6)$$

In other words, the probability of migrating (*M* = 1) is a function of *x*. Using the cost-benefit framework, *x* represents the factors weighting in as costs and benefits of migrating. Therefore, we can express equation (6) as follows:

$$\Pr(M = 1) = \Lambda(\beta B + \delta C) \quad (7)$$

However, we do not observe a binary outcome in our case but rather three possible outcomes. Consequently, we use a multinomial logit, in which the non-mover outcome is compared with alternative destination outcomes. Specifically, three migration outcome categories are used *non-mover*, *move to same type of region* (i.e. rural-rural); *move to different type of region* (i.e. rural-urban).

M = 0, if the individual does not migrate

M = 1, if the individual migrates to the same type of region (8)

M = 2, if the individual migrates to a different type of region

This means that each individual is faced with three mutually exclusive outcomes, each offering its own net present value calculation, M_0*, M_1* or M_2*. The chosen alternative (*k*) can then be interpreted to imply the following (Pekkala, 2003):

$$M_k^* > \max M_j^* \text{ for all } k \neq j \quad (9)$$

Following Long and Freese (2001), the multinomial logit model can be thought of as simultaneously estimating binary logits for all comparisons among the dependent categories. Formally, the multinomial logit model can be written as:

$$\ln \Omega_{m|b}(x) = \ln \frac{\Pr(y = m \mid x)}{\Pr(y = b \mid x)} = x\beta_{b|m} \quad \text{for } m = 1 \text{ to } J \quad (10)$$

where *b* is the base category, in our case the *non-movers*, which is also referred to as the comparison group. Since $\ln\Omega_{b|b}(x) = \ln 1 = 0$, it must hold that $\beta_{b|b} = 0$. That is, the log odds of an outcome compared to itself is always 0, and thus the effects of any independent variables must also be 0. There *J* equations can be solved to compute the predicted probabilities (Long and Freese, 2001):

$$\Pr(y = m \mid x) = \frac{\exp(x\beta_{m|b})}{\sum_{j=1}^{J} \exp(x\beta_{j|b})} \quad (11)$$

The base category *b* refers to outcome 0, and we obtain estimates for $\hat{\beta}_{1|0}$ and $\hat{\beta}_{2|0}$, where $\beta_{0|0} = 0$. The general specification of the multinomial logit model can be adapted using our previous cost-benefit framework to read as follow:

$$\Pr(M = 1,2) = \Lambda(\beta B^{icx} + \delta C^{icx}) \quad (12)$$

In this multi-outcome migration model, B^{ic} and C^{ic} represent sets of explanatory variables that enter in cost-benefits calculations: (i) individual characteristics (e.g. age, gender, education, immigration and visible minority status, etc.) and (c) community factors (e.g. geographic context of the community of origin – macro region and distance from a major metropolitan area) and local attributes inherent to the community of origin – population size, population density, etc. as well as (x) interaction terms calculated between select individual and community factors (e.g. age and population size, education and distance from large urban centre, etc.). A detailed discussion on data and variable specification is presented in the next section.

The coefficients of the multinomial logit model can be more easily interpreted by estimating the relative risk ratio (RRR). The RRR can be calculated as:

$$RRR = \frac{P(y = 1 \mid x+1) / P(y = \text{base category} \mid x+1)}{P(y = 1 \mid x) / P(y = \text{base category} \mid \text{x})} \quad (13)$$

The RRR ranges from 0 to infinity. It reports the effect that a change in the variable of study has on the probability of the outcome falling in the comparison group to the probability falling in the referent group. A value of 1 implies that there is no association between the dependent variable and the explanatory variable. When the ratio is greater than 1, this indicates that the risk of the individual falling in the comparison group (i.e. migrant) relative to the risk of the outcome falling in the referent group (i.e. migrant) increases as the explanatory variable increases (i.e. age groups). On the other hand if the ratio is less than 1, the risk of the individual falling in the comparison group (i.e. non-mover) relative to the risk of the individual falling in the referent group (i.e. migrant) decreases as the explanatory variable increases (i.e. education level) (UCLA Academic Technology Services).

4.4 Econometric model

Data and variables specification

The data are from the long questionnaire of 2006 Census of population, which covers 20% of all Canadians. In the case of the present study, only the working age population; 25 to 54 years of age in 2001 (30 to 59 in 2006), living in Canada in 2001 (outside of the Territories) and non-institutional residents were retained. The resulting sample contains approximately 2.7 million individuals, representing 13.2 million Canadians aged between 25 and 54 in 2001. Younger migrants, who may be moving to attend post-secondary education and older migrants who may be involved in retirement-related moves are excluded from this analysis as to isolate the economic driven migrations. Using this sample of micro-data, a number of dependent and independent variables can be computed and are briefly discusses below. Table 4 present the detailed definition of the variable used in this analysis.

Geographic unit of analysis – Community of origin and destination

Statistics Canada identified 5418 CSD in 2006. The database used for this analysis contains 4658 CSD which have a sample size sufficient to estimate community average. Furthermore, 10 CSD which are classified as Indian reserve have been suppressed from our sample. Individuals living in the Territories (Northwest Territories, Yukon Territory and Nunavut) were also excluded due to the 100km threshold for migration distance and the large area size of CSD in Territories (25,060 individuals). Finally, 4638 additional individuals were excluded from the analysis due to mismatching geographies. Larger spatial units (i.e. labour markets) would be desirable in such an analysis to avoid spatial dependency between community level variables but these were the best available geographic units at the time of the analysis.

Dependent variable - Migration status

According to Statistics Canada, a *mover* is a person who, on Census Day, was living at a different address than the one at which they resided five years earlier. *Internal migrants*, on the other hand, are movers who, on Census Day, were residing in a different Census subdivision (CSD) five years earlier (external migrants being persons who were living outside Canada five years earlier). The definition of *internal migrant* used in the present analysis relies on two criteria, 1) change of place of residence between 2001 and 2006 as defined by Statistics Canada and 2) distance of at least 100 km between area of residence in 2001 and area of residence in 2006.

The reason for including a distance criterion is to isolate work-related migrations. In this sense, some researchers define migration as occurring whenever the distance involved in a residential move (change in homes) is so large that it is no longer possible for the mover to commute to the old place of work (Goetz 1999). “This definition can be turned around to argue that migration has occurred when a change in jobs involves such a large distance that the individual also has to move to a new home closer to the new job”.

According to this definition of internal migrants, approximately 6% of the working age population had migrated across labour markets at least once between 2001 and 2006 (see Table 1). [17]

The definition of the regional type (rural and urban) is based on the place of residence in 2001 and 2006. Following the Standard Area Classification (SAC) of Statistics Canada, we set the main divide between core urban areas and what has been defined Rural and Small town (see du Plessis *et al.*, 2001). In sum, geographical units falling within a Census metropolitan area (CMA) or Census

[17] The Euclidian distance (crow’s flight) between the places of residence of 2001 and 2006 is calculated using the geographic coordinates corresponding to the centroid of both units of analysis (Census Block of residence in 2006 and CSD of residence in 2001). An individual reporting a migration distance equal or greater than 100km and who has also changed CSD of residence between 2001 and 2006 is classified as a migrant; everyone else is considered a non-migrant.

agglomeration (CA) are classified as urban areas while rural and small towns are the residual geographic units which do not fall into an urban category.

Combining the definition of migrants with the rural-urban classification, each individual can be assigned to either one of six migrant categories: (1) rural non-mover, (2) rural-rural migrant, (3) rural-urban migrant, (4) urban non-mover, (5) urban-urban migrant and (6) urban-rural migrant (see Table 2).[18] The dependent variable is expressed in either binary or multinomial form. In a first model, all individuals are included where all non-movers equal (0) and all migrants equal (1)[19]. In a second model, only rural population in 2001 are included; rural non-movers equal (0), rural-rural migrants equal (1) and rural-urban migrants equal (2). In a third model, only urban population in 2001 are included; urban non-movers equal (0), urban-urban migrants equal (1), urban-rural migrants equal (2) (see Table 2 for descriptive flows of migrants by category).

Individual level variables – Personal factors

The choice of individual level variables is constrained by the availability of data in the 2006 Census of Population.[20] While there are many variables collected through the Census, it is not possible to know each individual's situation before the move and after the move. In the case of Census micro-data, only the description of the individual after the move (e.g. 2006) is reported. Consequently, the variables selection is further restricted to those applicable in the beginning of the studied period (2001); those that we can assume are relatively unchanged since the time of migration. This being said, it is possible to track back certain individual characteristics of these migrants back to 2001 (e.g. gender, age, education level, aboriginal identity, immigration status and visible minority status, migratory antecedents and macro-region of residence).

Gender

The effect of gender in migration decisions is not uniform in the literature. In earlier years, it could have been said that women were more likely to be 'tied movers', as they would follow the migration pattern of their husband as his employment was more important in terms of family income (Pekkala, 2003). In certain parts of the world, this may still hold true. However, some authors have commented on the feminization of migration (Mendola, 2006) and question whether or not there is still a difference between male and female migration patterns in moderns developed countries.

Age

Age at the time of migration (in 2001) is the single most important individual determinant indicated in the literature; human capital theory sees this attribute as key factor determining the economic return and cost recovery of migration (Sjaadtad, 1962). Generally speaking, younger individuals are more likely to migrate. However, this is also a relevant attribute in migration that is not driven primarily by economic factors. For instance, older and return migrants may decide to migrate, not necessarily for economic reasons, but rather driven by the presence or absence of certain amenities or services in the community.

Education level

Along with gender and age, education and skills of the individual are key factors that enter in the cost-benefit computation. Both theory and empirical evidence provide strong evidence of the linkage

[18] Both non-mover categories are coded using the area type in 2001 (rural or urban) and include all individuals who had not migrated between 2001 and 2006. All migrant categories are constructed using the area type of origin followed by the area type of origin (i.e. rural-urban migrant). This classification includes all individuals in the sample.

[19] The first model including all migrants was for calibration purposes only and is not presented in this paper.

[20] The limits and advantage of using micro-data from the Census of population have been outlined in the literature (Finnie 2004; Robinson and Tomes 1982.): The Census identifies only the current place of residence and that of the previous census, while migration occurs over time (e.g., return moves and multiple moves, etc.). Second, there is little information on the earlier situation. On the other hand, Census data includes the individual's province of birth, education level, and other demographic attributes which are not available from tax files. It also provides data with high geographic detail and allows a detailed rural-urban break down as well as an adequate sample for rural areas.

between human capital and increased mobility; that is, the higher the educational attainment, the greater the propensity to migrate (Dion and Coulombe, 2008). In our model, the educational attainment in 2006 is used as a proxy for the initial level of individual human capital and is entered using four dummy variables, ranging from low to high educational attainment (see Table 4). The level of education of an individual may vary between the time of the initial change in residence and the Census year but given that we are using only individuals aged 30 to 54 years in 2006, and that the highest human capital level category is 'university degree, bachelor degree or higher', this variation is most likely minimal.

Cultural identity

In addition to these key individual attribute, we have also explore the use of Aboriginal identity and several categories for immigrant status or visible minority status (see Table 4). Aboriginals have been found to be more likely to migrate (Dion and Coulombe, 2008) while the results regarding immigration and minority status are still unclear. For instance, immigrants are said to be less mobile than Canadian-born citizens who had migrated before but more mobile than those who were still residing in their province of birth (Grenier, 2008).

Migratory antecedents

Migratory antecedents refer to past migratory behaviour; that is, whether or not the person was living in the province birth before migrating. In the case of immigrants, they were also classified as having migrated at least once before. Migratory antecedents can affect future migration decisions as it has been reported that repeat migrants have a higher propensity to move than others as the initial ties have already been broken and the psychical costs associated with relocation are lower. (Pekkala, 2003).

Macro-region of residence

Geographic variables were derived from the place of residence in 2001 such as the macro-region of residence (Atlantic Provinces, Quebec, Ontario, Prairies and West). Certain regional and cultural tendencies affecting migration patterns have been observed in different parts of the country. For example, francophone Québécois were less likely to migrate outside of Québec, presumably due to language and cultural barriers (Finnie, 2004).

Community indicators – Local factors

All the community indicators used in this analysis are generated from the 2001 Census of population. However, all of these indicators are coded in 2006 geographic boundaries. The 2006 Census Subdivision (CSD) is used as the operational definition of community (in the remainder of the paper the term CSD and community are used as synonymous).[21] The community attributes used in the analysis are outlined below.

Total population

The *natural logarithm* of the total population is used to describe the community's size in 2001. Recent urbanization trends in Canada and worldwide suggests that a greater share of individuals is now living in cities than ever before (World Bank, 2005). Audas and McDonald (2004) also report that the size of community of origin affects the average annual out-migration rate for various types of migrants.

Population density

Population density is one of the main attributes differentiating rural areas from urban areas. Furthermore, density can vary dramatically within each regional type and consequently, influence the

[21] A CSD is a geographic area that is a municipality or an area that is deemed to be equivalent to a municipality for statistical reporting purposes (e.g., as an Indian reserve or an unorganized territory). Municipal status is defined by laws in effect in each province and territory in Canada. For a detailed definition of Census Subdivision, see the Statistics Canada web site at: http://geodepot.statcan.ca/Diss/Reference/COGG/Index_e.cfm

perceived quality of life of places amongst individuals who choose to live in either rural or urban areas. Younger individuals may be looking for highly dense regions while more mature and pre-retirement workers may be looking for less dense communities to raise a family or retire.

Distance from metropolitan area

The distance between the location of origin and the closest CMA/CA is used to proxy access to major markets. Distance is an important factor in attracting and retaining residents in a community as population and employment growth in rural regions across Canada between 1971 and 2001 have been found to be strongly linked to proximity and connectedness with a major metropolitan area (Shearmur and Polèse, 2007).

Interaction terms – Individual and community factors

In addition to the individual and community indicators, we use a set of interaction terms to isolate the effect of certain subgroups of individuals with particular contexts (i.e. young and educated, highly educated and living in a community with low education levels, etc.) on the propensity to migrate. As discussed in the previous section, there are several examples of interaction terms used in the literature to explore individual and community effects simultaneously (Bilsborrow *et al.*, 1987; Singh, 2004; Lin 2007). In this case, the cross-product terms are created by multiplying two independent variables of interest (e.g. age group and education level, immigrant and visible minority status and cultural diversity). It should be noted that all community variables are centered prior to multiplication as recommended by Keith (2006). Centering is achieved by subtracting the mean score of the continuous variable from that variable; thus resulting in a mean of 0 with a standard deviation equal to the original standard deviation. This procedure prevents multicollinearity to occur between independent variables when introduced together in the multiple regression models and makes it easier to interpret results.

Age/Education and Population Size

It has been suggested that younger and more educated individuals are attracted to larger cities which generally offer a wider array of employment opportunities as well as entertainment and cultural activities (Florida, 2002), and thus, are more likely to leave smaller cities and rural areas. Given that younger educated individuals are generally more mobile, this set of interaction variables between age groups, level of education and population size serve to examine if the effect of age and education on the propensity to migrate also varies with the size of the city of origin.

Age/Education and Population Density

It could also be postulated that younger and more educated individuals residing in sparsely populated communities will be more likely to move out of these areas in search for greater employment opportunities and a different lifestyle (i.e. amenities not offered in rural areas). This set of interaction variables examine the link between age groups, level of education, population density and the propensity to migrate.

Age/Education and distance from small CMA

Younger and more educated individuals are more likely to migrate out of a community which is isolated from small and medium sized labour markets given that these centres offer greater employment opportunity to the young and educated. This set of interaction variables examine the link between age groups, level of education and the distance from a small CMA on the propensity to migrate.

Age/Education and distance from large CMA

Younger and more educated individuals are more likely to migrate out of communities that are located farther away from a large CMA and towards communities located closer or as part of these larger labour markets where employment opportunities are even more plentiful than in smaller urban areas and remote communities. This set of interaction variables examine the link between age groups, level of education and the distance from a large CMA on the propensity to migrate.

4.5 Results

The presentation of the results is organized in three sections. First, the descriptive statistics for the variables used in the model are presented. Second, the ranking and geographic illustrations of in-migration, out-migration and net migration patterns are analyzed and presented. Third, the results of the logit models are presented along with the graphs of the relative risk ratio and the individual, community and interaction effects on the propensity to out-migrate from either a rural or urban community are discussed.

Descriptive statistics

The descriptive statistics for the variables used in the model are presented in Table 4 and Table 5. The individual values are 2006 Census of Population weighted shares of individual factors by migration status. In the case of the community of origin and average, these values represent the community assigned values to individuals in each migration category. In this sense, they are not community averages but rather the average of community values weighted by individual sharing a migration outcome. Table 5 shows the values using the community of origin in 2001 with 2001 Census data.

Individual factors

First, looking at the individual data in Table 4; the descriptive statistics show that individuals who are non-movers in either rural or urban communities differ from migrants in general (i.e. younger, more educated, etc.). However, migrants also differ amongst themselves in certain respects depending on the type of origin and destination with regards to their age, level of education, immigrant status, visible minority, migratory antecedents and macro region of residence.

For instance, young adults (25 to 29 years of age) are more represented in the urban destinations compared with other migration categories (i.e. rural-urban and urban-urban); college degree holders have a greater representation in the urban-rural migrants category than university degree holders; aboriginals choose rural destinations to a larger extent (higher proportion in both rural-rural and urban-rural migration); immigrants and visible minority are predominantly found in the urban non-movers category while Canadian-born non-visible minority are to a lesser extent; individuals who had presumably never moved out of their province were found to larger extent in the rural non-movers category; and finally, a greater share of the population in Quebec is non-movers (rural and urban) while individuals living in the Prairies and the West are more represented in the migrant (rural and urban) categories.

Community of origin characteristics

Second, looking at community data in Table 5, it can be observed that the weighted averages of communities of origin by migration status also differ significantly in some regards. Individuals leaving a rural community for another rural area were living in communities relatively smaller in size and located further away from urban centre than rural residents leaving for the city. In this light, rural-rural migrants originated predominately from the most rural and remote type of communities. On the other hand, urban-rural migrants, those individuals leaving cities for rural areas, were living in urban areas smaller in population size, less dense and located further away from large urban centres compared with urban residents from other migration status. That is to say, urban-rural migrants were more likely to be living in communities resembling rural communities in some regards.

Migration rates

Using the 2006 Census consolidated subdivision (CCS) geography and individual migration data, it is possible to compute and rank communities based on migration rates (Table 6 and 7) as well as map these migration rates (Map 1 to 3) in order to gain further insight into the spatial distribution of migratory patterns across Canada.

Internal migration rates ranking

The top 20 communities with the greatest internal migration gains between 2001 and 2006 (Table 6) are predominately smaller sized communities (population size on average less than 2000 inhabitants) located in Quebec and Ontario with relatively low out-migration rates. There are exceptions in such cases as Milton, ON; located nearby Toronto with a population of roughly 54,000 in 2006, this community experienced significant population growth between 2001 and 2006. The bottom 20 communities with greatest internal migration losses between 2001 and 2006 (Table 7) are also predominately smaller sized communities (population size on average less than 1000 inhabitants) located in Quebec and the Prairies with relatively low in-migration rates. Some exceptions include larger sized areas such as Improvement District No. 9 in Alberta and Division No. 23, Unorganized; both displaying relatively high population mobility in both directions between 2001 and 2006 but with an overall net migration loss. Of course, these extreme cases only demonstrate a small portion of the migratory patterns across communities in Canada; consequently, the results can then be mapped using the entire range of communities in order to illustrate the spatial distribution of these migration rates across the country.

Spatial distribution of migration rates

Map 1 shows that in-migration rates are consistently lower in rural areas located farther away from large urban centers, especially in the Prairies and many coastal communities of Atlantic Canada. Conversely, Quebec communities located in the Laurentian region, north of the Montreal CMA, display high in-migration rates even while the island of Montreal itself displays low migration rates. Several areas in Southern Ontario are also displaying large numbers of in-migrants, around Barrie and Peterborough, while the Toronto CCS itself displays relatively low in-migration rates and the same logic applies to Calgary and its surrounding areas. Overall, these in-migration patterns are consistent with the expected population movements towards urban adjacent peripheral communities.

Map 2 shows that out-migration rates are unevenly dispersed across the Canadian geography. High out-migration rates can be found in communities located in the Rockies on British Columbia and the middle of Saskatchewan but also surrounding the island of Montreal and Eastern Ontario. Conversely, areas displaying the lowest out-migration rates can be found in communities of Saskatchewan, rural areas in the Beauce region located south of Quebec City as well as coastal communities in the Atlantic Provinces. This phenomenon can be reminiscent of smaller communities with strong local ties where people are less likely to leave, but which does not necessarily translate into stronger pull effects for in-migrants.

Map 3 shows the net-migration calculated as the in-migration minus the out-migration rate of the community. The communities who have experienced a net loss of population between 2001 and 2006 are typically more vulnerable to population and employment decline and are predominately concentrated in the Prairies, northern Ontario and Quebec and certain regions of Atlantic Canada. A notable exception is the case of Prince Edward Island where many smaller and rural communities display high net migration rates. Generally speaking, southern Ontario and communities located near Montreal in Quebec display net population gains as well as communities around Calgary in Alberta and several dispersed communities in Saskatchewan.

Rural out-migrants - Multinomial logit model results

The results of the multinomial logit model for individuals living in rural communities in 2001 are presented in Table 8. The pseudo R square value for the rural out-migrants model as a whole is 0.0879[22], and many of the individual and community variables included as well as the interaction terms are found to significantly influence the individual propensity to migrate towards another rural or urban community. As for all models, the variance inflation factor (VIF) was computed for each independent

[22] The pseudo R square value was computed using STATA software and would be considered low in a multiple regression model but considered satisfactory in a multinomial logit model dealing with individuals and a larger set of micro-data.

variable to ensure no multicollinearity affect the coefficient estimates. The results are presented and discussed below.

Individual factors

Overall, the individual factors results show the expected outcome: men are slightly more likely to migrate compared to women, the propensity to migrate decreases with age, increases with education level, aboriginals are more likely to migrate, as are immigrants and visible minorities, individuals who had previously migrated were almost 3 times more likely to migrate again than those who had presumably never migrated and individuals living in Western provinces were more likely to move than inhabitants of the Atlantic Provinces and Quebec.

Rural-to-rural and rural-to-urban migrants

Nevertheless, rural community out-migrants differ from each other depending on the destination category of choice (rural-rural vs. rural-urban migrants). Judging from the results of relative risk ratios presented in Table 8, we can note the following major differences between rural-rural and rural-urban migrants: men are slightly more likely to migrate toward an urban area rather than another rural area (i.e. Male: 1.024 vs. 1.034), the probability of migrating out of rural communities decreases with age in both cases but older migrants are more likely to choose a rural destination than an urban destination (i.e. 50 to 54 years: 0.357 vs. 0.298), individuals with higher levels of education are more likely to migrate toward an urban destination (i.e. University: 0.443 vs. 1.617) with individuals holding a university degree being much more likely to migrate towards an urban area than individuals with no high school diploma, Aboriginals are less likely to choose an urban destination (i.e. Aboriginal: 1.127 vs. 0.597), and are as likely to remain in place in a rural community than to choose another rural destination, while recent immigrants who also belong to a visible minority group are much more likely to migrate to an urban area and less likely to choose a rural community as a migration destination (i.e. Recent immigrant, visible minority: 0.795 vs. 2.486), people who have moved before are slightly more likely to choose an urban destination (i.e. Once mover: 2.857 vs. 2.991), and finally, people living in rural communities of the Prairies and Western provinces are also more likely to be rural-rural migrants rather than rural-urban migrants (i.e. West: 1.441 vs. 1.157).

Rural out-migration and community characteristics

The multinomial logit model results from Table 8 for the community characteristics show certain notable trends: people are more likely to migrate out of rural communities with slightly larger population sizes, located farther away from any CMA/CA and even farther from a large CMA. However, there are also differences between the effects of communities of origin on rural-rural migrants and rural-urban migrants. For instance, people living in a rural area located farther away from a CMA/CA, thus the more rural remote areas, are more likely to choose another rural destination then an urban community (i.e. Distance to CMA/CA: 1.171 vs. 1.108) while people originating from communities located farther away from a large CMA are more likely to move to an urban destination (i.e. Distance to large CMA: 1.267 vs. 1.444).

Individual and community interaction terms

The interaction terms from the multinomial logit model provide us with further details regarding the effect of the different locations of origin on the different types of migrants. For instance, the interaction between “age groups” and “population size” demonstrates that the size of a rural community can reduce the effect of age on the propensity to migrate of its citizens; thus, the greater the population size, the greater is the likelihood of people moving, especially young people (i.e. 30 to 34 years of age). The interaction between “age groups” and “population density” also has the effect of reducing migration propensity. However, in this case, the effect of age is masked by the density of the community of origin and migration takes place to the same degree when migrants get older. The interaction between “age groups” and “distance from CMA/CA” reinforces the effect of the distance variable as people living in rural areas located farther away from a CMA/CA are more likely to migrate out of these regions as they get older. The results are not as prominent with the interaction between “age groups” and “distance from a large CMA” where individuals of all ages are not more likely to migrate to another rural area or

an urban area whether or not they live close to a large urban area. In the case of interaction with the education variables, it was found that individuals living in a larger rural community who hold a university degree are less likely to migrate out of their community and also less likely to choose a rural destination. In the case of the distance variable, university graduates living far away from a CMA/CA are more likely to out-migrate and choose a rural destination than individuals with other educational attainment while rural-urban migrants are more likely to be individuals with some postsecondary education. Finally, living in a rural community located further away from any large CMA and holding a university degree increases the likelihood of migrating.

Urban out-migrants - Multinomial logit model results

The results of the multinomial logit model for individuals living in urban communities in 2001 are presented in Table 9. The pseudo R square value for the urban out-migrants model as a whole is 0.0740, and many of the individual and community variables included as well as the interaction terms are found to significantly influence the individual propensity to migrate towards another urban or rural community. The results are presented and discussed below.

Individual factors

Overall, the results are similar to the outcome of the rural out-migrants: men are slightly more likely to migrate compared to women, especially in the case of urban-urban migrants, the propensity to migrate decreases with age, except that it seems to increase with age in the 50-54 years of age group in the urban-rural migrants, aboriginals are more likely to migrate out of urban areas and into rural areas, while immigrants and visible minorities are least likely to migrate towards rural areas, individuals who had previously migrated were almost 3 times more likely to migrate toward another urban area and individuals living in Western provinces were more likely to move than inhabitants of the Atlantic Provinces and Quebec.

Urban-to-urban and urban-to-rural migrants

Similarly to the case of rural migrants, urban community out-migrants differ from each other depending on the destination category of choice (urban-urban vs. urban-rural migrants). Based on the results presented in Table 9, we can note the following major differences between urban-urban and urban-rural migrants: men are slightly more likely to migrate toward another urban area rather than a rural area (i.e. Male: 1.115 vs. 1.026), the probability of migrating out of rural communities decreases with age in both cases but it seems to increase with age in the 50-54 years of age group in the case of urban-rural migrants (i.e. 50 to 54 years of age: 0.301 vs. 0.636), migration is especially likely to occur between urban areas amongst university educated individuals (i.e. University: 1.931 vs. 0.760), aboriginals are more likely to migrate out of urban areas and into rural areas (i.e. Aboriginal: 1.583 vs. 5.277), while urban immigrants and visible minorities are least likely to migrate towards rural areas (i.e. Recent immigrant, visible minority: 0.617 vs. 0.111), people who have moved in the past are more likely to choose another urban destination (i.e. Once mover: 2.820 vs. 2.191), and finally, people living in urban communities of the Prairies and Western provinces are also more likely to be urban-urban migrants rather than urban-rural migrants (i.e. Prairies: 1.704 vs. 1.582).

Urban out-migration and community characteristics

The multinomial logit model results from Table 9 for the community characteristics show certain notable trends: people living in a community with slightly larger population sizes are more likely to migrate from one urban community to another, as are those located farther from a large CMA. However, there are also considerable differences between the effects of communities of origin on urban-urban migrants and urban-rural migrants. For instance, people living in an urban area located farther away from a CMA/CA, thus the more peripheral urban areas, are slightly more likely to choose another urban destination then a rural community (i.e. Distance to CMA/CA: 1.312 vs. 1.276) and people originating from larger sized urban communities are more likely to move to another urban destination (i.e. Total population: 1.106 vs. 1.036).

Individual and community interaction terms

The interaction terms from the multinomial logit model provide us with further details regarding the effect of the different locations of origin on the different types of migrants. For instance, the interaction between "age groups" and "population size" again demonstrates that the propensity to migrate of individuals remains relatively stable when population size is taken into consideration; thus, the greater the size of the urban area, the greater is the likelihood of people moving regardless of age. The interaction between "age groups" and "population density" also has the effect of stabilizing migration propensity. However, in this case, the effect of age is more apparent as individuals in older categories who are living in denser cities are more likely to choose a rural community as a migratory destination. The interaction between "age groups" and "distance from CMA/CA" is not highly significant as it was demonstrated the case in the community factors. The results are more prominent with the interaction between "age groups" and "distance from a large CMA" where older individuals are less likely to migrate to a rural area or an urban area whether or not they live close to a large urban area. In the case of interaction with the education variables, it can be noted that population size only has a negligible effect on the propensity to migrate except in the case of university graduates moving from one urban area to another, in which case it is slightly higher. The interaction with population density, however, shows that university graduates living in denser urban areas are more likely to stay in those communities. Finally, the distance effect is only significant in the case of urban communities located further away from a large CMA where university graduates are more likely to migrate towards another community than individuals with different education attainment.

4.6 Conclusions

Using a cost-benefit analysis driven migratory framework, this paper examined the propensity of working age population migration across the rural-urban spectrum using individual and community level data as well as their interaction effects. Few studies in Canada have integrated both Census micro-data and community level data in their analysis of migration patterns. It is the authors' hopes that the results of this paper will contribute to the better understanding of the link between personal factors and environmental factors in the decision to leave a community or region for employment purposes.

First, the results will be more relevant for the period of study, characterized by resource-led growth, a rapidly-rising Canadian dollar and falling employment in manufacturing, not necessarily representative of pre-2001 or post-2006 trends. It would be valuable to repeat the exercise with new data from the Census of Population 2011 and National Household Survey 2011[23] to see how the changes in migration dynamics.

The results at the individual level are similar to other studies found in the migration literature; younger, highly educated, immigrants and visible minorities and previous movers are more likely to migrate. However, the results differ significantly in some cases based on the types of origins and destinations of the migrants. For example, pre-retirement aged individuals and aboriginal are more likely to migrate out of an urban area and into a rural community when compared with other groups. Therefore, overarching frameworks aiming to explain migration as a whole may be overlooking some of the motivations of certain sub-groups of the migrant population. Isolating individuals based on geographic locations may help to better appreciate individual migration choices and help tailor migration policies to individual needs (i.e. attracting workforce in rural areas).

Similarly, the results at the community level suggest that communities and regions can potentially help reduce the flow of out-migration from their respective communities if they understand what these sub-groups of individuals are seeking in terms of geo-structural features. Again, these factors will differ in their degree of influence based on the location of the community of study; for example, highly educated individuals tend to leave small rural communities while population size in rural areas seems to help retain younger individuals who might otherwise leave these communities. In the case of urban

[23] It should be noted that the validity issues inherent, especially in smaller rural areas, found in the voluntary National Household Survey, 2011 might make such a future analysis incomparable.

communities, individuals in the older age groups living in denser areas are more likely to become urban-rural migrants while university graduates living in denser areas are more likely to remain in urban settings. The interaction between individual and community level factors suggest that greater research is required in order to understand how different environmental characteristics affect the migratory decisions of different sub-groups of individuals.

In future studies, it would be ideal to replicate the analysis presented here using multi-level analysis methods and various geographical scales (local vs. regional). Multi-level analysis would help isolate regional, local and individual effects in a way that is not attainable using the multinomial logit approach, even when including the interaction terms. Otherwise, it would also be advisable to experiment with different methods of modeling migrations; for example, modelize the migrant decision first ("yes" or "no") and then modelize the competing migratory destinations in a subsequent model for migrants only.

In sum, migration choices are influenced by many different combinations of environmental circumstances and personal preferences. Some workers feel the need to migrate toward the bigger cities in order to maximize their financial potential while others choose to migrate to smaller areas in order to be closer to their roots and families, or vice-versa. If we wish to be competitive in today's world economy, the process of migration and mobility needs to be facilitated in order to efficiently allocate the human resources where they are most needed. Whether this implies aiding families to permanently relocate when employment is scarce in one area and there is shortage of labour in another, or if this involves ensuring that workers' qualifications are officially recognized in other provinces, government policies should harness the power of migration as a social and economic phenomenon by assisting individuals in this important decision and not making it any harder than it needs to be. By helping to decrease the costs associated with migrating through social and economic policy (i.e. providing accurate information with regards to opportunities across the rural-urban gradient), more people would end up where they want to be; for some people this would mean living in dense cities while for others this would mean a smooth transition back to their rural roots, but in the end, everyone would be made better off.

Table 1 : Migration over 100km by working age population between 2001 and 2006, Canada

	Individuals	
	Frequency	**Percentage**
Non-migrants	12,408,113	94.01
Migrants (moved 100km or more)	790,728	5.99
Total	13,198,841	100.00

Note: Working age population and potential migrant includes all non-institutional population 25 to 54 years of age living in Canada in 2001.

Source: Author's computation based on Census of population 2006.

Table 2 : Migration over 100km by rural and urban types between 2001 and 2006, Working age population (25 to 54 years of age in 2001)

	Frequency	**Percentage of Total**	**Percentage of Rural-Urban Total**
Rural Non-Mover	2,259,644	17.12	92.72
Rural-Rural Migrant	59,743	0.45	2.45
Rural-Urban Migrant	117,762	0.89	4.83
Total - Rural	2,437,149	18.46	100.00
Urban Non-Mover	10,148,469	76.89	94.30
Urban-Urban Migrant	474,478	3.59	4.41
Urban-Rural Migrant	138,745	1.05	1.29
Total - Urban	10,761,692	81.53	100.00
Total – All Rural-Urban	13,198,841	100.00	-

Note: Working age population and potential migrant includes all non-institutional population 25 to 54 years of age living in Canada in 2001.

Source: Authors' computation based on Census of Population 2006 data.

Table 3 Migration status 2001 and 2006 of working age population by rural and urban types, Canada, 2006

	Same province	Different province	Total
	Individuals		
Total population	…	…	13,198,841
Non-migrant	…	…	
Rural	…	…	2,259,644
Urban	…	…	10,148,469
Total migrant	420,602	370,126	790,728
Rural to rural	38,049	21,695	59,743
Rural to rural – same (1)	21,843	11,918	33,761
Rural to rural – urban adjacent (2)	9,368	4,974	14,342
Rural to rural – rural remote (3)	6,838	4,802	11,640
Rural to urban	72,941	44,821	117,762
Rural to urban – larger urban (4)	46,505	27,492	73,996
Rural to urban – smaller urban (5)	26,436	17,330	43,766
Urban to rural	88,504	50,241	138,745
Urban to rural – urban adjacent (6)	48,594	26,499	75,093
Urban to rural – rural remote (7)	39,910	23,741	63,652
Urban to urban	221,108	253,369	474,478
Urban to urban – same (8)	127,190	190,805	317,996
Urban to urban – larger urban (9)	46,964	27,873	74,837
Urban to urban – smaller urban (10)	46,953	34,692	81,645

Note: Working age population and potential migrant includes all non-institutional population 25 to 54 years of age living in Canada in 2001.

The rural and urban communities are subdivided into 2 categories using Statistical Area Classification (SAC) types in rural (urban adjacent and rural remote) and in urban (larger urban and smaller urban) and are also divided between intra- and inter-provincial migration. ‘Rural adjacent’ refers to Strong and Moderate MIZ. ‘Rural remote’ refers to Weak and No MIZ. ‘Large urban’ refers to CMA. ‘Smaller urban refers to CA.

Source: Authors’ computation based on Census of Population 2006 data.

Table 4 : Descriptive statistics by migration status 2001 to 2006 and type of region, Canada, 2006

Variable	Migration status						
Individual factors (%)	**Rural non migrant**	**Rural to rural**	**Rural to urban**	**Urban non migrant**	**Urban to urban**	**Urban to rural**	**Total**
Female	50.14	50.37	50.81	51.40	48.90	50.35	51.08
Male	49.86	49.63	49.19	48.60	51.10	49.65	48.92
25 to 29	11.13	20.19	21.93	13.60	27.71	21.64	13.87
30 to 34	13.66	18.34	19.23	15.47	20.77	17.80	15.42
35 to 39	18.54	18.47	19.00	18.86	17.87	16.36	18.75
40 to 44	20.21	15.96	16.12	19.27	13.88	14.09	19.14
45 to 49	19.06	14.47	12.94	17.45	10.68	13.75	17.39
50 to 54	17.40	12.57	10.78	15.34	9.10	16.36	15.43
No high school	24.01	18.97	15.09	13.25	9.26	15.18	15.01
High school	25.82	22.77	22.48	24.66	19.22	22.99	24.62
College, etc.	40.20	43.80	43.02	38.56	36.87	42.81	38.89
University	9.97	14.46	19.41	23.54	34.64	19.02	21.48
Non-Aboriginal	92.80	89.49	91.33	97.92	96.33	92.64	96.84
Aboriginal	7.20	10.51	8.67	2.08	3.67	7.36	3.16
Non-immigrant, non-visible	87.82	82.87	82.07	70.43	74.63	84.46	73.87
Immigrant before 1996, non-visible	3.81	4.55	4.26	9.13	5.81	5.02	7.99
Recent immigrant, non-visible	0.43	0.99	1.06	1.44	1.90	0.82	1.27
Non-immigrant, visible minority	7.26	10.57	9.10	3.53	5.39	7.67	4.36
Immigrant before 1996, visible minority	0.53	0.68	2.34	11.38	6.32	1.21	9.10
Recent immigrant, visible minority	0.15	0.34	1.18	4.10	5.94	0.82	3.41
Never mover	82.70	60.73	58.80	59.86	46.13	57.65	63.26

Migrated at least once	17.30	39.27	41.20	40.14	53.87	42.35	36.74
Atlantic	17.78	16.12	17.62	5.30	7.66	7.93	7.71
Quebec	27.25	14.40	15.52	24.46	16.80	15.79	24.45
Ontario	24.03	17.65	19.92	42.01	33.32	32.21	38.20
Prairies	11.73	16.35	13.39	5.03	8.36	9.19	6.47
West	19.21	35.47	33.55	23.20	33.87	34.88	23.17

Note (if needed): Percentage is calculated by broad individual factors category.

Source: Authors' computation based on Census of Population 2006 data.

Table 5 Descriptive statistics by migration status 2001 to 2006 and community of origin, Canada, 2001

	Living in rural area in 2001			Living in urban area in 2001		
Community factors (Average)	**Rural non migrant**	**Rural to rural**	**Rural to urban**	**Urban non migrant**	**Urban to urban**	**Urban to rural**
Total population	5,449	4,795	5,106	569,993	501,176	412,038
Population density (pop./km^2)	101.27	145.58	164.18	1,456.38	1,289.18	1,095.21
Distance to CMA/CA (km)	66.80	100.56	93.10	17.31	16.38	16.31
Distance to large CMA (km)	285.71	361.84	351.77	105.06	156.81	172.20

Note: The community factors average is not the "community average" but rather the average community values attached to each type of individual in each migration category.

Source: Authors' computation based on Census of Population 2006 and 2001 data.

Table 6 : Communities with greatest internal migration gains between 2001 and 2006 (Pop. 500+)

Rank	Community	Name	Prov.	In-migration rate	Out-migration rate	Net migration rate
1	2480140	Val-des-Bois	QC	34.89	1.34	33.55
2	2411050	Saint-Mathieu-de-Rioux	QC	40.86	8.81	32.04
3	3546018	Algonquin Highlands	ON	35.25	3.54	31.72
4	2430010	Notre-Dame-des-Bois	QC	37.31	6.78	30.53
5	3524009	Milton	ON	44.48	15.20	29.28
6	2428075	Saint-Magloire	QC	28.67	0.00	28.67
7	5903017	Central Kootenay C	BC	30.03	1.50	28.53
8	2456015	Noyan	QC	40.93	13.21	27.73
9	5919035	Cowichan Valley I	BC	39.48	13.19	26.29
10	2471125	Très-Saint-Rédempteur	QC	29.05	2.86	26.19
11	3549024	Ryerson	ON	28.91	2.92	26.00
12	3548031	Chisholm	ON	25.55	0.00	25.55
13	2476030	Mille-Isles	QC	32.53	7.17	25.36
14	5927012	Powell River B	BC	25.31	0.00	25.31
15	4707042	Marquis No. 191	SK	26.27	1.23	25.04
16	3549028	McKellar	ON	36.40	12.62	23.78
17	4615023	Odanah	MB	31.79	8.46	23.34
18	2480145	Bowman	QC	38.19	14.89	23.30
19	2479050	L'Ascension	QC	38.92	16.34	22.58
20	2479010	Notre-Dame-de-Pontmain	QC	27.75	5.39	22.36

Note: In-migration rate = (In-migrants) / (In-migrants) + (Total population) * 100

Out-migration rate = (Out-migrants) / (Out-migrants) + (Total population) * 100

Net migration rate = In-migration – Out-migration rate

Only Census subdivisions with total population greater than 500 in 2006 were retained.

Source: Authors' computation based on Census of Population 2006 data.

Table 7 : Communities with greatest internal migration losses between 2001 and 2006 (Pop. 500+)

Rank	Community	Name	Prov.	In-migration rate	Out-migration rate	Net migration rate
1	1101039	Lot 47	PEI	1.73	14.66	-12.93
2	2448020	Sainte-Christine	QC	5.63	18.92	-13.28
3	2433017	Sainte-Agathe-de-Lotbinière	QC	5.21	18.61	-13.41
4	2487110	Clermont	QC	4.00	17.51	-13.51
5	2418005	Saint-Just-de-Bretenières	QC	0.00	14.52	-14.52
6	2429025	Saint-Évariste-de-Forsyth	QC	0.00	14.63	-14.63
7	2444003	Saint-Malo	QC	7.92	22.69	-14.77
8	4815032	Improvement District No. 9	AB	14.91	29.87	-14.96
9	4707036	Caron No. 162	SK	10.54	25.83	-15.29
10	4707063	Victory No. 226	SK	1.30	17.04	-15.74
11	2433123	Leclercville	QC	2.33	18.10	-15.77
12	1314016	Eldon	NB	0.84	16.84	-16.00
13	2485015	Saint-Édouard-de-Fabre	QC	3.02	19.70	-16.67
14	4623062	Division No. 23, Unorganized	MB	9.16	26.08	-16.92
15	4712011	Milden No. 286	SK	1.13	19.03	-17.90
16	4702061	Elmsthorpe No. 100	SK	2.15	20.17	-18.02
17	2406050	Saint-Alexis-de-Matapédia	QC	1.18	21.07	-19.90
18	2409005	La Rédemption	QC	0.00	21.47	-21.47
19	2420015	Saint-Jean-de-l'Île-d'Orléans	QC	11.57	33.34	-21.77
20	4711042	Wreford No. 280	SK	9.81	31.72	-21.90

Note: In-migration rate = (In-migrants) / (In-migrants) + (Total population) * 100

Out-migration rate = (Out-migrants) / (Out-migrants) + (Total population) * 100

Net migration rate = In-migration – Out-migration rate

Only Census subdivisions with total population greater than 500 in 2006 were retained.

Source: Authors' computation based on Census of Population 2006 data.

Table 8 : Multinomial logit model results: Relative-risk-ratio (RRR) - Rural migration model (Individual and community variables)

	Rural-Rural Migration			Rural-Urban Migration		
	RRR	**z**	**P>|z|**	**RRR**	**z**	**P>|z|**
Individual factors						
Female	**1**			**1**		
Male	**1.024**	**1.54**	0.124	**1.034**	**2.44**	0.014
25 to 29	**1**			**1**		
30 to 34	**0.605**	**-3.83**	0.000	**0.725**	**-2.82**	0.005
35 to 39	**0.548**	**-4.27**	0.000	**0.523**	**-4.66**	0.000
40 to 44	**0.421**	**-6.33**	0.000	**0.341**	**-9.76**	0.000
45 to 49	**0.372**	**-6.63**	0.000	**0.264**	**-10.49**	0.000
50 to 54	**0.357**	**-6.41**	0.000	**0.298**	**-8.11**	0.000
No high school	**1**			**1**		
High school or equivalent	**0.686**	**-2.79**	0.005	**0.977**	**-0.14**	0.886
Some postsecondary	**0.660**	**-3.78**	0.000	**0.935**	**-0.60**	0.547
University	**0.443**	**-5.04**	0.000	**1.617**	**3.81**	0.000
Non-aboriginal	**1**			**1**		
Aboriginal	**1.127**	**0.83**	0.406	**0.597**	**-5.19**	0.000
Non-immigrant, non-visible	**1**			**1**		
Immigrant before 1996, non-visible	**0.592**	**-8.40**	0.000	**0.568**	**-11.15**	0.000
Recent immigrant, non-visible	**0.887**	**-0.84**	0.400	**0.888**	**-1.06**	0.289
Non-immigrant, visible minority	**0.931**	**-0.51**	0.608	**1.616**	**5.44**	0.000
Immigrant before 1996, visible minority	**0.497**	**-4.80**	0.000	**1.749**	**6.34**	0.000
Recent immigrant, visible minority	**0.795**	**-1.04**	0.298	**2.486**	**7.13**	0.000
Never mover	**1**			**1**		
Once mover	**2.857**	**24.55**	0.000	**2.991**	**22.58**	0.000
Atlantic	**0.648**	**-4.69**	0.000	**0.569**	**-5.47**	0.000
Quebec	**0.810**	**-2.90**	0.004	**0.831**	**-2.50**	0.012
Ontario	**1**			**1**		

Prairies	**1.117**	**1.31**	0.190	**0.838**	**-2.26**	0.024
West	**1.441**	**5.33**	0.000	**1.157**	**2.07**	0.039
Community Characteristics						
Total population	**1.096**	**2.30**	0.022	**1.094**	**2.60**	0.009
Population density	**1.002**	**0.06**	0.948	**1.029**	**1.47**	0.141
Distance to CMA/CA	**1.171**	**2.70**	0.007	**1.108**	**2.04**	0.042
Distance to large CMA	**1.267**	**3.97**	0.000	**1.444**	**7.08**	0.000
Interaction terms						
25 to 29 * Population	**1**			**1**		
30 to 34 * Population	**0.797**	**-2.80**	0.005	**1.039**	**0.58**	0.560
35 to 39 * Population	**0.947**	**-0.60**	0.551	**1.026**	**0.38**	0.707
40 to 44 * Population	**0.903**	**-1.17**	0.240	**0.888**	**-1.76**	0.079
45 to 49 * Population	**0.945**	**-0.60**	0.549	**0.861**	**-2.00**	0.045
50 to 54 * Population	**0.921**	**-0.83**	0.406	**0.968**	**-0.40**	0.692
25 to 29 * Density	**1**			**1**		
30 to 34 * Density	**1.029**	**0.81**	0.417	**1.071**	**2.42**	0.015
35 to 39 * Density	**1.082**	**1.86**	0.063	**1.128**	**3.47**	0.001
40 to 44 * Density	**1.142**	**3.19**	0.001	**1.055**	**1.57**	0.115
45 to 49 * Density	**1.073**	**1.63**	0.104	**1.118**	**3.25**	0.001
50 to 54 * Density	**1.086**	**1.77**	0.078	**1.140**	**3.39**	0.001
25 to 29 * CMA/CA	**1**			**1**		
30 to 34 * CMA/CA	**1.038**	**0.21**	0.831	**1.254**	**1.57**	0.117
35 to 39 * CMA/CA	**1.093**	**0.46**	0.648	**1.190**	**0.91**	0.365
40 to 44 * CMA/CA	**1.253**	**1.21**	0.227	**1.318**	**1.85**	0.065
45 to 49 * CMA/CA	**1.343**	**1.37**	0.171	**1.868**	**3.62**	0.000
50 to 54 * CMA/CA	**1.675**	**2.11**	0.034	**1.562**	**2.28**	0.023
25 to 29 * CMA500	**1**			**1**		
30 to 34 * CMA500	**0.910**	**-1.28**	0.200	**0.965**	**-0.65**	0.514
35 to 39 * CMA500	**1.003**	**0.04**	0.971	**1.089**	**1.28**	0.200
40 to 44 * CMA500	**0.956**	**-0.61**	0.541	**0.968**	**-0.56**	0.574
45 to 49 * CMA500	**0.975**	**-0.32**	0.752	**0.882**	**-1.96**	0.050
50 to 54 * CMA500	**0.842**	**-1.99**	0.047	**0.938**	**-0.94**	0.347

No high school * Population	**1**			**1**		
High school or equivalent * Population	**0.841**	**-2.20**	0.028	**0.908**	**-1.27**	0.203
Some postsecondary * Population	**0.818**	**-3.00**	0.003	**0.869**	**-2.29**	0.022
University * Population	**0.686**	**-3.84**	0.000	**0.825**	**-2.54**	0.011
No high school * Density	**1**			**1**		
High school or equivalent * Density	**1.030**	**0.73**	0.468	**1.105**	**2.95**	0.003
Some postsecondary * Density	**1.016**	**0.42**	0.674	**1.072**	**2.22**	0.026
University * Density	**1.056**	**1.12**	0.261	**1.058**	**1.53**	0.127
No high school * CMA/CA	**1**			**1**		
High school or equivalent * CMA/CA	**1.242**	**1.20**	0.229	**1.348**	**1.35**	0.177
Some postsecondary * CMA/CA	**1.713**	**3.39**	0.001	**2.087**	**4.91**	0.000
University * CMA/CA	**2.684**	**4.04**	0.000	**1.305**	**1.40**	0.161
No high school * CMA500	**1**			**1**		
High school or equivalent * CMA500	**1.124**	**1.71**	0.086	**1.096**	**1.15**	0.250
Some postsecondary * CMA500	**1.148**	**2.43**	0.015	**1.002**	**0.03**	0.973
University * CMA500	**1.326**	**3.33**	0.001	**1.120**	**1.84**	0.066
Measure of fit						
Pseudo R Squared =	**0.0879**					
Number of observations	**2,437,149**					

Note: See Table 1 for a description of the indicators and unit of measures

Source: Author's estimation based on Census of Population 2001 and 2006 data

Table 9 : Multinomial logit model results: Relative-risk-ratio (RRR) - Urban migration model (Individual and community variables)

	Urban-Urban Migration			Urban-Rural Migration		
	RRR	**z**	**P>|z|**	**RRR**	**z**	**P>|z|**
Individual factors						
Female	**1**			**1**		
Male	**1.115**	**16.88**	0.000	**1.026**	**2.35**	0.019
25 to 29	**1**			**1**		
30 to 34	**0.652**	**-21.16**	0.000	**0.729**	**-11.34**	0.000
35 to 39	**0.471**	**-30.37**	0.000	**0.527**	**-19.67**	0.000
40 to 44	**0.360**	**-34.08**	0.000	**0.437**	**-22.55**	0.000
45 to 49	**0.304**	**-38.30**	0.000	**0.457**	**-17.13**	0.000
50 to 54	**0.301**	**-30.55**	0.000	**0.636**	**-8.83**	0.000
No high school	**1**			**1**		
High school or equivalent	**1.058**	**2.55**	0.011	**0.785**	**-8.04**	0.000
Some postsecondary	**1.252**	**10.27**	0.000	**0.920**	**-2.71**	0.007
University	**1.931**	**16.30**	0.000	**0.760**	**-6.62**	0.000
Non-aboriginal	**1**			**1**		
Aboriginal	**1.583**	**4.37**	0.000	**5.277**	**15.20**	0.000
Non-immigrant, non-visible	**1**			**1**		
Immigrant before 1996, non-visible	**0.392**	**-10.94**	0.000	**0.296**	**-11.30**	0.000
Recent immigrant, non-visible	**0.536**	**-5.51**	0.000	**0.315**	**-7.66**	0.000
Non-immigrant, visible minority	**0.858**	**-1.71**	0.087	**0.402**	**-9.45**	0.000
Immigrant before 1996, visible minority	**0.315**	**-7.87**	0.000	**0.059**	**-21.00**	0.000
Recent immigrant, visible minority	**0.617**	**-3.83**	0.000	**0.111**	**-14.98**	0.000
Never mover	**1**			**1**		
Once mover	**2.820**	**23.45**	0.000	**2.191**	**19.42**	0.000
Atlantic	**0.759**	**-2.15**	0.032	**0.764**	**-2.90**	0.004
Quebec	**1.021**	**0.20**	0.843	**0.796**	**-2.61**	0.009
Ontario	**1**			**1**		
Prairies	**1.704**	**3.20**	0.001	**1.582**	**5.21**	0.000

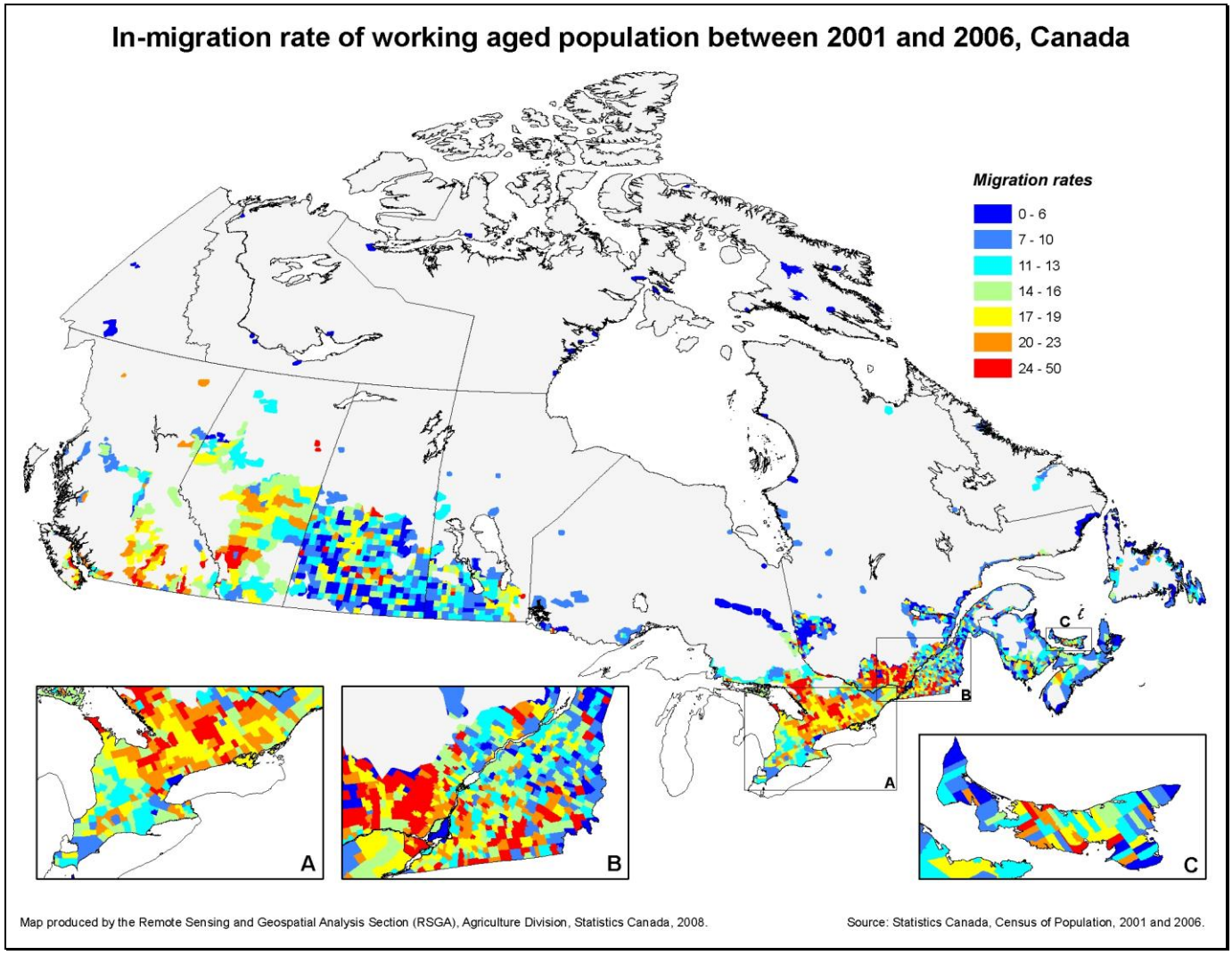
West	**1.535**	**4.90**	0.000	**1.485**	**6.16**	0.000
Community Characteristics						
Total population	**1.106**	**3.08**	0.002	**1.036**	**1.19**	0.234
Population density	**0.942**	**-1.20**	0.229	**0.946**	**-2.25**	0.025
Distance to CMA/CA	**1.008**	**0.89**	0.373	**1.012**	**1.33**	0.182
Distance to large CMA	**1.312**	**5.72**	0.000	**1.276**	**8.11**	0.000
Interaction terms						
25 to 29 * Population	**1**			**1**		
30 to 34 * Population	**0.938**	**-2.11**	0.034	**0.896**	**-2.32**	0.020
35 to 39 * Population	**0.917**	**-1.97**	0.049	**0.883**	**-1.91**	0.056
40 to 44 * Population	**0.881**	**-2.50**	0.013	**0.890**	**-1.43**	0.153
45 to 49 * Population	**0.850**	**-3.17**	0.002	**0.917**	**-0.95**	0.344
50 to 54 * Population	**0.878**	**-1.94**	0.053	**0.996**	**-0.04**	0.968
25 to 29 * Density	**1**			**1**		
30 to 34 * Density	**1.078**	**1.91**	0.057	**1.059**	**1.16**	0.247
35 to 39 * Density	**1.088**	**1.55**	0.120	**1.138**	**2.12**	0.034
40 to 44 * Density	**1.118**	**1.56**	0.118	**1.133**	**1.93**	0.054
45 to 49 * Density	**1.145**	**1.84**	0.066	**1.237**	**2.18**	0.030
50 to 54 * Density	**1.074**	**0.72**	0.469	**1.112**	**0.83**	0.406
25 to 29 * CMA	**1**			**1**		
30 to 34 * CMA	**0.954**	**-3.04**	0.002	**0.936**	**-3.49**	0.000
35 to 39 * CMA	**0.946**	**-2.68**	0.007	**0.913**	**-4.29**	0.000
40 to 44 * CMA	**0.936**	**-3.11**	0.002	**0.955**	**-1.99**	0.046
45 to 49 * CMA	**0.944**	**-2.47**	0.014	**0.913**	**-3.05**	0.002
50 to 54 * CMA	**0.945**	**-2.07**	0.038	**0.936**	**-1.83**	0.067
25 to 29 * CMA500	**1**			**1**		
30 to 34 * CMA500	**0.942**	**-2.86**	0.004	**0.881**	**-4.88**	0.000
35 to 39 * CMA500	**0.960**	**-1.61**	0.107	**0.845**	**-4.89**	0.000
40 to 44 * CMA500	**0.955**	**-1.40**	0.161	**0.880**	**-4.03**	0.000
45 to 49 * CMA500	**0.935**	**-2.01**	0.045	**0.809**	**-5.25**	0.000
50 to 54 * CMA500	**0.893**	**-2.95**	0.003	**0.755**	**-6.21**	0.000
No high school * Population	**1**			**1**		

High school or equivalent * Population	**1.019**	**0.46**	0.645	**0.983**	**-0.32**	0.746
Some postsecondary * Population	**1.019**	**0.47**	0.639	**1.083**	**1.55**	0.122
University * Population	**1.161**	**2.47**	0.014	**1.082**	**1.24**	0.216
No high school * Density	**1**			**1**		
High school or equivalent * Density	**0.974**	**-0.65**	0.518	**1.010**	**0.23**	0.818
Some postsecondary * Density	**1.010**	**0.26**	0.798	**0.967**	**-0.73**	0.463
University * Density	**0.823**	**-2.58**	0.010	**0.889**	**-1.84**	0.065
No high school * CMA	**1**			**1**		
High school or equivalent * CMA	**0.957**	**-2.02**	0.043	**0.937**	**-2.66**	0.008
Some postsecondary * CMA	**0.981**	**-1.06**	0.291	**0.963**	**-1.82**	0.069
University * CMA	**1.021**	**0.69**	0.490	**0.957**	**-1.41**	0.160
No high school * CMA500	**1**			**1**		
High school or equivalent * CMA500	**1.027**	**1.02**	0.307	**1.008**	**0.25**	0.806
Some postsecondary * CMA500	**1.046**	**1.88**	0.059	**1.073**	**2.34**	0.019
University * CMA500	**1.109**	**2.56**	0.011	**1.208**	**4.90**	0.000
Measure of fit						
Pseudo R Squared =	**0.0740**					
Number of observations	**10,761,692**					

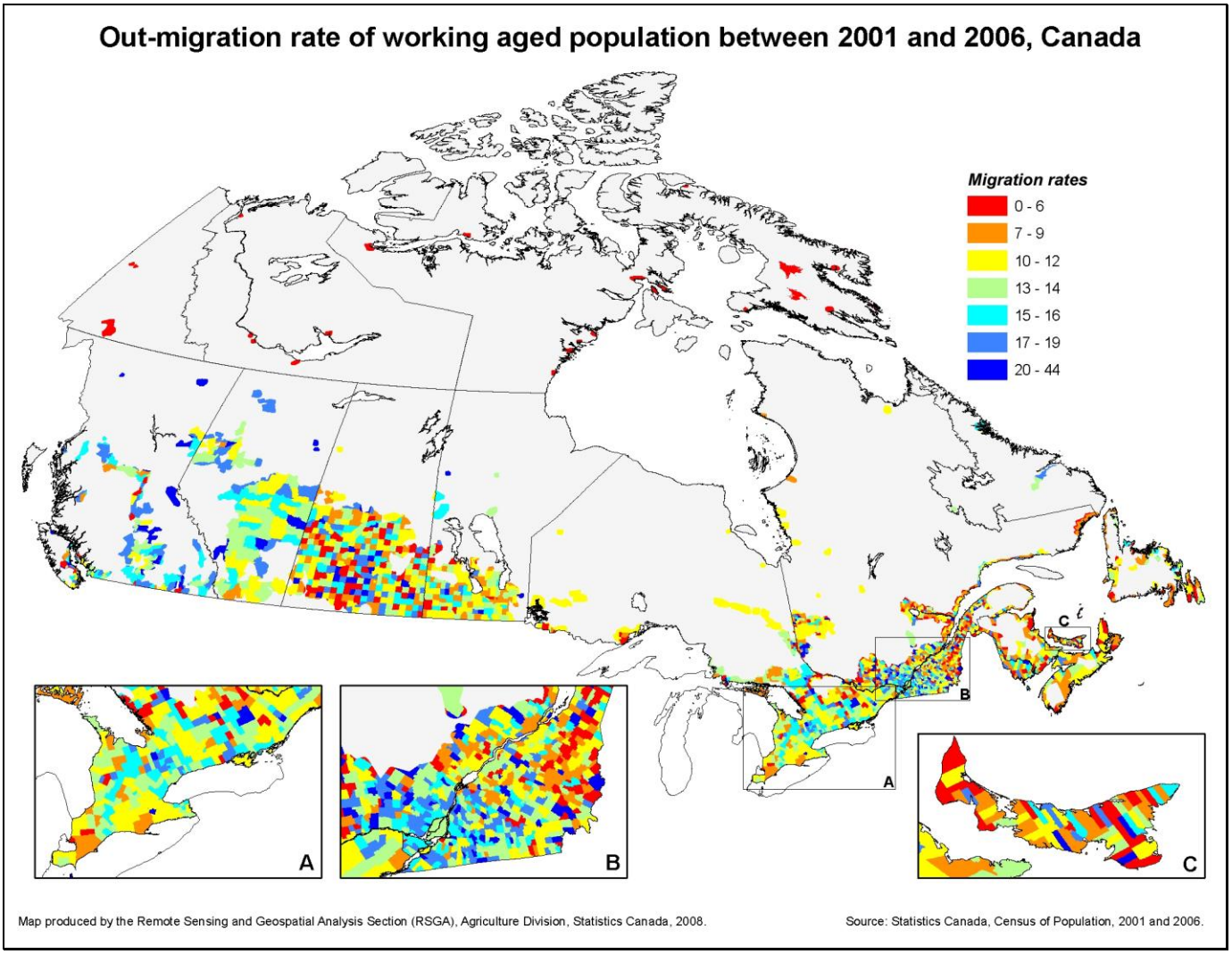
Note: See Table 1 for a description of the indicators and unit of measures

Source: Author's estimation based on Census of Population 2001 and 2006 data

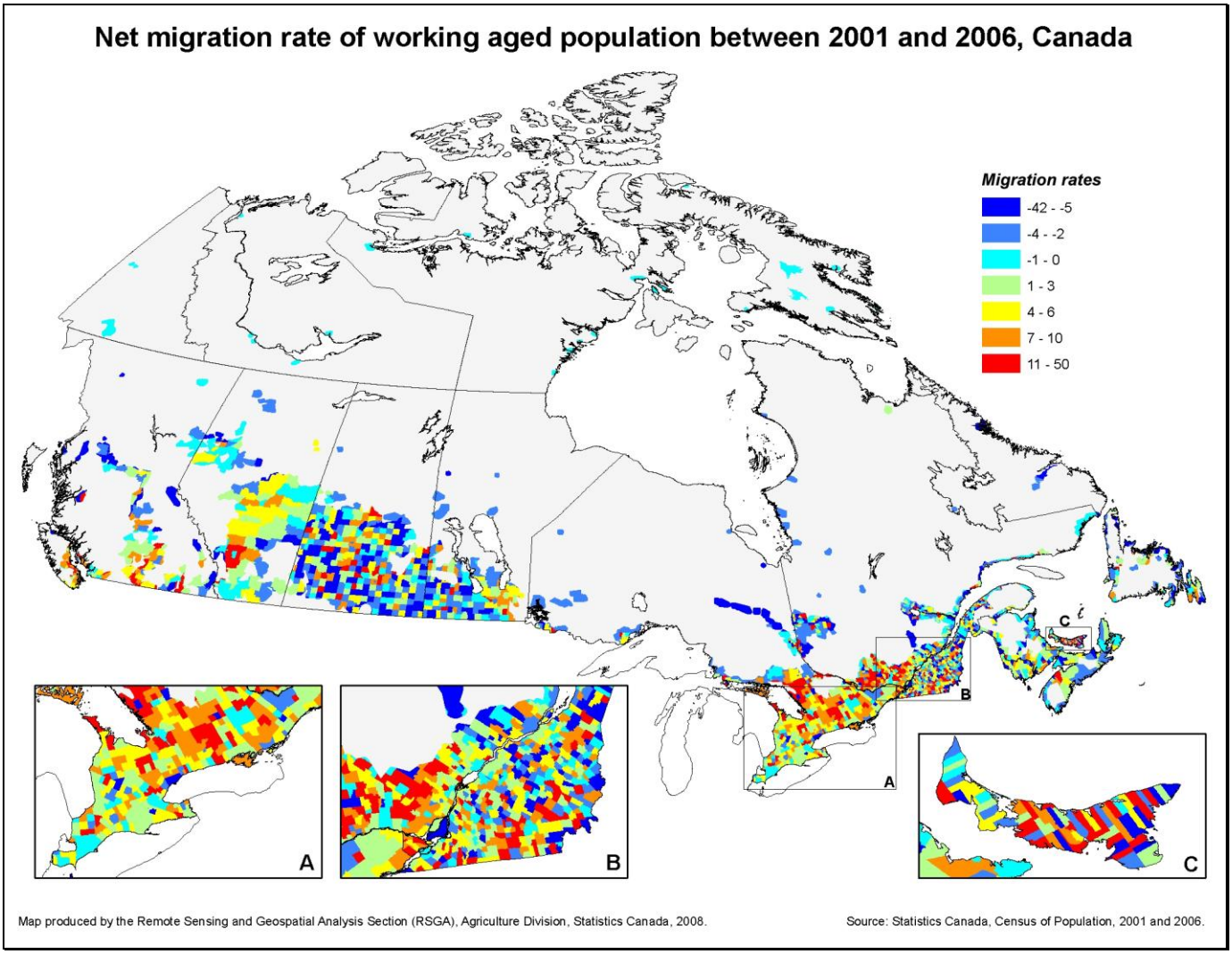
Map 1. In-migration rate of working aged population between 2001 and 2006, Canada



Map 2. Out-migration rate of working aged population between 2001 and 2006, Canada



Map 3 : Net migration rate of working age population between 2001 and 2006, Canada



CHAPTER 5: THE RURAL ADVENT-AGE: MIGRATION FLOWS TOWARD RURAL LABOUR AREAS IN CANADA, 2001 TO 2006

Jean-François Frenette and Richard Shearmur

Executive summary

Rural gentrification, caused in part by migration from urban areas to rural areas (or "counterurbanization") in recent years, has been attracting attention from researchers, policy makers and community leaders alike. Declining areas plagued by decades of outmigration might see this trend as a new hope for the future of their communities; policy analysts might see the potential for setting up incentive structures to direct the flow of migrants towards needy areas. However, such advice should be read with a caveat stating that not every rural community may have the potential for attracting and retaining migrants given that internal migration is a zero-sum game in Canada. Further quantitative research is required to understand the dynamics of urban-to-rural migration as well as rural-to-rural migration.

As a starting point, using microdata from the Census of Population 2006 and an adapted gravity model[24], we analyze migration flows from urban to rural communities (and rural to rural communities) between 2001 and 2006 for different age cohorts (e.g. young adults, core working age population and seniors) between 349 labour areas across Canada. Finally, we ask if the emergence of amenities led migration, retirement migration, residential economies or long-distance commuter can potentially help the smaller remote rural Canadian communities survive in the long-run despite continuous decline in employment opportunities and the lack of a significant export or trade base.

Keywords: Rural development, migration flows, Canada

5.1 Introduction

Rural gentrification, caused in part by migration from urban areas to rural areas (or "counterurbanization"), has been attracting attention from researchers, policy makers and community leaders alike in recent years. This phenomenon is linked in particular to the migration and permanent settlement in the countryside of middle-class or affluent urbanites and retired populations, and is increasingly affecting contemporary rural communities (Guimond and Simard, 2010). Researchers and policy makers are asking if the emergence of amenities led migration, retirement migration, residential economies or long-distance commuter can potentially help the smaller remote rural Canadian communities survive in the long-run despite continuous decline in employment opportunities and the lack of significant export or trade base.

This comes as good news to rural community leaders who have seen their population and tax bases eroding as over the last two decades, about one third of Canadian communities experienced continuous population decline (Alasia *et al.*, 2007); many of them located in rural regions (Mwansa and Bollman, 2005). For most rural communities, development is essentially a demographic phenomenon (Rothwell *et al.* 2002) as internal migration is now the most important contributing factor to population

[24] The model used in this article is borrowed, with gratitude, from *Delisle, F. and Shearmur, R. (2009). Where does all the talent flow? Migration of young graduates and nongraduates, Canada 1996-2001. The Canadian Geographer. (0) 1-19.*

growth or decline. Birth rates[25] in most rural and peripheral areas have dropped to match levels found in urban areas (Shearmur and Polèse, 2001; Caron-Malenfant *et al.*, 2007) and international migrants are settling predominantly in urban areas (Beshiri, 2004). Demographic changes and migratory patterns across the rural-urban gradient in Canada and over recent years have been presented in several studies (Rothwell, 2002; Rothwell *et al.*, 2002; Audas and McDonald, 2004; Caron-Malenfant *et al.*, 2007; Dion and Coulombe 2008). Generally speaking, communities (mostly urban) who attract in-migrants, from within and from outside Canada, will be those recording high population growth rates, while communities that experience migratory out-flows will typically be those experiencing rapid population declines (Caron-Malenfant *et al.*, 2007). If rural communities could only make themselves more attractive to new migrants, perhaps the trend of out-migration could be slowed down or reversed in time to save those declining community.

However, retirement migration can only be sustainable if it is sustained over time (i.e. a constant flow of retirees migrate to compensate for the loss due to later death) as opposed to youth migration which can be self-sustained by itself (i.e. higher levels of natural increase in the years that follow migration) (Bourne and Simmons, 2004). However, given that internal migration is now a zero-sum game[26] in Canada, some communities will inevitably win while others will necessarily lose population through this migratory transaction. Before labelling this movement as a panacea for rural communities, it is important to understand "who is going where" in order to develop policy to help communities deal with this phenomenon in coming years.

The question addressed in this paper takes into consideration that a) internal migration is a zero-sum game and b) urban areas are attracting young talent and immigrants: which rural communities have a better chance of survival in Canada and who can they hope to attract from either urban or other rural areas? More specifically, we ask which rural communities/regions are successfully attracting internal migrants (e.g. permanent settlement migration); what groups of people (e.g. young adults, core working age population, seniors, etc.) are they attracting; and where are they coming from (e.g. urban, rural origins)?

5.2 Theoretical framework: Migration Flows

5.2.1 Literature

Migration and development

Internal migration is now one of the principal determinants of population growth in nonmetropolitan areas in Canada (Caron-Malenfant *et al.* 2007). Given that most rural areas do not tend to attract a significant number of international migrants, and birth rates are too low to compensate for outmigration (Delisle and Shearmur, 2009), understanding internal migration is primordial in the study of rural community development.

Several groups have commented on how out-migration of working age population in smaller towns and rural areas can have a negative effect on those communities left behind:

> "A shrinking labour force and tax base makes it difficult for many small communities to maintain roads, schools, medical facilities, and other public services, which in turn makes it difficult for small towns and villages to attract new immigrants or prevent current residents from moving elsewhere."[27]

[25] The fertility rate in rural areas has gone from being well above the national average to only slightly above urban Canada (in 2001 the fertility rate was roughly 1.5 child per household in the largest Census Metropolitan Areas (CMA) and still below 2.0 in most rural areas (Statistics Canada, 2007).

[26] A zero-sum game is a mathematical representation of a situation in which a participant's gain or loss is exactly balanced by the losses or gains of the other participant(s).

[27] *Jenny Higgins (2008), Newfoundland and Labrador Heritage Web Site:* *http://www.heritage.nf.ca/society/depop_impacts.html*

In recent years, community leaders who have been struggling to cope with outmigration may have heard of a reverse trend in migration coined “counterurbanization”; in which case some individuals are moving towards rural areas either as “neo-rurals” (urban-rural migrants) (Guimond and Simard, 2007), or ruralites (rural-rural migrants) from other parts of the country. This migration may prove to be essential for the survival of rural communities in certain parts of Canada.

Insight from migration theory

In this section we review and summarize some of the theoretical and applied literature on migration, with particular reference to the Canadian context. Far from being an exhaustive review, we focus on the key elements of relevance for our analysis. There are several extensive reviews of migration research upon which these summary insights are based (Goetz, 1999; Taylor and Martin, 2001; Mendola, 2006).

Why do people migrate? Motivations to migrate vary largely, depending on the economic context and conditions in which migrants are located as well as the personal characteristics of the migrants themselves. However, the study of migration was founded on several “laws” of migration initially stated by Ravenstein (1885) which seem to have stood the test of time:

1) Most migrants move only a short distance;
2) There is a process of absorption, whereby people immediately surrounding a rapidly growing town move into it and the gaps they leave are filled by migrants from more distant areas, and so on until the attractive force [pull factors] is spent;
3) There is a process of dispersion, which is the inverse of absorption (people [pushed] away from unattractive localities);
4) Each migration flow produces a compensating counter-flow (although not necessarily of the same volume);
5) Long-range migrants usually move to urban areas;
6) Rural dwellers are more migratory than urban dwellers;
7) Females are more migratory than males;
8) Economic factors are the main cause of migration.

These “laws” still hold true to this day, especially applicable to the study of rural-urban migration, as this type of migration has been largely driven by sector restructuring and economic factors but what does it mean for urban-rural migration? Traditional manufacturing and resource related jobs in rural areas are declining while service sector jobs are growing in cities; people are moving where the opportunities lay, classic migration story. However, the focus of migration studies has also recently extended to the analysis of migratory flows driven by factors that are not strictly economics or not merely reflected in “classical” migration models; these include returning to region of origin, retirement, amenities, and life style choice driven migration.

Many researchers have elaborated on these basic laws of migration over the years; however, they have generally taken two distinct approaches to the study of migration: micro-level analysis and regional flows. Through seminal theoretical works in migration conducted in the 1960s (Sjaadtad, 1962; Lee, 1966), four major type of factors have been associated with the decision to migrate: personal factors, migration factors associated with the area of origin, factors associated with the area of destination, and intervening obstacles. Following such insights, theoretical frameworks have consolidated these factors in what has since become known as the cost-benefit or human capital investment framework to migration (Sjaadtad, 1962; Taylor and Martin, 2001). In broad terms, the migration decision using the cost-benefit framework implies that each individual moves to another region if the present value of the total benefits to move is higher than the present value of the cost of moving (Taylor and Martin, 2001; Etzo, 2008). In this framework, migration is treated as an investment which constitutes a sacrifice of

current consumption in exchange for (presumably higher) future consumption (Kremarik, 1999).

Vanderkamp (1971) further elaborated on some major conceptual basis of migration flows by suggesting that the degree of migration between two regions is determined primarily by the average incomes in the two regions and by the distance between them. Subsequent works emanating from this tradition helped identify and estimate some of the important costs and returns of migration (employment opportunities, wage rates, distance, etc.) linked to the origin and potential destination regions. Analyzing aggregated migratory flows rather than individual micro-data level migration information, this research stream has taken a more place-based oriented approach to the study of migration. This approach suggests that in every area there are factors which facilitate retention of people within the area or attract people to it, and there are others which tend to repel them (Lee, 1966). Some authors have conceptualized these regional or community level factors as push or pull factors to potential migrants. Dorigo and Tobler (1983) describe the push factors as those life situations that give one reason to be dissatisfied with one's present locale while the pull factors are those attributes of distant places that make them appear appealing. In sum, the relative attractiveness of a region or community can be calculated as the difference between its push and pull factors (Dorigo and Tobler, 1983). Evidently, push and pull factors can vary in terms of migratory inducing influences, depending on the individuals, while some are more generalized and consistent across the population (i.e. economic or labour market conditions). There are amenities, such as cultural amenities, that can be particularly attractive for certain subsets of the population (Florida, 2002). Amenities can take the form of cultural activities, climate as well as a welcoming social environment for new comers with diverse lifestyles.

Notwithstanding the local effects, individuals moving from disadvantaged areas to more dynamic economic areas, whose migration decision is largely driven by economic reason, are also simultaneously influenced by attributes such as education and skills level, age, risk taking capacity, capacity to face new situations, entrepreneurship and ethnicity (Todaro, 1980; Mendola, 2006). In this sense, it can be postulated that characteristics of migrants also interact with place-based factors in the decision to migrate. Liao (2000) suggests that older people are more likely to be affected by non-economic determinants of migration, such as scenic amenities or retirement reasons, while younger people tend to change residences for economic opportunities or educational reasons. In sum, the cost-benefit calculation, theoretically estimated by each individual, incorporating the elements of place as well as distance and personal factors, explains why some people migrate while others do not.

While the cost-benefit/human capital framework along with the place-based oriented approaches to studying migration explains a large part of migration, it has become evident that the nature of the migration flows is more complex and motivations underlying migration decisions might vary greatly between individuals (Robinson and Tomes, 1982). In fact, if all inhabitants of a country held equal perceived costs and benefits regarding migration, all utility maximizing economic agents would, for example, migrate towards the single highest wage region of that country. This is clearly not the case in practice and the existence of heterogeneity in the population and disparities across geographies offer an interesting twist to the study of migration patterns. Contrary to simple choice models, it is assumed that “each individual faces a set of profiles defined over alternative locations unique to him, rather than the average profiles for a person of his type, thus allowing for heterogeneity in the population” (Robinson and Tomes, 1982:477). Robison and Tomes (1982) argued that this heterogeneity is one of the factors that may explain sizable reverse migration flows from ‘attractive’ areas (higher income) to less attractive ones (lower income) (or from urban to rural).

Migration and gravity models

The gravity model, applied to the study of human migration, is a model in urban geography derived from Newton's law of gravity. Newton's law states that: "Any two bodies attract one another with a force that is proportional to the product of their masses and inversely proportional to the square of the distance between them." In the context of human geography, it is used to predict the degree of interaction (i.e. human migration) between two places (Rodrigue *et al.* 2009, 216). The gravity model of migration is therefore based upon the idea that as the importance of one or both of the location increases, there will also be an increase in movement between them (i.e. population migration or trade in gross domestic

product, etc.). The farther apart the two locations are, however, the less movement between them.

Many researchers have analyzed migration flows through the use of spatial interaction model such as gravity models: demographers (Shen, 1999; Zhu and Poncet, 2003), international economists (Anderson, 1979; McCallum, 1995; Helliwell, 1996, 1997; Anderson and van Wincoop, 2001), geographers (Tobler, 1979; Fotheringham *et al.*, 2000) and economic geographers (Crozet, 2004).

Applied research in Canada

Several Canadian researchers have studied internal migration over the past few decades and have empirically tested different hypothesises using various methods and databases. Two approaches are generally opposed in most empirical literature: first, the use of regional flows (origin-destination); second, the use of micro data (generally individual level). This opposition often leads to the classification of migration studies in which some look at the individual characteristics which influence migration and place-based factors. Multinomial logit, probit, tobit, two-stage (Heckman) for estimating discrete-continuous models, have been widely used to estimate migration-decision models at a micro level. Regardless of the type of data, in most cases, the geographical focus of the study is inter-provincial migration (Courchene, 1970; Newbold, 1996; Lin, 1998; Vachon and Vaillancourt, 1998; Finnie, 2004; Coulombe, 2006) with the exception of Simmons (1982) who uses sub-provincial geographic units and more recently, Delisle and Shearmur (2009), upon which this current article is founded.

Migratory flows

Among the studies that use aggregate flows, one of the first applied contributions to empirical migration research using Canadian data is that of Courchene (1970); examining inter-provincial migration using aggregate data from the 1961 Census of Canada. The cross-section regression analysis models and time-series results explain a significant portion of the variance in migration rates over the period 1952-67. The findings support Ravenstein's laws (1885) in that migration in Canada is positively related to relative wage or income differences and negatively related to distance. It is also found that the higher the level of education or the greater percentage of the labour force employed in agriculture in the province [of origin] the greater is the outmigration for that province (Courchene, 1970). These findings are consistent with the theoretical underpinning regarding human capital investment and the migratory decision; notably, that the distance between origin and destination increases both the financial and psychological costs of migrating.

Vanderkamp (1971) looks at new mover, return and autonomous migration flows in Canada between seven regional aggregates (Atlantic regions and the remaining six provinces) which amount to 42 cross-section observations for migration flows. Running various regression models for each year between 1947 and 1966, Vanderkamp (1971) explores the link between migration, income differentials between origin and destination and distance of the moves. The expected trends ensue, new and repeat migrants are attracted to higher income destinations and negatively affected by distance involved in the move, but it is also found that these variables vary strongly with business activity in such a way that overall migration slows down along with the economy. However, it is also reported that return migrants may respond differently to migration incentives than other migrants as their flow varies negatively with the state of labour markets.

Simmons (1982) is one of the few researchers in Canada to apply a gravity model to migration between sub-provincial geographies. Again, the findings support the theoretical notions that flows are larger between larger places and that they decrease with distance. As one of the first studies examining migration flows within provincial boundaries in Canada, it is also found that provincial borders decrease the intensity of flows – especially in the case of Québec.

More recently, Coulombe (2006) examined net migration flows across age groups between the ten Canadian provinces since 1977 and found interprovincial migration to be driven by "structural factors such as the long-run regional differential in unemployment rates, labour productivity, and the rural/urban differential structure of the provinces".

Finally, Delisle and Shearmur (2009) apply a gravity model using sub-provincial spatial units to compare migration flows from graduates and non-graduates in Canada between 1996 and 2001. They find that the basic gravity model variables (size and distance) apply but that their effects, as well as that of other variables (income differentials, presence of graduates, border effect, etc.) vary when applied to different migrants (graduates vs. non-graduates). Similarly to Simmons (1982), Delisle and Shearmur (2009) find that, notwithstanding structural effects, migration dynamics change not only at different time periods but also at the scale of analysis (i.e. macro-regional or provincial vs. local).

Individual characteristics

Also of great relevance to our analysis are migration studies that use micro data (individual or household level); offering the benefit of controlling for individual factors associated with the propensity of migrating. Robinson and Tomes (1982) uses 1971 Census of Population data to investigate self-selectivity of migration. The use of structural probit equations estimated with and without selection allows them to address a key point recognized in the literature; that is, estimates of the returns to migration are subject to selectivity bias. Earlier migration models suggest that permanent income differentials between provinces, net of moving costs, largely dictate the propensity to migrate between provinces. Robinson and Tomes (1982) find that controlling for self-selection using personal factors such as age, educational level, language, family size, marital status, etc. the coefficients of variables associated with migration such as wage gain differentials, language and education levels are significantly altered. This supports the claim that heterogeneity in a population results in differentiated levels of return amongst migrants and non-migrants. This selectivity of migrants has been tested empirically in many of the studies using micro-data.

Using data derived from the 1986 Census of Canada, Newbold (1996) studies the determinants of return migrants (individuals migrating back to their province of birth) and onward migrants (individuals migrating further or transmigrating) for nonnative adults aged 20 to 64 years. After controlling for self-selection effects of individual characteristics which influence the propensity to migrate, Newbold (1996) finds that migrants returning to their province of origin are negatively selected in such a way that their migration is not primarily determined by provincial economic variables such as average employment growth and income levels in the same manner as onward migrants.

Other individual factors such as immigration and visible minority status also have implications for migration propensity. Lin (1998) investigates the different mobility of foreign born and native born Canadian across provinces. The analysis uses micro-data from Statistics Canada's Labour Market Activity Survey (LMAS) to analyze interprovincial mobility of foreign-born and native-born between 1989 and 1990. Using a probit and logit specification to estimate the propensity of out-of-province migration and using a dummy variable to distinguish immigrants from native-born Canadians, Lin (1998) finds that overall, there are no structural differences between the two groups in interprovincial migration behaviour when controlling for labour market outcomes/conditions, personal and job-related characteristics, and policy interventions. However, a lower mobility rate found among foreign-born Canadians can be attributed to compositional differences between immigrants and non-immigrant populations.

Vachon and Vaillancourt (1998) use data from family allowances/child tax benefit recipients and income tax filers to describe annual interprovincial mobility and report that the decision to migrate can also be influenced by policy or singular events in market economies. For example, national mobility patterns were influenced by local events such as the collapse of the cod fisheries in Newfoundland, the victory in 1976 of the Parti Québécois in Québec and the fluctuation of wheat prices in Saskatchewan and oil in Alberta.

Finnie (2004) applies a panel logit model to the Longitudinal Administrative Data (LAD) which includes data covering ten percent of Canadian tax filers over the years 1982 to 1995. The findings show that inter-provincial migration is influenced by various personal attributes (i.e. age is negatively related to mobility, presence of children increases the costs of migrating) as well as the size of the province and area of origin (i.e. smaller provinces experience higher out-migration rates but living in a rural area was negatively related to inter-provincial mobility), cultural factors such as language (i.e. francophone

Québécois are less likely to migrate out of Québec), labour market conditions in province of origin (i.e. mobility is greater in province with higher unemployment rates) as well as the employment status of the migrants (i.e. individuals having received unemployment insurance were more likely to move).

More recently, Dion and Coulombe (2008) apply a multinomial logistic model to individual level data from the Census of Population 2006. This analysis confirms the earlier ideas that migrants have specific features that distinguish them from people who did not migrate and that these trends still apply in recent years. Specifically, people aged 20 to 29 are more likely to migrate, the presence of children reduces the probability of migrating, individual reporting aboriginal identity are also more likely to migrate and finally, the analysis shows that persons living in rural areas are more mobile than those living in urban areas.

5.3 Methodology

In order to study rural-rural and urban-rural migration flows, we propose a migration gravity model adapted from Delisle and Shearmur (2009):

$$M_{ij} = A\frac{P_i^a P_j^b}{d_{ij}^d} \qquad (1)$$

to which certain control variables are subsequently added

$$M_{ij} = A\frac{P_i^a P_j^b}{d_{ij}^d} + V_i + V_j + V_{ij} \qquad (2)$$

Where:

M_{ij} = migration flows between origin *i* and destination *j*;

P_i = population at origin;

P_j = population at destination;

d_{ij} = distance between origin and destination;

A = a constant;

V_i = vector of characteristics of the origin self-contained labour area (SLA);

V_j = vector of characteristics of the destination SLA;

V_{ij} = series of differentials between the origin and destination SLAs.

Delisle and Shearmur (2009) have shown that such a gravity model fits Canadian internal migration data relatively well.

5.3.1 Data and variables specification

Micro-data was accessed through the COOL-RDC and stems from the long questionnaire of 2006 Census of population, which covers 20% of all Canadians. We analyze three age groups: 18 to 24 years of age (young adults), 25 to 54 years of age (core working age population), and seniors (55 years of age and over), living in Canada in 2001 (outside of the Territories).

5.3.1.1 Migration flows

We follow the initial migration definition of Statistics Canada, according to which, a *mover* is a person who, on Census Day, was living at a different address than the one at which they resided five years earlier (Statistics Canada). *Internal migrants* are movers who, on Census Day, were residing in a different Census subdivision (CSD) five years earlier (external migrants being persons who were living outside Canada five years earlier). In our case, the definition of *internal migrant* used will rely on two

criteria, 1) change of place of residence between 2001 and 2006 as defined by Statistics Canada and 2) change of residence outside the geographical unit representing a self-contained labour area (SLAs are defined in the next section – Geographic unit of analysis) and greater than 50km, as SLAs are larger geographic units and exiting the boundaries already constitutes a work-related, or equivalent, migration. These criteria allow us to isolate life-altering migrations (e.g. change of job and/or school outside original commuting zone). In this case, the migration data is aggregated into flows (i.e. total number of migrants) between origins (e.g. urban or rural) and destination (e.g. rural) communities.

5.3.2 Geographic unit of analysis

Areas of residence (current and 5 years ago) for individuals are first provided at the Census Subdivision (CSD) level in 2006 boundaries. The Self-contained[28] Labour Areas (SLA)[29], constructed by Statistics Canada and defined as smaller (or rural) SLA (population under 100,000) and larger (or urban) SLA (population equal or over 100,000), are then applied to the computed migration data. There are 349 SLAs in Canada. There are between 197 and 229 self-contained labour areas that can be described as "rural self-contained labour areas", depending on the way "rural" is defined. For the purpose of this study, all dependent (i.e. migration) and independent variables (i.e. all indicators in 2001) were computed using the 2006 SLA geography.

Since the self-contained labour areas used in this analysis are, on average, 96% self-contained in terms of people living and working in the same area, the migration figures provided here reflect a substantial change in the life of these individuals. Specifically, these changes are likely related to either a new job (in a different labour market area) or a major transition in the individual/family's life cycle, such as the start or completion of an educational program, a search for new or first employment, retirement, etc.

5.3.3 Data manipulation

As is customary for a gravity model, the data is set in matrix form that integrates both the characteristics of SLA and flow information (Delisle and Shearmur, 2009). Thus, each flow of migrants is associated with an origin and a destination SLA, as well as with the characteristics of the respective SLA at the beginning of the period (2001). In total, 121,452 observations are available (from which we omit the diagonal, therefore excluding intra-SLA migrations), many of which are zero (no flows between two SLA between 2001 and 2006). Of the total available SLA combinations for the total population, only 20,037 origin-destination combinations reported flows. Furthermore, migrations between SLA less than 50 kilometres apart are being excluded from this analysis, leading to a total of 121,226 pairs of SLA. This distance restriction ensures that we only isolate "life-altering" migration flows for all age cohorts: i.e. education related moves for young adults, employment related for core working age populations; retirement or non-economic related moves for seniors. Using both the geographic boundaries of SLA, which are already computed based on commuting flows and self-containment, as well as the 50 km threshold allows us to make the assumption that the majority of moves correspond to a change in labour market. It is worth noting that the largest flows contained in the data, as expected, are intra-SLA flows, excluded from the analysis.

[28] "Self-containment" is a measure of the degree to which the workers living in "A" are also working in "A". Thus, by clustering areas with a high reciprocal importance of commuting flows and a low level of self-containment, new areas were created with increasingly higher degrees of self-containment. Once a certain threshold for self-containment has been reached, this would then be considered a self-contained labour market because most residents with jobs are working in the given labour area and most individuals living in the given labour area are also working in the given labour market area.

[29] The delineation of self-contained labour areas (SLAs) was based on a clustering procedure using data on the reciprocal flows of commuters. The method is derived from the algorithm developed by Bond and Coombes (2007). The main features of the method are outlined in Munro *et al*. (2011) while the details are presented in a forthcoming technical paper (Munro *et al*., forthcoming). http://www.statcan.gc.ca/pub/21-006-x/2008008/section/s2-eng.htm

5.3.4 Limitations

The data have a number of limitations. Migration flows do not take into account individual factors except for age (groups). The data does not account for multiple or return migrants (migration between 2001 and 2006). As Delisle and Shearmur (2009) point out, return migrations that occurred within the five-year period are not recorded in the census, and neither are chains of migrations over the period: only the point of origin in 2001 and the point of residence five years later (2006) are recorded. The fact that migration is accounted for on a 5 year period necessarily limits us to internal migration for one period at a time (unlike the, albeit imperfect, indicator of population change over a series of census periods, for example). Finally, international out-migrants are excluded by virtue of the fact that they are no longer present in Canada to complete the census, and international in-migrants cannot be assigned to an SLA of origin.

5.3.5 Variables in the gravity model

Population variable.

Population size effects in the gravity model differ from individual migration model in some respect. Whereas in the previous model, population was being used as a community level variable to represent urban agglomeration and its resulting amenities, services, attractiveness, etc. between destination options, population size in the gravity model first acts as the size of the "pool" of potential migrants, thus determining the initial quantity of out-flows from origin SLAs (Delisle and Shearmur, 2009). Generally speaking, there will more potential people migrating out of highly dense cities than sparsely populated rural areas.

However, population size also has a non-mechanical effect in the gravity model, especially at the destination. Consistent with classic "laws" of migration put forth by Ravenstein (1885)[30], larger metropolitan areas and their agglomeration economies (Pred, 1977; Krugman, 1991) have a stronger attractive pull than smaller regions but also attract migrants from other large urban centres over a longer distance. However, given that urban-rural migrants will necessarily be migrating toward a smaller SLA than their origin, in our case, we use the population variable to control for the attractiveness effect of larger SLAs. That being said, migrants that are making the move to rural SLA, despite the pull from either their origin or other potential destinations, are consistent with Ravenstein's (1885) laws of migration in that people can be "pushed" away from unattractive localities, metropolitan areas and the ensuing problems (e.g. congestion, crime, pollution, etc.). Thus, the parallels from the gravity model used in Newtonian physics can only be made to a certain extent in social sciences.

We also expect a different reaction to destination options by different age groups. For example, we would expect that young adults and core-working-age migrants who choose to relocate to a new rural (from an urban or other rural SLA) will choose a larger rural SLA - which still retains some aspects of agglomeration economies and its employment opportunities - than would seniors who are no longer limited by such choices. However, seniors at a later stage may also be more likely to choose urban destinations that offer long-care facilities and access to specialized medical services.

Distance variables.

Distance in migration is also consistent with the Newtonian physics gravity model as the attractive force of a place (or planet) dissipates over distance. Again, as pointed out in early laws of migration, long-distance migrants are more likely to choose an urban area (i.e. larger centre) than a rural area as a destination. However, in migration, distance is more complex as it represents an economic and non-economic cost (Delisle and Shearmur, 2009). A very short migration, migrating within a same SLA, for example, will represent the lowest cost to a migrant (i.e. cost of selling and purchasing property but no need to change employment or leave friends and family) while migrating across the country will have

[30] 2) There is a process of absorption, whereby people immediately surrounding a rapidly growing town move into it and the gaps they leave are filled by migrants from more distant areas, and so on until the attractive force [pull factors] is spent; 3)There is a process of dispersion, which is the inverse of absorption (people [pushed] away from unattractive localities). (Ravenstein, 1885).

even more implications (i.e. the psychological cost of leaving familiar surroundings compounded by the incomplete information regarding the destination) (Sjaastad, 1962; Vanderkamp, 1968; Greenwood, 1975).

Again, in the context of our analysis, more urban-rural migrants should be expected to migrate towards neighbouring cottage country SLA, some perhaps owning a secondary home in the case of seniors who relocate permanently, winterizing their cottage. For example, Torontians who move permanently to the Muskokas lakes or Montrealers who move to the Laurentides hills upon retiring. That being said, the effect of distance should be different for young adults who move to smaller university towns than say, core-working-age migrants who moves to a rural SLA for employment in a resource extraction community or again, a senior who migrates outside of the commuting zone of their city to the nearby countryside.

Income levels.

Generally speaking, higher income differentials act as an attractive factor for potential migrants, from low income to higher income regions and intra-regionally, and may also signal a greater number of employment opportunities as employers compete for labour (Crozet, 2004). In our gravity model, we use the ratio of average income between origin and destination as a measure of this differential. However, Ferguson *et al.* (2007) show that older migrants are not as responsive to economic factors such as income differentials when making migratory decisions. We would expect young adults and core-working-age migrants from rural-to-rural to move to SLAs with higher incomes but not necessarily urban-to-rural migrants, especially in the case of seniors.

Border effects.

A permanent resettlement across a provincial border in Canada implies a major change in lifestyle in various ways: changing driver's license, often times switching telecommunications providers, banks (especially Credit Unions), and other logistical costs. Each province and region also has its own culture, medical system, governments, and in many cases, professional accreditation standards. Therefore, we introduce dummies for cross-provincial (regional) border effects. Canada is divided into six provincial or macro-regions (Atlantic Canada, Québec, Ontario, Prairies (i.e. Manitoba and Saskatchewan), Alberta and British Columbia). We introduce a series of six dummies to identify migrations flows crossing these provinces and/or macro-regions.

Again, we expect urban-rural migrants to relocate to a greater extent to rural SLA with which they are already more familiar, thus within their own provinces or at least within their macro-regions (i.e. migrating from New Brunswick to a cottage in PEI, but remaining in Atlantic Canada). Younger rural-rural migrants may, however, be more willing to relocate across provincial boundaries in search of employment opportunities, even if information is relatively scarce (i.e. Newfoundlanders migrating to Fort McMurray, Alberta, with the only knowledge being "jobs in the oil industry" and fellow expatriates as social networks).

5.3.6 Econometric Estimates

In a migration gravity model, such as described above, the dependant variables analyzed will be counts - migration flows between origin and destination. Unlike population change in percentage, for example, Boyle and Flowerdew (1993) argue that an ordinary least squares regression would be inappropriate in our case. One solution to modeling count data with a large number of zeros[31] is to use Poisson estimations. This approach assumes a non-normal distribution of observations, a Poisson distribution, with count data as the dependent variable. Even if more appropriate, there are some issues with applying Poisson estimations to our data. Having the majority of observations being zeros is problematic, as the conditional variance is greater than the conditional mean, also known as "over-dispersion". Delisle and Shearmur (2009) have used a negative binomial regression technique to

[31] In our study, only approximately 1/6 of possible origin-destination pairs reported migration flows (20,037 out of 121,452).

account for the large number of zeros in migration flows. However, their Poisson and negative binomial estimations were similar and in this case, only the Poisson results are presented below.

5.4 Results

5.4.1 Descriptive statistics – Migration flows

Tables 10 to 15 show the twenty largest internal migration flows toward rural SLAs of over 50 kilometres for the three age cohorts (young adults, core-working-age and seniors) between 2001 and 2006. Generally speaking, the distance between origins and destinations are relatively short (under 200km) and within provincial boundaries, with the notable exception of young adults and core-working-age population flows towards the area of Fort McMurray (Alberta), known for its employment opportunities in the oil and gas industry. This speaks to the strength of employment opportunities and high wages as an attractive force for younger migrants, notwithstanding information decay over long distance; the same factors seem to be repulsive for seniors choosing to migrate away from the oil sands capital of Canada.

Young adults

Young adult flows towards rural areas (**Table 10**) suggest a trend of young professionals who relocate into exurban rural areas surrounding major cities. For example: Montreal - Saint-Hyacinthe (Quebec), offering lower housing costs, easily accessible via major highway and still within commuting distance to the city of origin. However, other flows may follow a more hedonic migration rationale as young adults postpone their careers or education to enjoy the natural amenities of their rural backyards, Vancouver - Squamish (British Columbia), the "outdoors capital of Canada". Other flows may simply be capturing semi-permanent migration associated with starting post-secondary education in smaller college towns located close to home, for example, Halifax - Kings-West Hants-Kentville (Nova Scotia), Acadia University or Winnipeg - Brandon (Manitoba), Brandon University. Rural to rural flows (**Table 11**) also do not generally cross provincial borders but at first glance appear to be more economically driven: for example, Peace River (and others) - Grande Prairie (Alberta), oil, gas and forestry dominate the region's economy and may be attracting low-skilled young workers in that industry from other resource-based regions.

Core-working-age

Core-working-age population exhibit similar migratory patterns as young adults, moving from city to neighbouring rural areas (**Table 12**) but this age cohort may also be capturing hedonic migrations more commonly associated with retirement or pre-retirement moves: for example, Ottawa - Petawawa-Pembroke-Renfrew-Shawville (Ontario/Quebec) (i.e. Lanark County) or Vancouver - Sechelt-Gibsons (British Columbia) (i.e. Sunshine Coast). The presence of Edmonton as an origin five times in the top twenty also reflect the high population mobility and higher than average growth rate of Alberta's capital but also three of the corresponding destinations (Camrose, Whitecourt, Vegreville (Alberta)) are within reasonable commuting distance, suggesting urban sprawl rather than repulsiveness. Rural to rural flows (**Table 13**) are also similar to those of young adults as illustrated by the various (4) origins having Grand Prairie (Alberta) as a destination in the top twenty, also crossing borders such as Prince George (British Columbia) - Grand Prairie (Alberta). These migrations are more likely work related rather than pleasure or pre-retirement related, such as the case of Rouyn-Noranda – Val d'Or (Quebec) or Dawson - Whitehorse (Yukon).

Seniors

Seniors appear to follow trends outlined in the amenities literature as they choose to settle in cottage countries surrounding their major city of origin (**Table 14**): for example, Toronto - Huntsville-Bracebridge-Gravenhurst (Ontario) (i.e. Lake Muskoka), Montréal – Mont-Laurier (Québec) (i.e. Capital of the Haute-Laurentides), Vancouver - Sechelt-Gibsons (British Columbia) (i.e. Sunshine Coast), Halifax – Lunenburg (Nova Scotia) (i.e. UNESCO World Heritage Site and home of the Bluenose II). **Table 15** shows that the major senior flows from rural to rural areas are of short distances and would

therefore not translate into a major life change but again rather show a preference for nice scenery and local amenities.

Table 10 : Twenty largest internal migration flows (all SLAs to rural SLAs) of over 50 kilometres for young adults (18 to 24 years of age), 2001-2006.

Rank	Origin	Destination	Distance (km)	Rank	Origin	Destination	Distance (km)
1	Montreal (Quebec)	Saint-Hyacinthe (Quebec)	76	**11**	Vancouver (British Columbia)	Squamish (British Columbia)	101
2	Edmonton (Alberta)	Fort McMurray (Alberta)	715	**12**	Halifax (Nova Scotia)	Kings-West Hants-Kentville (Nova Scotia)	79
3	Ottawa-Gatineau (Ontario/Quebec)	Petawawa-Pembroke-Renfrew-Shawville (Ontario/Quebec)	104	**13**	Saskatoon (Saskatchewan)	Lloydminster (Alberta/Saskatchewan)	229
4	Winnipeg (Manitoba)	Brandon (Manitoba)	208	**14**	Saskatoon (Saskatchewan)	Prince Albert (Saskatchewan)	185
5	Edmonton (Alberta)	Whitecourt (Alberta)	70	**15**	Calgary (Alberta)	Grande Prairie (Alberta)	559
6	Edmonton (Alberta)	Grande Prairie (Alberta)	341	**16**	Summerside (Prince Edward Island)	Charlottetown (Prince Edward Island)	63
7	Edmonton (Alberta)	Hinton-Edson-Drayton Valley (Alberta)	140	**17**	Toronto (Ontario)	Huntsville-Bracebridge-Gravenhurst (Ontario)	177
8	Montreal (Quebec)	Drummondville (Quebec)	105	**18**	Saguenay (Quebec)	Alma (Quebec)	57
9	Peace River (Alberta)	Grande Prairie (Alberta)	125	**19**	Toronto (Ontario)	Minden Hills-Bancroft-Madawaska Valley (Ontario)	174

10	Winnipeg (Manitoba)	Winkler-Morden-Altona (Manitoba)	134	**20**	Lethbridge (Alberta)	Medicine Hat (Alberta)	167

Table 11 : Twenty largest internal migration flows (rural SLAs to rural SLAs) of over 50 kilometres for young adults (18 to 24 years of age), 2001-2006.

Rank	Origin	Destination	Distance (km)	Rank	Origin	Destination	Distance (km)
1	Peace River (Alberta)	Grande Prairie (Alberta)	125	**11**	Portage la Prairie (Manitoba)	Brandon (Manitoba)	85
2	Summerside (Prince Edward Island)	Charlottetown (Prince Edward Island)	63	**12**	Prince George (British Columbia)	Grande Prairie (Alberta)	293
3	Quesnel (British Columbia)	Prince George (British Columbia)	103	**13**	Elliott Lake (Ontario)	Sault Ste. Marie (Ontario)	86
4	Val-d'Or (Quebec)	Rouyn-Noranda (Quebec)	149	**14**	Dauphin (Manitoba)	Brandon (Manitoba)	105
5	Amqui-Causapscal (Quebec)	Rimouski (Quebec)	54	**15**	Killarney-Boissevain (Manitoba)	Brandon (Manitoba)	99
6	Ville-Marie (Quebec)	Rouyn-Noranda (Quebec)	220	**16**	Campbell River (British Columbia)	Courtenay-Comox (British Columbia)	56
7	Virden (Manitoba)	Brandon (Manitoba)	75	**17**	Rivière-du-Loup (Quebec)	Rimouski (Quebec)	118
8	Brooks (Alberta)	Medicine Hat (Alberta)	113	**18**	Rouyn-Noranda (Quebec)	Val-d'Or (Quebec)	149
9	Corner Brook (Newfoundland and Labrador)	Fort McMurray (Alberta)	2,932	**19**	Amos (Quebec)	Val-d'Or (Quebec)	53
10	High Prairie (Alberta)	Grande Prairie (Alberta)	143	**20**	Dawson (Yukon)	Whitehorse (Yukon)	163

Table 12 : Twenty largest internal migration flows (all SLAs to rural SLAs) of over 50 kilometres

for core-working-age population (25 to 54 years of age), 2001-2006.

Rank	Origin	Destination	Distance (km)	Rank	Origin	Destination	Distance (km)
1	Montreal (Quebec)	Saint-Hyacinthe (Quebec)	76	**11**	Montreal (Quebec)	Mont-Laurier (Quebec)	152
2	Ottawa-Gatineau (Ontario/Quebec)	Petawawa-Pembroke-Renfrew-Shawville (Ontario/ Quebec)	104	**12**	Vancouver (British Columbia)	Squamish (British Columbia)	101
3	Toronto (Ontario)	Huntsville-Bracebridge-Gravenhurst (Ontario)	177	**13**	Ottawa-Gatineau (Ontario/ Quebec)	Brockville (Ontario)	96
4	Halifax (Nova Scotia)	Kings-West Hants-Kentville (Nova Scotia)	79	**14**	Winnipeg (Manitoba)	Brandon (Manitoba)	208
5	Montreal (Quebec)	Drummondville (Quebec)	105	**15**	Edmonton (Alberta)	Camrose (Alberta)	119
6	Edmonton (Alberta)	Whitecourt (Alberta)	70	**16**	Edmonton (Alberta)	Grande Prairie (Alberta)	341
7	Vancouver (British Columbia)	Sechelt-Gibsons (British Columbia)	65	**17**	Edmonton (Alberta)	Vegreville (Alberta)	114
8	Toronto (Ontario)	Minden Hills-Bancroft-Madawaska Valley (Ontario)	174	**18**	Toronto (Ontario)	Midland (Ontario)	95
9	Edmonton (Alberta)	Fort McMurray (Alberta)	715	**19**	Halifax (Nova Scotia)	Lunenburg (Nova Scotia)	102
10	Vancouver (British Columbia)	Vernon (British Columbia)	275	**20**	Calgary (Alberta)	Medicine Hat (Alberta)	219

Table 13 : Twenty largest internal migration flows (rural SLAs to rural SLAs) of over 50 kilometres for core-working-age population (25 to 54 years of age), 2001-2006.

Rank	Origin	Destination	Distance (km)	Rank	Origin	Destination	Distance (km)

1	Rouyn-Noranda (Quebec)	Val-d'Or (Quebec)	149	**11**	High Level (Alberta)	Grande Prairie (Alberta)	389
2	Campbell River (British Columbia)	Courtenay-Comox (British Columbia)	56	**12**	Grande Prairie (Alberta)	Peace River (Alberta)	125
3	Peace River (Alberta)	Grande Prairie (Alberta)	125	**13**	Rimouski (Quebec)	Rivière-du-Loup (Quebec)	118
4	Summerside (Prince Edward Island)	Charlottetown (Prince Edward Island)	63	**14**	Fort St. John (British Columbia)	Dawson Creek (British Columbia)	123
5	Brooks (Alberta)	Medicine Hat (Alberta)	113	**15**	Dolbeau-Mistassini (Quebec)	Roberval-Saint-Félicien (Quebec)	59
6	Courtenay-Comox (British Columbia)	Campbell River (British Columbia)	56	**16**	Fort McMurray (Alberta)	Athabasca (Alberta)	625
7	Charlottetown (Prince Edward Island)	Summerside (Prince Edward Island)	63	**17**	Hinton-Edson-Drayton Valley (Alberta)	Grande Prairie (Alberta)	274
8	Nelson (British Columbia)	Castlegar-Trail (British Columbia)	66	**18**	Grande Prairie (Alberta)	Hinton-Edson-Drayton Valley (Alberta)	273
9	Crowsnest Pass-Fernie-Sparwood (Alberta/British Columbia)	Cranbrook-Kimberley (British Columbia)	76	**19**	Gander (Newfoundland and Labrador)	Fort McMurray (Alberta)	3,155
10	Dawson (Yukon)	Whitehorse (Yukon)	163	**20**	Fort St. John (British Columbia)	Grande Prairie (Alberta)	215

Table 14 : Twenty largest internal migration flows (all SLAs to rural SLAs) of over 50 kilometres for seniors (55 year of age and over), 2001-2006.

Rank	Origin	Destination	Distance (km)	Rank	Origin	Destination	Distance (km)

1	Toronto (Ontario)	Huntsville-Bracebridge-Gravenhurst (Ontario)	177	**11**	Vancouver (British Columbia)	Vernon (British Columbia)	275
2	Toronto (Ontario)	Minden Hills-Bancroft-Madawaska Valley (Ontario)	174	**12**	Vancouver (British Columbia)	Courtenay-Comox (British Columbia)	144
3	Toronto (Ontario)	Midland (Ontario)	95	**13**	Vancouver (British Columbia)	Salmon Arm (British Columbia)	297
4	Vancouver (British Columbia)	Sechelt-Gibsons (British Columbia)	65	**14**	Halifax (Nova Scotia)	Kings-West Hants-Kentville (Nova Scotia)	79
5	Montreal (Quebec)	Mont-Laurier (Quebec)	152	**15**	Ottawa-Gatineau (Ontario/Quebec)	Brockville (Ontario)	96
6	Ottawa-Gatineau (Ontario/Quebec)	Petawawa-Pembroke-Renfrew-Shawville (Ontario/Quebec)	104	**16**	Halifax (Nova Scotia)	Lunenburg (Nova Scotia)	102
7	Vancouver (British Columbia)	Penticton (British Columbia)	214	**17**	Toronto (Ontario)	Elliott Lake (Ontario)	350
8	Montreal (Quebec)	Saint-Hyacinthe (Quebec)	76	**18**	Edmonton (Alberta)	Camrose (Alberta)	119
9	Montreal (Quebec)	Drummondville (Quebec)	105	**19**	Montreal (Quebec)	Shawinigan (Quebec)	150
10	Toronto (Ontario)	Owen Sound (Ontario)	132	**20**	Edmonton (Alberta)	Whitecourt (Alberta)	70

Table 15 : Twenty largest internal migration flows (rural SLAs to rural SLAs) of over 50 kilometres for seniors (55 year of age and over), 2001-2006.

Rank	Origin	Destination	Distance (km)	Rank	Origin	Destination	Distance (km)
1	Crowsnest Pass-Fernie-Sparwood (Alberta/British Columbia)	Cranbrook-Kimberley (British Columbia)	76	**11**	Prince George (British Columbia)	Salmon Arm (British Columbia)	420
2	Clare-Digy (Nova Scotia)	Kings-West Hants-Kentville (Nova Scotia)	79	**12**	Elliott Lake (Ontario)	Sault Ste. Marie (Ontario)	86
3	Charlottetown (Prince Edward Island)	Summerside (Prince Edward Island)	63	**13**	Whitecourt (Alberta)	Hinton-Edson-Drayton Valley (Alberta)	120
4	Courtenay-Comox (British Columbia)	Campbell River (British Columbia)	56	**14**	Castlegar-Trail (British Columbia)	Penticton (British Columbia)	139
5	Campbell River (British Columbia)	Courtenay-Comox (British Columbia)	56	**15**	Prince George (British Columbia)	Vernon (British Columbia)	459
6	Summerside (Prince Edward Island)	Charlottetown (Prince Edward Island)	63	**16**	Antigonish (Nova Scotia)	Truro (Nova Scotia)	152
7	Penticton (British Columbia)	Salmon Arm (British Columbia)	146	**17**	Lunenburg (Nova Scotia)	Kings-West Hants-Kentville (Nova Scotia)	63
8	Amos (Quebec)	Val-d'Or (Quebec)	53	**18**	Rouyn-Noranda (Quebec)	Val-d'Or (Quebec)	149
9	Truro (Nova Scotia)	Kings-West Hants-Kentville (Nova Scotia)	96	**19**	Williams Lake (British Columbia)	Salmon Arm (British Columbia)	246

10	Fort McMurray (Alberta)	Athabasca (Alberta)	625	**20**	Fort McMurray (Alberta)	Vegreville (Alberta)	599

5.4.2 Poisson Regression Models – Migration flows

Tables 16 shows that when applied to rural destination migration flows, the basic Poisson regression[32] model (A) fits the data relatively well[33], although the effects of the indicators vary with the different age cohorts, and the more complex model (B) is even better at explaining migration patterns. The inter-regional (C) and intra-regional (D) models, while having fewer observations, are even generally stronger, with the intra-regional model being strongest for core-working-age population. Results for the different variables and age-cohorts are summarized below.

Distance

Contrary to other studies, distance is not a very strong explanatory factor in all models when migration destinations are solely rural. This is likely due to large urban-rural and rural-rural migration flows across long distances, such as from Newfoundland to Fort McMurray. However, intra-regional migrants are more sensitive to distance (model D), suggesting that this type of migration most likely occur between cities and nearby and/or surrounding countryside towns. These findings suggest a quadratic effect, or almost a *plateau* effect, with regards to distance; that is, the further the distance, the less the impact on the decision to migrate.

Population

Population size at origin for most migration flows has a simple mechanical effect of providing larger pool of potential migrants in large urban origins. That said, in almost all cases, with the exception of intra-regional migrants, a larger population size is most repulsive for seniors; meaning that older migrants are more likely to leave larger cities for smaller towns and is consistent with the notion of retirement destinations surrounding major cities.

Population size at the destination, on the other hand, confirms that young adults are most attracted to the larger end of the small town spectrum in all models. Even in the case of rural to rural migration, and consistent with youth outmigration studies, we would expect young adults to be moving more often to larger areas, which would then act as a stepping stone for future migration to a larger centre.

Income

When the average income differential between origin and destination is first included (model B), results suggest that migrants are moving from lower to higher income regions. However, the income effect appears to be much stronger inter-regionally than intra-regionally. Even when moving from urban to rural regions, young adults and core-working-age, in particular, are attracted to economic opportunities and higher wages, consistent with most economic migrant literature, whether inter-provincial or community level migration. Seniors, on the other hand, are seemingly not attracted by better economic conditions and higher incomes actually repulse this age cohort in the intra-regional migration model (D).

Percentage of cohort

As the old idiom goes “birds of the same feather flock together”; apparently so do young adults. As illustrated in model (B) the percentage of young adults residing in the community of destination is the biggest determinant of young adult migration. This is consistent with the results indicating that young adults tend to move to the larger of the rural areas but may also capture young adults who move to university towns for post-secondary education, where there are higher concentrations of young adults.

[32] The *negative-binomial* method can also be used in such an analysis but we opted for the Poisson regression in this case.
[33] The pseudo R squared results are higher than expected (R^2>0.72), especially given the large dataset and the inherent noise which is unavoidable with such data.

This variable also has attractive effects on all other age cohorts but less pronounced for seniors. Furthermore, its effect dissipates in the inter-regional and regional models for all age groups.

Border effects

The negative coefficient on the borders variable for all age cohorts suggests that the majority of migrations toward rural areas occur within the same region. These findings are consistent with literature highlighting the fact that crossing borders involves greater social, cultural and financial costs to migrants.

Rural effect

The rural effect is not straightforward across all age cohorts. However, a general lesson learned is that in general, originating from a rural SLA decreased the likelihood of migrating intra-regionally but increases the inter-regional migration flows. In model B, the negative coefficient suggests that most migration flows of young adults originate from urban to rural SLAs. This is not the case for core-working-age and seniors. However, in the inter-regional model (C), all cohorts appear to migrate from rural to rural regions; perhaps reflecting the migration toward resource towns from other smaller towns and regions. Finally, in the intra-regional model (D), younger and senior migrants are again migrating predominately from urban to rural SLAs within their own region of origin while the core-working-age group coefficient is not significant, suggesting flows between all regions.

The regional effects.

Model C presents results from a reduced sample (N = 99,466) that only includes migratory flows that cross different macro regions. Each region (except for Quebec, which is the reference region) is present twice, once as the origin and once as the destination.

As expected, the Alberta attraction effect is strongest for young adults and core-working-age while British Columbia is strongest for seniors. Small towns in British Columbia, for example in the Okanagan valley, are known to be retirement destinations, while the oil fields in Alberta attract younger migrants from across the country; predominantly from neighbouring Prairies in the case of core-working-age population and the Atlantic Provinces, for example, migrants from Newfoundland affected by high unemployment rates during the period of study who found work in Fort McMurray. New developments in off-shore drilling around Newfoundland may reverse such trends but this would not be captured in the period of study.

Model D illustrates that younger migrants are more mobile within the Atlantic regions, Prairies and Alberta and less mobile in Ontario. This is surprising as the majority of Canadians live in Ontario but may simply be a result of there being too many large areas in Ontario and not enough being classified as rural by our definition. Core-working-age populations on the other hand are most mobile in the Prairies and Alberta while seniors are most mobile within British Columbia. Again, the latter finding may reflect urban-rural moves to amenities rich smaller regions in British Columbia.

Table 16 : Migration of Young Adults (YA) (18 to 24 years of age), Core-Working-Age (CWA) (25 to 54 years of age) and Seniors (S) (55 years of age and over) to rural SLAs, over 50 km, 2001-2006: raw regression coefficient

Flows												
	All:			All:			Inter-regional:			Intra-regional:		
	YA	**CWA**	**S**	**YA**	**CWA**	**S**	**YA**	**CWA**	**S**	**YA**	**CWA**	**S**
Model name	**A**			**B**			**C**			**D**		
Distance	-0.001	-0.001	-0.001	-0.001	0.000	-0.001	-0.001	0.000	-0.001	-0.004	-0.003	-0.004
Origin population (log)	0.663	0.841	0.847	0.717	0.806	0.825	0.939	0.972	1.018	0.627	0.743	0.728
Destination population (log)	0.870	0.818	0.712	0.865	0.751	0.764	1.058	0.932	1.013	0.853	0.739	0.755
Average Income (Origin/Dest)				-0.738	-0.567	-0.052	-0.670	-0.735	**0.067**[b]	-0.126	-0.203	0.973
Origin% Age Cohort				9.872	10.897	-3.099	9.954	13.413	-2.357	5.241	8.987	-1.447
Dest% Age Cohort				33.934	6.433	4.670	19.838	7.059	6.556	19.313	3.518	2.824
Border Effect				-1.652	-1.501	-1.650						
Rural origin				-0.102	0.185	0.037	0.527	0.609	0.431	-0.401	**-0.006***	-0.135
Atlantic destination							1.071	1.365	1.718			
Ontario destination							0.479	0.789	1.219			
Prairies destination							0.701	1.123	1.079			
Alberta destination							2.120	1.922	2.369			
BC destination							1.592	1.599	2.599			

Atlantic origin							1.695	1.195	1.154			
Ontario origin							0.908	0.794	0.822			
Prairies origin							1.094	1.358	1.071			
Alberta origin							1.210	1.269	0.998			
BC origin							1.276	1.121	1.369			
Atlantic										0.560	0.274	0.222
Ontario										-0.294	-0.125	-0.035
Prairies										0.757	0.980	0.415
Alberta										0.642	0.872	0.723
BC (British Columbia)										0.397	0.523	0.931
Df	120,000	120,000	120,000	120,000	120,000	120,000	90,000	99,000	99,000	22,000	22,000	22,000
N	121,226	121,226	121,226	121,226	121,226	121,226	99,466	99,466	99,466	21,760	21,760	21,760
Log likelihood null	-380,790	-1,067,833	-390,932	-285,105	-804,913	-311,956	-99,666	-276,885	-100,466	-105,134	-238,343	-111,296
Log likelihood model	33,953	137,795	45,302	81,854	232,311	93,622	8,588	82,800	9,330	54,726	133,038	50,101
Prob (chi-square = 0)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R^2	0.7279	0.7908	0.7534	0.7963	0.8423	0.8032	0.7886	0.8617	0.7906	0.8556	0.9044	0.8710

NOTE: All coefficients are significant at the 99% confidence level except those marked with '∗' that are not significant at the 90% level, and those marked with 'b' that are significant at the 95% level.

5.5 Conclusions

This article focuses on rural in-migrants. That, in itself, is a novelty in quantitative migration studies as relevant empirical research analyzing urban-rural migration in Canada has recently been qualitative in nature (Guimond and Simard, 2008; 2010). Furthermore, much of the quantitative research on migration flows in Canada focuses on macro-levels geographies (i.e. provinces, city-regions) (Courchene, 1970; Newbold, 1996; Lin, 1998; Vachon and Vaillancourt, 1998; Finnie, 2004; Coulombe, 2006) or when examining rural migration, usually does so from the standpoint of out-migration (Dupuy *et al.*, 2000; Audas and McDonald, 2004). In this study, we highlight migration findings from a perspective toward local rural Canadian labour markets.

Do rural in-migrants go where the jobs are or to amenities or a combination of both? It depends. On the whole, the findings are consistent with other migration studies, suggesting that rural in-migrants are not a truly "unique" set of individuals. Furthermore, the findings corroborate other research by Delisle and Shearmur (2009), as well as Simmons (1982) which suggests that migration dynamics and attractive (repulsive) factors depend on the spatial or temporal scale of study. Taking a closer look at the different age cohorts paints a clearer picture of rural migrants. As Liao (2000) suggests, older people are more likely to be affected by non-economic determinants of migration, such as scenic amenities or retirement reasons and this rule appears also to apply to rural destinations. We found that younger people tend to change residence for economic or educational reasons, as highlighted by the attraction of same age-cohort on migration decisions for young adults; possibly representing the attractiveness of post-secondary education institutions on youth. Core-working-age migrants moving to rural areas are the most standard or "rational" migrants, attracted to economic opportunities and higher wages, especially across long distances. This may reflect the fact that as people evolve professionally, they accumulate information on job markets over a growing range of potential destinations with also a growing range of contacts (i.e. secure job offers).

It is worth noting that most rural destination migrants travel shorter distances than typical urban-urban migrants, possibly due to the lack of information available on rural realities. A quick Internet search on most Canadian small towns versus the city of Toronto, for example, would confirm the difficulty of finding information regarding potential rural destinations (i.e. housing, rentals, classified ads, attractions, etc.), even if that information is compared on a per capita basis. Add to that the fact that most urban-rural migrants are sensitive to distance and that these migrants presumably wish to keep in touch with the city they departed (i.e. settling in a rural area neighbouring a large city), and one begins to understand how difficult it is for rural communities with limited resources to compete for migrants.

That being said, the weak role of distance in the migratory decision of working-age populations is also surprising. This may be the result of increased opportunities for long-distance commuting driven by improvements in air service, such as the addition of daily flights from Corner Brook to Fort McMurray, for example. This result may also be exacerbated and in part reflect Canada's unique geography; where the poorest and richest regions, for this time period, are at two geographical extremes of the nation. However, it should also be mentioned that natural resource led growth of rural communities is not necessarily a good foundation for sustainable growth as variations in commodity prices are cyclical by definition, and so is the demand for jobs associated with these resources. Retirement led growth is also not fully sustainable unless there is a constant flow of retirees migrate to compensate for the loss due to later death. Youth migration, unless exclusively tied to schooling, or better yet young adult migration, can be self-sustained by itself due to higher levels of natural increase in the years that follow migration (Bourne and Simmons, 2004).

In sum, many migrants are indeed attracted to rural Canada. The rural localities who do manage to attract migrants often do so because of a fortuitous combination of attributes but there is no magic formula for making oneself attractive to everyone. Some regions will be able to market themselves as retirement communities and attract seniors; others with natural resource endowment and economic conditions favorable for their industries will be successful at attracting young workforce and potentially working-age populations for the longer term. Other rural communities will not be so fortunate; but that is the reality of Canada's geography and worldwide economic trends.

CHAPTER 6 : ON THE UNPREDICTABILITY OF GROWTH AND DECLINE OF RURAL COMMUNITIES: MIGRATION RATES IN RURAL CANADA, 2001-2006

Jean-François Frenette

Executive summary

This paper utilizes an econometric model of internal migration rates, applied to Canada (2001–2006), to identify residuals — relative to model predictions — in order to analyze them over space with a focus on rural communities that have exceeded migratory expectation. The model's explanatory power is not the main attraction of this article, as in most studies of this nature, but rather the outlying communities themselves who could be the subject of further qualitative analysis to determine why they outperform the model, in this time period.

Keywords: Rural development, migration rates, Canada

6.1 Introduction

"What makes a community grow or decline?" This is the *Holy Grail* of local economic development. In more practical terms, explaining variations in regional employment and population growth rates across Canada and internationally has been the focus of many regional development papers over the years but there is no clear consensus on the answer.

There are two distinct schools of thought in the local economic development literature: quantitative vs. qualitative. On the one hand, the former group of researchers insists on the fundamental stability of national economic geographies, and on the weight of important local development factors such as population size, distance to markets and initial assets of natural resources or other geographic attributes (Davis and Weinstein, 2002; Brackman *et al.* 2004; Polèse and Shearmur, 2007; Sharma, 2007; Apparicio *et al.*, 2008). These researchers often use secondary data sources to run large datasets in econometric models on many regions at once, trying to find underlying trends. While not completely discrediting major geographic determinants, the latter group of researchers approach local economic development from a community perspective, almost in isolation, as the adage goes "once you've seen one rural community, you've seen one rural community". They often collect data first-hand using case studies and field visits with qualitative interviews. Their analysis is more contextual in nature and these proponents would argue that social dynamics and community "capacity" play a much greater role in explaining local development (Jean, 1989; Pecqueur, 1989; Braczyk *et al.*, 1998; Crevoisier, 2004; Camangni and Maillat, 2006). In other words, the first group might be seen as viewing the big picture: trying to find broad explanations for local economic development (or lack thereof) while the second group is more focused on individual communities and believe that communities can become what they aspire to be, if the community really wants it enough and mobilizes its stakeholders effectively.

In order to reconcile both approaches to studying local economic development, Apparicio *et al.* (2008) applied a geostatistic econometric model of local employment growth in Canada for the period 1971 – 2001 and analyzed its residuals (i.e. difference between projected and observed results). The study started with the postulate that if the econometric model captures all the general factors underlying local economic development, then the residuals would only be "accidents" which escape generalization and would be distributed completely randomly, over time and space (Apparicio *et al.*, 2008). However, following a more thorough analysis of the residuals, it was found that deviations from the model suggested the presence of processes that are harder to model in a systematic manner and which suggest the presence of social dynamics which might explain local economic development.

Population growth or decline in rural Canada

Population stability or growth is key to community survival; if you don't have people, you don't have a community. For many rural communities in Canada, population sustainability is uncertain as about one third of Canadian communities experienced continuous population decline over the last two decades (Alasia *et al.*, 2007) and it has been reported that rural communities are more likely to be situated within declining regions (Mwansa and Bollman, 2005). Out-migration of all age groups, young people in particular, heavily affects rural communities, their future potential as well as their immediate stability (Garasky, 2002; Davies, 2008; Chew *et al.*, 2010). Many rural communities struggle to find skilled employees to fills the jobs that the old population is leaving behind, to sustain the community's energy and livelihood that is lost when young people leave, and to keep basic services open (Malatest and Associates Ltd, 2002; Halseth and Ryser, 2006; Chew *et al.*, 2010).

Rural population decline through out-migration is not a new trend (Bryant and Joseph, 2001). Out-migration became apparent in the 1930's and 1940's when the farming crisis became prevalent (Bryant and Joseph, 2001; Davies, 2008). Since this time, youth have been searching for employment opportunities within their communities but were likely to be unsuccessful as unstable economies made for limited job opportunities (Malastest and Associates Ltd, 2002; Bjarnason and Thorlindsson, 2006). Furthermore, over the last two decades, global economic integration has increasingly opened up new economic opportunities for various economic sectors, and at the same time, increased economic exposure to global competition for more traditional sectors (Alasia *et al.* 2008). The economy of regions and communities that were relying on primary resource sectors (e.g. agriculture, forestry, and mining), often located in rural areas, and traditional and labour intensive manufacturing (e.g. textile sectors), have been more likely to experience loss or negative outcomes, specifically with regard to population and employment trends. Due to global economic pressures as well as to a lack of education and employment opportunities located within rural communities, many people have been migrating to urban areas over the years (Dupuy *et al.*, 2000; Garasky, 2002; Glendinning *et al.* 2003; Davies, 2008; Argent, 2009). Without a critical mass of population, some rural communities enter a vicious cycle of decline, as illustrated by trends in the rural Great Plains and Atlantic Canada (Mwansa and Bollman 2005; Partridge *et al.*, 2007)

On the other hand, some rural communities have recently experienced a degree of revitalization through the in-migration of older migrants, often retirement age population. In some cases individuals are moving towards rural areas either as "neo-rurals" (urban-rural migrants) (Guimond and Simard, 2007), or ruralites (rural-rural migrants) from other parts of the country. This migration may prove to be essential for the survival of rural communities in certain parts of Canada. In light of success stories of "declining communities turned retirement destinations", community leaders who have seen their communities struggling to cope with outmigration for years may be asking themselves if it is indeed possible to reverse trend in migration through "counterurbanization". In other words, can community development initiatives help slow down and/or reverse rural population out-migration?

Demographic changes and migratory patterns across the urban-to-rural gradient in Canada have been outlined by several recent studies (Rothwell, 2002; Audas and McDonald, 2004; Mwansa and Bollman 2005; Malenfant *et al.* 2007; Alasia *et al.* 2008; Dion and Coulombe 2008;). The present study will apply a similar methodology as Apparicio *et al.* (2008) to the internal migration of different age cohorts in Canada between 2001 and 2006 in order to understand if rural communities can indeed do something to help attract (or even repulse) migrants at the local level.

The main questions behind this paper, as so often in regional science, remains: Why do some communities grow (employment and population wise) while others do not? Which rural communities or regions in Canada are more likely to decline and cease to exist in the near future? Which ones have a chance of survival? In order to address these questions, choices have to be considered with regards to measurements, geographies, scope and analysis; their rationale is presented below.

6.2 Theoretical framework: Migration rates

6.2.1 Why internal migration?

Several authors use employment change as an indicator of local economic development (Shearmur and Polèse, 2005; Apparicio *et al.*, 2008), as Shearmur and Polèse (2007) remind us: "for communities to survive, it is jobs that are needed, not necessarily high income or growth in productivity". Others argue that one of the key indicators of a region's performance is reflected by population change, if not in absolute terms, at least relative to the performance of comparable regions in the country (Kitson *et al.* 2004; Porter *et al.* 2004; Weiler 2004; Partridge *et al.*, 2007;). Partridge *et al.* (2007) argue that population change, which is largely driven by 'net migration' – or voting with one's feet (i.e. choosing the best possible place to live, given all other factors) – captures both the benefits of growth in economic activity in a geographic space and the amenity benefits of residing in a geographic space. Furthermore, employment change does not necessarily capture non-economic population change such as that driven by retirement or pre-retirement migratory decisions.

That being said, population change is also directly influenced in part by natural determinants (e.g. birth and deaths) which tend to have slow and long terms effects on population dynamics (Alasia *et al.*, 2008). Many aboriginal communities in Northern Canada have reported high population growth rates due to high birth rates, for example, but this is not related to economic or local development initiatives succeeding in attracting labour force. Domestic migration flows, on the other hand, play a more significant role in sustaining and fuelling the growth of a region and can rapidly change the demographic outcome of single communities and regions (Alasia *et al.*, 2008).

Finally, population (or employment) change offers the possibility of comparing econometric models for different periods (Shearmur and Polèse, 2007), however, internal migration data in Canada is only available for single inter-censal periods (e.g. 2001-2006) and thus, doesn't account for multiple migrations, nor return migrants. On the other hand, while percentage of population change and other variations are good proxy for economic opportunities available in a community, they do not capture the whole story as population change can be the result of more factors than individual economic decisions (e.g. birth, death, international migration, etc.).

6.2.2 Why labour markets?

Researchers have used various sub-national geographic levels for studying local economic development in Canada. For example, Alasia *et al.* (2008) use the level of Consolidated Census Subdivision (CCS) to analyze community vulnerability to employment and population decline, Apparicio *et al.*, (2007) Shearmur and Polèse (2005; 2005a, 2007) use a special tabulation of 421 geographical units where CSD are regrouped into CMA, CA and agglomerations outside of metropolitan areas (rural)[34] to analyze employment and population change over time, others such as Finnie (2004) use provincial level data to analyze migration flows in Canada.

When examining the causes and effects of internal migration within a country, one must isolate moves that are simply related to normal life-events (i.e. buying a bigger house in the suburbs) and moves that implicate a change of labour areas (i.e. involving both a change in place of residence and place of work; or place of social networks for retired or non-workers). In that sense, labour markets are the preferred unit of analysis for studying local economic development.

Some attempts have been made in Canada to identify labour markets in non-urban areas using commuting flows (Ribichesi and Shearmur, 2008; Munro *et al.*, 2010; Munro *et al.*, 2011), however, technical and data disparities limit the extent to which we can compare traditional urban labour markets (e.g. CMA, CA) with constructed rural labour markets. An ideal spatial unit would be one comparable to *'bassins de vie'* used in France (INSEE, 2003), unfortunately, these are not available in Canada. However, Ribichesi and Shearmur (2008) have shown that, in Québec, most nonmetropolitan labour markets represented by MCDs are contained within CDs. CDs are large enough to ensure that, except

[34] The community/regional units are constructed at the SAREL in Montreal and are derived from 288 census divisions (CDs) and 144 urban areas (UAs).[34] The CDs have been aggregated in order to prevent any overlap between UA and CD boundaries, further to which the UA data have been subtracted from the CD data.

within close proximity to large urban areas, a majority of people both live and work within them: in fact, they often live and work within small parts of CDs, so ideally a finer scale should be used.

6.2.3 Why different age cohorts?

If one starts with the cost-benefit analysis framework of migration, then it must be understand that while there are general factors, different individuals will internalize different costs and benefits to arrive at a decision to migrate or not. As Ferguson *et al.* (2007) states, the effect of economic factors on population attractiveness tends to decrease with age, as older migrants tend to make migratory decision based more non-economic factors. It could be expected that the application of a given econometric model is better at explaining the growth of urban areas in general, but might not explain the variability in rural areas, especially for older age cohorts, where other non-economic factors might play a greater role in attraction migrants.

6.2.4 Community factors

There is a long standing tradition of empirical studies devoted to identifying traditional factors of economic growth (e.g. population, employment, income, migration, etc.) at the local level in the regional development literature stream as well as a series of more recent studies (Rupasingha, 2002 ; Wong, 2002 ; Shearmur and Polèse, 2007 ; Apparicio *et al.*, 2007 ; Alasia *et al.*, 2008). Most empirical studies generally agree on using a certain number of key factors but the interpretation of the results may vary (Glaeser, 2000). In sum, determinants of local economic development generally includes tangible elements such as "localization factors, infrastructure factors, human resources, capital and financial resources, industrial structure" (Wong, 2002) as well as intangible factors such as "entrepreneurial culture, institutional framework encouraging inter-business collaboration, private and public sector cooperation, a dynamic tertiary sector, financial activity supporting innovation and emerging activities" (Maillat et Bataini, 2001).

6.2.4.1 Location factors

Wong (2002) defines locational factors as "the external attributes of a region or the accessibility gained by the spatial interaction between a region and its partners in the process of production and consumption" - for example, markets, suppliers and major business centers. It is thus possible to measure the factors of geographical location of a community (i.e. distance of a major urban area, geographic coordinates, etc.) and to assess their effects on local economic development.

As mentioned by several authors, the location of a region or community within a country may greatly affect its economic growth potential. That said, a community located near a large city or metropolitan may reap the benefits of agglomeration economies of its neighbours. To measure this factor, Reimer (2002) uses the code Beale (modified for the Canadian context by Ehrensaft and Beeman, 1992), Connell and Wall (2004) measures the distance in miles from an urban center (in least 10,000 inhabitants), the Atlas of Canada (2004) uses the metropolitan influence zones (MIZ) developed by Statistics Canada, Alasia *et al.* (2008) use the distance to both a CMA (over 500 000) and a CMA or CA (less than 500 000 inhabitants), Rupasingha *et al.* (2002) use a dichotomous variable (rural / urban) and finally, Polèse and Shearmur (2007) classify the regions into four groups (central urban, urban fringe, rural center, rural peripheral). The distance between the location of origin and the closest CMA is used to proxy access to major markets and the closest CMA with a population of 500,000 inhabitants or greater.

Finally, Shearmur and Polèse (2007) also use north-south coordinates in degrees as a proxy for access to US markets. In this study, we calculate the distance from the centroid of the SLA to the closest south border of the US.

6.2.4.2 Human resources

According to Wong (2002), human resources refer to the "availability, level of participation, quality, attitude, cost and other characteristics of the workforce." As a result, many

economists have long stressed the importance of human capital in the process of economic growth (Mankiw, Romer and Weil, 1992). These authors concluded that by adding a measure of human capital in the traditional growth model of Solow (1956), they came to explain some important residues of this early econometric model. Several studies also discuss the role of human capital at the local level (Emery and Flora, 2006; Markey *et al.*, 2005).

Most studies in the literature make reference to the level of education as a factor of economic growth or community indicator. As noted in Markey *et al.* (2005) “education helps to create a productive workforce, effective leadership, and informed citizens.” Among the authors who use an objective measure of educational attainment in a statistical model, Polèse and Shearmur (2007) choose the "percentage of university graduates in the population 15 years and over," Alasia *et al.* (2008) opt for the "percentage of the population aged between 25 - 54 who hold a postsecondary education" and Reimer (2002) distinguishes between the "percentage of women and men with a postsecondary education. Finally, the indicator of quality of community life measuring education as used by the Atlas of Canada (2004) is the "percentage of people who attended a trade school, college or university compared to the percentage of population that has not reached the ninth grade. Higher human capital levels can thus influence the migration decisions of potential migrants, especially the more educated work force. The percentage of the population holding a bachelor degree or higher is used as proxy for human capital at the community level.

Finally, recent urbanization trends in Canada and worldwide suggests that a greater share of individuals is now living in cities than ever before (World Bank, 2005). Audas and McDonald (2004) also report that the size of community of origin affects the average annual out-migration rate for various types of migrants. Population size alone (even in rural communities) can have a mechanical attractive effect on migrants. Thus, the natural logarithm of the total population is used to assess the community’s size attractiveness at the beginning of the period, in 2001.

6.2.4.3 Industrial structure

Industrial structure refers to the “mix of industries in an economy; the degree of concentration in a few industries that might affect its growth potential and its vulnerability to economic change” (Wong, 2002).

Polèse and Shearmur (2007) also argue that "industrial structure dominated by a few companies, or subcontractors passive, can slow the local development." For instance, large heavily capitalized enterprises located in smaller areas (e.g. mines, pulp and paper mills, aluminums producers, etc.) can translate into higher wages, this in turn can discourage the creation or implementation of small and medium sized businesses (SMB), a phenomenon that Shearmur and Polèse have coined in French “*le syndrome du rentier encombrant*” (or instrusive rentier syndrome) (Polèse and Shearmur, 2002; Polèse and Shearmur, 2005). To reflect this factor, they employ several industrial classes for the base year in their econometric model (Polèse and Shearmur, 2007).

Alasia *et al.* (2008) also measures the “degree of economic specialization using the concentration index Herfindahl.” Other researchers use location quotients (LQ) to measure the over- or under- representation of certain industries in local labour markets compared with regional or national employment levels. Furthermore, Alasia *et al.* (2008) point out that “communities with a greater share of employment in traditional sectors - which are more exposed to global competition - are more likely to be vulnerable to the restructuring of the global market.” The latter therefore employ an indicator of the sectoral composition of the community and the surrounding area measured by “the share of employment in agriculture, in other primary sectors and in the traditional manufacturing sector” (Alasia *et al.*, 2008) to illustrate that the community feels vulnerable to the pressures of the global economy.

One of the main stressors on communities is sector restructuring due to changes in global trade relations and the relative prices of labour and capital (Alasia *et al.* 2008). These changes have had particularly strong effects on the traditional sectors within developed countries.

Agriculture, other primary sectors, such as forestry, and traditional manufacturing has experienced significant restructuring. A diversified economic base is likely to provide a wider variety of options for responding to the forces of global restructuring (Alasia *et al.*, 2008) and offers greater employment opportunities for a diverse work force; thus, a more economically diverse community can help mitigate depopulation. The degree of economic specialization in a community is represented by the Herfindahl Index in the present study.

Furthermore, in this case, as the focus is primarily on rural communities, we use the natural resource reliance[35] definition by Natural Resource Canada to identify SLAs who rely heavily (30% or more) on a single primary industry: agriculture, energy, fisheries, forestry and mining and metals. The economic base for a particular community is defined as the total employment income within a local economy that is generated by demand from outside the community. Economic base is of crucial importance to most communities because their economic well-being (and, in some cases, even their viability) is based on the local employment income generated from selling products outside of the community. The employment income of the base subsequently supports other industries (primarily local services) that generate income solely from the local area.

6.2.4.4 Labour Markets and Income

The variables considered here focus on employment opportunities and wages.

According to Alasia *et al.* (2008), the unemployment rate is a good indicator of stress for a community. Given that young adults may be interested in migrating to rural areas but often choose not to due to uncertainty of employment opportunities (Halseth and Ryser, 2006), then higher unemployment rates would signal lack of opportunities and be a deterrent to migration, especially for younger cohorts; but less so for retirement age migrations.

Alasia *et al.* (2008) also suggest that "access to wealth" (individual, company or group) may be an important asset in the adjustment of a community when coping with economic stress. Reimer (2002) and the Atlas of Canada (2004) employ a measure of average salary or income in their calculation of the capacity and quality of community life. By contrast, according to Polèse and Shearmur (2007), the average wage of a region is sometime negatively correlated with employment growth, which is consistent with classical models of industrial location based on cost. Nevertheless, all authors refer to earned income (excluding transfers and government) as an indicator of community-based development. The natural logarithm of the average earned income is used as a proxy for wages, relative to wages of other communities. Wage rate or income differentials between place of origin and destination are often used in migration models to account for push and pull factors from alternative migration decisions (Dorigo and Tobler, 1983).

6.2.5 Why residuals?

It is unreasonable to expect that any econometric model, no matter how sophisticated or including as many variables as possible, can fully explain the variation in population via migration (or employment changes) for a given set of sub-national entities. It should, however, be expected to find a number of cases where more people are inmigrating for presumably non-captured reasons and others are not outmigrating for equally non-captured reasons than is predicted by an econometric model. These outlying cases can have interesting explanations, previously unknown to the researchers.

That being said, it is expected that while some regions or communities surpass expectations, there are certainly limitations to the attractiveness of not-easily-measurable factors on migrants (i.e. natural beauty). Remoteness (distance from large urban centre and access to public services such as health care) often outweighs the attractiveness of local features, even for hedonic migrants. In other cases,

[35] The Natural Resources Canada website provides details about the origins of the resource-reliance mapping project and also expands upon the concepts, methodology and data sources used to obtain the resource-reliant values for 2001. http://atlas.nrcan.gc.ca/auth/english/maps/economic/rdc2001/dataandmappingnotes.html

significant public spending and targeted investments may succeed in attracting a greater number of migrants than would be the case without such investments, for example, and these are the types of factors not captured in most econometric models.

Because these are unique events geographically, the qualitative analysis of residuals can, given contextual information on local economies, help decision-makers understand whether or not specific public policies, subsidies or programs actually have an impact on attracting migrants to their respective *milieu*.

6.3 Methodology

6.3.1 Data and variables specification

The micro-data at the basis of this analysis was accessed through the COOL-RDC and stems from the long questionnaire of 2006 Census of population, which covers 20% of all Canadians. In the case of this paper, several age groups are retained: **young adults** (18 to 24 years of age), **core working age** (25 to 54 years of age) and **seniors** (55 years of age and over), living in Canada in 2001 (outside of the Territories) and non-institutional residents. Studying these different populations groups allows for the differential effect of certain explanatory variables to be investigated. All other community indicators used in this analysis are generated from the 2001 Census of Population.

6.3.1.1 Migration rates

We follow the initial migration definition of Statistics Canada, according to whom, a *mover* is a person who, on Census Day, was living at a different address than the one at which they resided five years earlier (Statistics Canada). *Internal migrants*, on the other hand, are movers who, on Census Day, were residing in a different Census subdivision (CSD) five years earlier (external migrants being persons who were living outside Canada five years earlier). In our case, the definition of *internal migrant* used will rely on two criteria, 1) change of place of residence between 2001 and 2006 as defined by Statistics Canada and 2) change of residence outside geographical unit representing a self-contained labour area. This allows us to isolate life-altering migrations.

The migration rates are calculated for use as the dependant variables in this analysis as follows:

$$\text{Net migration rate}\,(2001\text{-}2006) = \text{In-migration} - \text{Out-migration} \qquad [2]$$

where:

$$\text{In-migration rate} = (\text{In-migrants } 01\text{-}06)/[(\text{Out-migrants } 01\text{-}06) + (\text{Non-movers } 01)] \times 100$$

$$\text{Out-migration rate} = (\text{Out-migrants } 01\text{-}06)/[(\text{Out-migrants } 01\text{-}06) + (\text{Non-movers } 01)] \times 100$$

6.3.2 Geographic unit of analysis

As mentioned above, areas of residence (current and 5 years ago) for individuals are first provided at the Census Subdivision (CSD) level in 2006 boundaries. The Self-contained[36] labour areas (SLA)[37], constructed by Statistics Canada and defined as smaller (or rural) SLA (population under 100,000) (n =

[36] "Self-containment" is a measure of the degree to which the workers living in "A" are also working in "A". Thus, by clustering areas with a high reciprocal importance of commuting flows and a low level of self-containment, new areas were created with increasingly higher degrees of self-containment. Once a certain threshold for self-containment has been reached, this would then be considered a self-contained labour market because most residents with jobs are working in the given labour area and most individuals living in the given labour area are also working in the given labour market area.

[37] The delineation of self-contained labour areas (SLAs) was based on a clustering procedure using data on the reciprocal flows of commuters. The method is derived from the algorithm developed by Bond and Coombes (2007). The main features of the method are outlined in Munro et al. (2011) while the details are presented in a forthcoming technical paper (Munro *et al*., forthcoming). http://www.statcan.gc.ca/pub/21-006-x/2008008/section/s2-eng.htm

303) and larger (or urban) SLA (population equal or over 100,000) (n = 46), are then applied to the computed migration data. For the purpose of this study, all dependent (i.e. migration) and independent variables (i.e. all indicators in 2001) were computed using the 2006 SLA geography.

Since the self-contained labour areas used in this analysis are, on average, 96% self-contained in terms of people living and working in the same area, the migration figures provided here reflect a substantial change in the life of these individuals. Specifically, these changes are likely related to either a new job (in a different labour market area) or a major transition in the individual/family's life cycle, such as the start or completion of an educational program, a search for new or first employment, retirement, etc.

6.3.2.1 Community factors

The choice of community level variables is inspired by a series of common indicators used in different regional models (Shearmur and Polèse, 2007; Alasia *et al.*, 2008). The variables retained for this analysis are those found in the 2001 Census of Population with the exception of "distance" variables, which are calculated using ArcGIS software.

6.3.3 The model

In a first part, we test an econometric model of regional growth (based on a modified version of the *Coffey-Polèse-Shearmur* (CPS) model) (Shearmur and Polèse, 2007) and assess its effectiveness in explaining migration rate differences between regions. For this article, the sample includes all Canadian communities (i.e. Self-contained Labour Areas). The dependant variable is the net migration rate between 2001 and 2006 for different age groups (young adults, core working age and seniors) and the independent variables are regional geostructural and local factors for the base year (2001). Finally, the model will be applied to two groups of SLA: all SLA (n = 349) and smaller (or rural) SLA (<100,000 population) (n = 303). The larger (or urban) SLA (>=100,000 population) sample size is too small (n = 46) for a regression analysis and not relevant to the object of this particular study.

$$y_i = \beta_1 x_{i1} + ... + \beta_p x_{ip} + \varepsilon_i \quad [1]$$

The relationship between dependent and independent variables included in this version of the CPS model reads as follows:

$$G = A + aS + bE + cW + dE + eD + fR + gU + hP + iC + \varepsilon \quad [2]$$

where **A** = constant

G = net migration rate between 2001 and 2006

S = logarithm of population size in 2001

E = percentage of university graduates in the 15 years and over population in 2001

W = average employment income in 2001

E = unemployment rate in 2001

D = diversity index in 2001 (Herfindahl Index). A low diversity index indicates high diversity

R = resource reliance as dummy variables for each category: agriculture, energy, fisheries, forestry and mining and metals in 2001

U = Distance to US border

P = Prairie dummy, fixed to 1 for Saskatchewan and Manitoba, otherwise 0, as to reflect the concept of *empty quarters* (Garreau, 1981), also observed in the Midwest region of the United States, in relative decline since the 1930s.

C = Distance to urban area (CA/CMA)

Note: a variance inflation factor (VIF) analysis was conducted to assess that there was no multicollinearity issues between explanatory variables.

6.3.4 Residuals

Multiple regression models, such as the one employed in this analysis, allow for the option of obtaining residuals for each observation. This is can be calculated as the difference between the predicted outcome and the observed outcome (i.e. Residual = Observed – Predicted). This allows us to isolate communities based on their position relative to the model average. Thus, communities who are expected to decline and manage to attract more migrants in reality, or who declined but less than expected, are considered to have surpassed expectations. Alternatively, communities who are expected to grow given their community characteristics in 2001 and do not live up to these expectations are under-performing the model.

6.3.5 Limitations

As previously noted, there are also important limitations to this type of analysis. First, migration rates do not take into account individual factors except for age (cohorts). Secondly, the data also do not account for multiple or return migrants (migration between 2001 and 2006). However, migration rates are preferable to population change, which can result from non-economic or non-decisional factors (i.e. birth, death). Third, the fact that migration is accounted for in the 2006 census on a 5 year period limits us to analyze internal migration for one period at a time (unlike the, albeit imperfect, indicator of population change over a series of census periods, for example). Fourth, there is always a danger of multicollinearity between explanatory variables when using many locational factors. A variance inflation factor (VIF) analysis was conducted, revealing that there was no issue in these regression models. Fifth, the geography of our primary spatial units (rural SLA), often discontinuous and non-contiguous, precludes the use of Moran type indexes of spatial autocorrelation. Sixth, the period of study (2001-2006) was characterized by resource-led growth, a rapidly-rising Canadian dollar (low point was January 2002, about 0.60$US), and falling employment in manufacturing, not necessarily representative of pre-2001 trends. Thus, we would expect many of the most positive residuals to be for resource-based communities, especially in oil and gas. Finally, as stated earlier, the interpretation of what lies behind residuals necessarily entails an element of subjective/qualitative analysis.

6.4 Results

This article provides further insight into the demographic trends facing rural labour markets in Canada and the results will be focused on this group.

6.4.1 Descriptive Statistics

Table 17 shows the differences between smaller (rural) and larger (urban) SLA used in the analysis. As noted, education levels are usually lower in rural (11.38) than urban (18.60) areas as well as the average employment income ($24,061 vs. $29,367 respectively). Also note the higher unemployment rate in rural (12.70) than urban (7.81) areas, which suggests lack of employment opportunities or higher incidence of seasonal workers as well as higher rate of economic specialization in rural (7.37) than urban (6.17) areas.

Table 17. Descriptive Statistics – Independent Variables (Average) by SLA Type

	SMALLER SLA (<100,000K)	LARGER SLA (>=100,000K)	TOTAL SLA
N	303	45	349
Population	17,816	527,458	84,990
University Education Level	11.38	18.60	12.33
Herfindahl Index (diversity	7.37	6.17	7.21
Average Employment Income in $	24,061	29,367	24,760
Unemployment Rate	12.70	7.81	12.06
Distance to CMA/CA (in km)	107.58	30.76	97.45
Distance to US border (in km)	369.66	149.63	340.66
Source: Authors' computation based on Census of Population 2001 and 2006 data.			

Table 18 shows that young adults (18 to 24 years of age) are attracted to places such as Fort McMurray (Alberta) which offers high paying jobs related to oil sand extraction and energy processing and Red Lake (Ontario), known for its gold mine. It also shows how some young adults are attracted to amenities rich and outdoors sports destinations such as Squamish (British Columbia) and Jasper (Alberta). Finally, high in-migration rates in low population areas such as Val Marie (Saskatchewan) and Hawke's Bay (Newfoundland and Labrador) mathematically boost population changes and send those communities to the top of the list, especially when no out-migration is captured for this period. Special attention should also be drawn to larger regions that genuinely attract enough in-migrants to compensate positively for the number of out-migrants, such as Edmonton (Alberta), Victoria-Saanich (British Columbia), Halifax (Nova Scotia), Calgary (Alberta) and Saskatoon (Saskatchewan).

Table 18. Top 20 Positive Net Migration Rates (2001-2006) for Young Adults (18 to 24 years of age).

Rank	Self-contained Labour Area	Total Population 2001	In-migration rate	Out-migration rate	Net-Migration rate
1	Val Marie (Saskatchewan)	615	23.53	0.00	23.53
2	Fort McMurray (Alberta)	42,500	36.45	17.09	19.36
3	Grande Prairie (Alberta)	76,500	27.83	10.73	17.10
4	Minton (Saskatchewan)	305	50.00	33.33	16.67
5	Hawke's Bay (Newfoundland and Labrador)	530	15.38	0.00	15.38
6	Cow Head (Newfoundland and Labrador)	710	12.50	0.00	12.50

7	Canmore (Alberta)	22,895	25.27	12.80	12.47
8	Squamish (British Columbia)	28,090	24.73	13.20	11.53
9	Fort St. John (British Columbia)	28,005	21.61	10.64	10.97
10	Edmonton (Alberta)	940,595	15.82	5.59	10.22
11	Jasper (Alberta)	4,550	23.30	14.20	9.09
12	Bella Bella (British Columbia)	1,415	9.09	0.00	9.09
13	Victoria-Saanich (British Columbia)	324,235	18.20	9.26	8.94
14	Halifax (Nova Scotia)	380,860	16.68	8.75	7.93
15	Calgary (Alberta)	1,044,185	14.33	6.51	7.82
16	Red Lake (Ontario)	5,385	13.19	6.25	6.94
17	Red Deer (Alberta)	176,790	21.91	15.16	6.75
18	Lloydminster (Alberta/Saskatchewan)	47,900	21.78	15.24	6.54
19	Saskatoon (Saskatchewan)	240,040	16.88	10.58	6.30
20	Yellowknife (Northwest Territories)	19,480	16.44	10.73	5.71

Source: Authors' computation based on Census of Population 2001 and 2006 data.

Table 19 shows that core working age migrants (25 to 54 years of age) are also attracted to energy and mining resource-reliant regions such as Fort McMurray (Alberta) and Red Lake (Ontario), presumably for work related reasons but it is worth noting the high out-migration rate of booming regions such as Fort McMurray; these migration patterns suggest a high turnover rate and instability of labour force in such resource dependent communities. Again, the positive net migration of larger labour areas such as Kelowna-Central Okanagan (British Columbia), Barrie (Ontario), Joliette (Quebec), Nanaimo (British Columbia) and Red Deer (Alberta) supports the attractive effects of having the right combination of employment opportunities and presence of non-work related amenities (environmental, social, etc.).

Table 19. Top 20 Positive Net Migration Rates (2001-2006) for Core-Working-Age Adults (25 to 54 years of age).

Rank	Self-contained Labour Area	Total Population 2001	In-migration rate	Out-migration rate	Net-Migration rate
1	Fort McMurray (Alberta)	42,500	37.79	23.67	14.12
2	Red Lake (Ontario)	5,385	27.40	14.60	12.80

3	Neilburg-Marsden (Saskatchewan)	1,210	13.33	2.22	11.11
4	Sechelt-Gibsons (British Columbia)	25,580	24.05	13.07	10.97
5	Grand Rapids (Manitoba)	945	15.07	4.11	10.96
6	Invermere (British Columbia)	8,600	26.00	15.96	10.04
7	Salmon Arm (British Columbia)	41,250	25.92	15.94	9.98
8	Duncan-Ladysmith-Cowichan Valley (British Columbia)	71,135	20.88	11.16	9.72
9	Kelowna-Central Okanagan (British Columbia)	147,725	23.23	13.64	9.59
10	Barrie (Ontario)	317,660	22.44	13.06	9.38
11	Grande Prairie (Alberta)	76,500	26.64	17.36	9.28
12	Osoyoos-Oliver (British Columbia)	15,140	28.25	19.21	9.03
13	Courtenay-Comox (British Columbia)	52,645	25.96	17.26	8.70
14	Val Marie (Saskatchewan)	615	12.77	4.26	8.51
15	Vernon (British Columbia)	62,065	23.49	15.22	8.27
16	Joliette (Quebec)	132,955	17.14	9.07	8.08
17	Trout River to Woody Point Bonne Bay (Newfoundland and Labrador)	1,260	9.80	1.96	7.84
18	Nanaimo (British Columbia)	128,945	21.15	13.35	7.79
19	Red Deer (Alberta)	176,790	22.31	15.15	7.16
20	Penticton (British Columbia)	56,650	21.58	14.49	7.09

Source: Authors' computation based on Census of Population 2001 and 2006 data.

Table 20 shows that senior migrants (55 years of age and over) are not as attracted to energy and mining resource-reliant regions such as Fort McMurray (Alberta) and Red Lake (Ontario). Instead, they seem to prefer the warmth and amenities richness that characterize western regions such as Nanaimo (British Columbia), Creston-Central Kootenay (British Columbia) and Kelowna-Central Okanagan (British Columbia). These descriptive statistics also indicate a willingness of seniors to move to smaller and more remote areas such as Trout River to Woody Point Bonne Bay (Newfoundland and Labrador), proximity to Gros Morne national park, Manitoulin Island (Ontario) and Mont Laurier (Quebec) in the *Hautes Laurentides.*

Table 20. Top 20 Positive Net Migration Rates (2001-2006) for Seniors (55 years and over).

Rank	Self-contained Labour Area	Total Population 2001	In-migration rate	Out-migration rate	Net-Migration rate
1	Hodgeville (Saskatchewan)	605	18.18	0.00	18.18
2	Nanaimo (British Columbia)	128,945	24.45	9.22	15.23
3	Creston-Central Kootenay (British Columbia)	12,950	24.27	12.08	12.19
4	Courtenay-Comox (British Columbia)	52,645	20.82	8.98	11.84
5	Sechelt-Gibsons (British Columbia)	25,580	23.46	12.01	11.45
6	Trout River to Woody Point Bonne Bay (Newfoundland and Labrador)	1,260	10.67	0.00	10.67
7	Salmon Arm (British Columbia)	41,250	22.05	11.81	10.24
8	Penticton (British Columbia)	56,650	19.27	9.27	10.00
9	Barrie (Ontario)	317,660	17.79	8.49	9.30
10	Kelowna-Central Okanagan (British Columbia)	147,725	18.04	9.13	8.92
11	Manitoulin Island (Ontario)	8,930	14.26	5.45	8.81
12	Mount Waddington-Alert Bay (British Columbia)	1,475	14.08	5.63	8.45

13	Duncan-Ladysmith-Cowichan Valley (British Columbia)	71,135	17.88	9.54	8.34
14	Kawawachikamach-Schefferville (Quebec)	1,230	8.33	0.00	8.33
15	Midland (Ontario)	43,245	16.04	7.74	8.30
16	Elliott Lake (Ontario)	18,620	19.77	11.63	8.14
17	Invermere (British Columbia)	8,600	21.31	13.32	7.99
18	Mont-Laurier (Quebec)	33,455	13.58	5.76	7.82
19	Tumbler Ridge (British Columbia)	2,830	49.35	41.56	7.79
20	Grand Forks (British Columbia)	12,220	20.65	89	7.76

Source: Authors' computation based on Census of Population 2006 data.

6.4.2 Model Results

Table 21 shows the regression results with all SLA included in the analysis. A variance inflation factor (VIF) analysis was conducted and no major multicollinearity issues were detected for any of the independent variables (VIF < 3.4). As predicted, population at the base year (2001) is a major factor in attracting more population, especially in the case of young adults (4.25***) and core-working-age (5.92****) migrants, but non-significant in the case of seniors. Education level, which usually has a positive causal relationship with migration, is non-significant for all age cohorts expect for the core-working-age group which correlates negatively (-3.59***), perhaps capturing the high rate of workers migrating for low-skilled employment due to the boom in the energy sector for this time period. Average income is also inversely correlated with migration for seniors (-4.74****) but non-significant with other groups, presumably highlighting non-work related migration decisions. Young adult migrants prefer slightly more industrially diverse regions (1.98*), in part, another reflection of size; many of which are presumably moving for education purposes while seniors seem to have the opposite relation with economic diversity, preferring labour areas with higher concentration of workers in few industries (-2.41*).

As predicted, the prairies dummy variable acts as a negative factors in migration decisions of young adults (-2.77**) and seniors (-2.70**). Agricultural dependence is especially repulsive for young adults (-3.70**) while energy reliance is an attractive factor for young adults (2.14*) and core-working-age migrants (2.17*) but non-significant in the case of seniors. Forestry regions are also repulsive to young adults (-2.01*) while mining and metals regions are especially repulsive to seniors (-2.43*). Finally, regions located far away from the US border are a big turnoff to senior migrants (-4.08****) while distance away from a large CMA doesn't deter young adults (2.57*) from migrating towards those regions, perhaps illustrating the willingness to move to energy reliant regions located outside commuting zones of large any CMA.

Table 21. Net Migration Rates (2001-2006), Regression Model Results (All SLAs) – T-values.

	Young Adults (18 to 24 years of age)	Core-Working-Age (25 to 54 years of age)	Seniors (55 years and over)	Variance Inflation Factor (VIF)
R^2	0.2913	0.2105	0.2758	-
n	**349**	**349**	**349**	-
Intercept	-0.59	0.01	4.84	-
Population (S)	**4.25*** **	**5.92**** **	1.58	3.339
Education Level (E)	1.25	**-3.59*** **	0.82	2.230
Average Income (W)	-0.26	-0.59	**-4.74**** **	3.325
Unemployment Rate (UR)	1.33	-0.36	-1.01	3.189
Diversity (D)	**1.98***	0.12	**-2.41***	1.978
Prairies (P)	**-2.77****	-0.79	**-2.7****	1.943
Agriculture reliant (dummy)	**-3.7****	-0.28	-0.63	1.512
Energy reliant (dummy)	**2.14***	**2.17***	1.14	1.321
Fisheries reliant (dummy)	-0.73	-0.84	-0.67	1.129
Forestry reliant (dummy)	**-2.01***	-0.09	0.09	1.326
Mining and metals reliant (dummy)	0.03	-0.01	**-2.43***	1.211
Average distance to US border (km)	-1.09	-1.32	**-4.08**** **	1.956
Average distance to nearest CMA/CA	**2.57***	0.43	-1.67	1.676

Note: **** <0.0001, *** <0.001, **<0.01, *<0.05

Source: Authors' computation based on Census of Population 2006 data.

Table 22 shows results for rural SLA only (n = 303). A variance inflation factor (VIF) analysis was conducted and no major multicollinearity issues were detected for any of the independent variables (VIF < 3.5). The lower explanatory power of the model when applied to rural SLA (0.19 to 0.26) suggests that non-traditional variables may be better at explaining migration rates for rural labour areas. On the other hand, results for smaller observations are necessarily more volatile, especially under conditions of fluctuation resource demand.

Again, and as predicted, population at the base year (2001) is a major factor in attracting more population, especially in the case of young adults (2.87**) and core-working-age (5.54****) migrants, but again non-significant in the case of seniors. Again, education level, which usually has a positive causal relationship with migration, is only significant, but negatively, with the core-working-age group (-2.30*), perhaps capturing the high rate of workers migrating for low-skilled employment located in

rural areas. Average income is also inversely correlated with migration for seniors (-4.74****) but non-significant with other groups, presumably highlighting non-work related migration decisions. Again, economic diversity seems to have an opposite relation with seniors (-2.06*), as they seem to preferring labour areas with higher concentration of workers in few industries.

As predicted, the prairies dummy variable acts as a negative factors in migration decisions of young adults (-2.83**) and seniors (-2.17**). Agricultural dependence is especially repulsive for young adults (-3.27**) while energy reliance is an attractive factor for this same age group (1.98*) but non-significant in the case of core-working-age group and seniors. Mining and metals specialized regions are also repulsive to seniors (-2.06*). Finally, regions located far away from the US border are a big turnoff to senior migrants (-3.89****) while distance away from a large CMA doesn't deter young adults (2.25*) from migrating towards those regions, again, perhaps illustrating the willingness to move to energy reliant regions located outside commuting zones of large any CMA.

Table 22. Net Migration Rates (2001-2006) CPS Regression Model Results (only Rural SLAs) – T-values.

	Young Adults (18 to 24 years of age)	Core-Working-Age (25 to 54 years of age)	Seniors (55 years and over)	Variance Inflation Factor (VIF)
R^2	0.2079	0.1885	0.2623	-
n	**303**	**303**	**303**	-
Intercept	-0.54	-0.04	4.67	-
Population (S)	**2.87****	**5.54*****	1.33	2.501
Education Level (E)	0.26	**-2.30***	1.42	1.718
Average Income (W)	-0.12	-0.62	**-4.63******	3.076
Unemployment Rate (UR)	0.91	0.10	-0.63	3.430
Diversity (D)	1.57	0.49	**-2.06***	2.088
Prairies (P)	**-2.83****	-0.31	**-2.17***	2.038
Agriculture reliant (dummy)	**-3.27****	-0.37	-0.61	1.505
Energy reliant (dummy)	**1.98***	1.92	1.28	1.363
Fisheries reliant (dummy)	-0.65	-0.84	-0.57	1.130
Forestry reliant (dummy)	-1.69	-0.15	0.34	1.368
Mining and metals reliant (dummy)	0.22	0.09	**-2.06***	1.242
Average distance to US border (km)	-0.87	-1.50	**-3.89******	1.964
Average distance to nearest CMA/CA	**2.25***	0.73	-1.26	1.606

Note: **** <0.0001, *** <0.001, **<0.01, *<0.05

Source: Authors' computation based on Census of Population 2006 data.

6.4.3 Residuals analysis

The analysis of residuals is presented for the rural SLA model only, the focus of our research.

Table 23 shows that many rural regions in the Prairies do not behave according to the model's expectations such that communities as Val Marie (Saskatchewan), Minton (Saskatchewan), Central Butte (Saskatchewan), Dinsmore (Saskatchewan) and Tugaske (Saskatchewan) top the list. At the same time, other prairie regions did not fare as well as many made it into the bottom 10 list: Watson (Saskatchewan), Mankota (Saskatchewan), Leader (Saskatchewan), Bengough (Saskatchewan), Winnipegosis (Manitoba), Consul (Saskatchewan) and Cut Knife (Saskatchewan), as well as most of the remainder of the bottom 20 list. It should be noted that Saskatchewan communities are economic geographies outliers in their construction compared with the rest of Canadian labour markets. Saskatchewan CSDs are smaller in geographic size than their peers across Canada and the lower inter-CSD commuting observed within these regions - in part, as a result of high concentrations of labour in the agriculture sector - cause these rural SLAs to be smaller in population size and thus more vulnerable to volatile fluctuations in population change between censal periods.

Another observation is that the presence of amenities-rich regions such as Canmore (Alberta), Squamish (British Columbia) and Jasper (Alberta), to name a few, suggests a need to develop accurate non-economic variables in future models that capture the attractiveness of leisure opportunities for young adults.

Finally, the presence of Fort McMurray (Alberta) and Red Lake (Ontario) - that is after controlling for energy and mining and metals reliance - serves to illustrate short-term unpredictable resource booms driven by international oil and mineral prices, but not necessarily good predictors of long term growth.

Table 23. Top 20 / Bottom 20 Residuals – Rural SLA only (2001-2006) for Young Adults (18 to 24 years of age).

Rank	Self-contained Labour Area	Standardized Residuals	Rank	Self-contained Labour Area	Standardized Residuals
1	Val Marie (Saskatchewan)	4.05	**303**	Watson (Saskatchewan)	-3.56
2	Minton (Saskatchewan)	2.99	**302**	Mankota (Saskatchewan)	-3.56
3	Hawke's Bay (Newfoundland and Labrador)	2.29	**301**	Leader (Saskatchewan)	-3.38
4	Cow Head (Newfoundland and Labrador)	2.25	**300**	Bengough (Saskatchewan)	-3.26
5	Central Butte (Saskatchewan)	1.88	**299**	Winnipegosis (Manitoba)	-3.18
6	Fort McMurray (Alberta)	1.80	**298**	St. Alban's (Newfoundland and Labrador)	-3.12
7	Dinsmore (Saskatchewan)	1.74	**297**	Thompson-Nicola A (British Columbia)	-2.99

8	Bella Bella (British Columbia)	1.68	**296**	Ramea (Newfoundland and Labrador)	-2.83
9	Tugaske (Saskatchewan)	1.67	**295**	Consul (Saskatchewan)	-2.63
10	Grande Prairie (Alberta)	1.66	**294**	Cut Knife (Saskatchewan)	-2.36
11	Canmore (Alberta)	1.64	**293**	Imperial (Saskatchewan)	-2.30
12	Cross Lake (Manitoba)	1.59	**292**	Kerrobert (Saskatchewan)	-2.18
13	Squamish (British Columbia)	1.59	**291**	Ituna (Saskatchewan)	-2.15
14	Lynn Lake (Manitoba)	1.55	**290**	Chaplin (Saskatchewan)	-1.89
15	Shoal Lake (Ontario)	1.49	**289**	Ogema (Saskatchewan)	-1.86
16	Red Lake (Ontario)	1.44	**288**	Major-Smiley (Saskatchewan)	-1.83
17	Coryatsaqua-Babine (British Columbia)	1.41	**287**	Cadillac (Saskatchewan)	-1.74
18	Craik (Saskatchewan)	1.39	**286**	Natashquan (Quebec)	-1.65
19	Jasper (Alberta)	1.38	**285**	Baie Verte (Newfoundland and Labrador)	-1.58
20	Yellowknife (Northwest Territories)	1.38	**284**	Grenfell-Wolseley-Broadview (Saskatchewan)	-1.57

Source: Authors' computation based on Census of Population 2006 data.

Table 24 shows that some of the same regions out-performed the core-working-age model, with the notable presence of regions such as Ogema (Saskatchewan) that made the top 20 for core-working-age group while making the bottom 20 in the young adults model. Ogema, a small town in southern Saskatchewan, was particularly active in trying to attract labour force to work in a new hog farm during that time period, which might partially explain its over-performance. Again, the presence of Fort McMurray (Alberta) and Red Lake (Ontario) may only illustrate a short-term boom of core-working-age population driven by oil and mineral prices for the given period of analysis. It is also worth noting the presence of Jasper (Alberta) and Canmore (Alberta), highly sought after regions for the young adult migrants, but this time in the bottom 20 for the core-working-age group, suggesting that resort towns may not be as attractive destinations for permanent migrants looking for long-term employment.

Table 24. Top 20 / Bottom 20 Residuals – Rural SLA only (2001-2006) for Core-Working-Age Adults (25 to 54 years of age).

Rank	Self-contained Labour Area	Standardized Residuals	Rank	Self-contained Labour Area	Standardized Residuals
1	Red Lake (Ontario)	2.64	**303**	Lytton (British Columbia)	-6.11
2	Grand Rapids (Manitoba)	2.47	**302**	Imperial (Saskatchewan)	-4.92

3	Val Marie (Saskatchewan)	2.26	**301**	Jasper (Alberta)	-4.21
4	Luseland (Saskatchewan)	2.21	**300**	Hodgeville (Saskatchewan)	-3.58
5	Neilburg-Marsden (Saskatchewan)	2.21	**299**	Lynn Lake (Manitoba)	-3.27
6	Consul (Saskatchewan)	2.17	**298**	Bengough (Saskatchewan)	-2.52
7	Invermere (British Columbia)	2.15	**297**	Cut Knife (Saskatchewan)	-2.40
8	Fort McMurray (Alberta)	2.14	**296**	Redvers (Saskatchewan)	-1.90
9	Sechelt-Gibsons (British Columbia)	2.09	**295**	Falher (Alberta)	-1.88
10	Trout River to Woody Point Bonne Bay (Newfoundland and Labrador)	1.96	**294**	Natashquan (Quebec)	-1.73
11	Chaplin (Saskatchewan)	1.69	**293**	Slave Lake (Alberta)	-1.58
12	Ogema (Saskatchewan)	1.57	**292**	Hazelton (British Columbia)	-1.58
13	Chitek Lake-Pelican Lake (Saskatchewan)	1.53	**291**	Kerrobert (Saskatchewan)	-1.49
14	Dinsmore (Saskatchewan)	1.51	**290**	Port Hardy (British Columbia)	-1.44
15	Central Butte (Saskatchewan)	1.48	**289**	Canmore (Alberta)	-1.44
16	Nakusp (British Columbia)	1.47	**288**	Oyen (Alberta)	-1.42
17	Duncan-Ladysmith-Cowichan Valley (British Columbia)	1.44	**287**	Cadillac (Saskatchewan)	-1.29
18	Osoyoos-Oliver (British Columbia)	1.43	**286**	Wabasca-Calling Lake-Opportunity Municipal District (Alberta)	-1.26
19	Davidson (Saskatchewan)	1.42	**285**	Whitefish Bay 32A First Nation-Sioux Narrows-Nester Falls (Ontario)	-1.20
20	R.M.'s of Hart Butte & Happy Valley (Saskatchewan)	1.39	**284**	Kamsack (Saskatchewan)	-1.16

Source: Authors' computation based on Census of Population 2006 data.

Table 25 shows that regions attracting more seniors than predicted by the model are vastly different than for the previous two cohorts (young adults and core-working-age). The presence of regions

such as Major-Smiley (Saskatchewan) in the top 10 for seniors, as opposed to appearing in the bottom 20 for young adults, or inversly, Fort McMurray (Alberta) appearing in the bottom 20 for seniors suggests a difference in priorities as migrants get older and approach retirement.

Table 25. Top 20 / Bottom 20 Residuals – Rural SLA Only (2001-2006) for Seniors (55 years and over).

Rank	Self-contained Labour Area	Standardized Residuals	Rank	Self-contained Labour Area	Standardized Residuals
1	Tumbler Ridge (British Columbia)	2.86	**303**	Thompson (Manitoba)	-6.70
2	Hodgeville (Saskatchewan)	2.33	**302**	Nemiscau (Quebec)	-3.98
3	Chicken No. 224 First Nation - Stony Rapids (Saskatchewan)	2.29	**301**	Labrador City-Wabush (Newfoundland and Labrador)	-3.34
4	Kawawachikamach-Schefferville (Quebec)	2.18	**300**	Pelican Narrows (Saskatchewan)	-2.98
5	Major-Smiley (Saskatchewan)	1.98	**299**	Yellowknife (Northwest Territories)	-2.94
6	Marathon (Ontario)	1.73	**298**	Sandy Bay 5 First Nation-Lakeview (Manitoba)	-2.93
7	Val Marie (Saskatchewan)	1.66	**297**	Lynn Lake (Manitoba)	-2.69
8	Whapmagoostui-Kuujjuarapik (Quebec)	1.61	**296**	Saint-Julien (Quebec)	-2.55
9	Courtenay-Comox (British Columbia)	1.57	**295**	Squamish (British Columbia)	-2.38
10	Edam (Saskatchewan)	1.52	**294**	Natashquan (Quebec)	-2.27
11	Dinsmore (Saskatchewan)	1.51	**293**	Whitefish Bay 32A First Nation-Sioux Narrows-Nester Falls (Ontario)	-2.14
12	Harbour Breton (Newfoundland and Labrador)	1.51	**292**	Lytton (British Columbia)	-2.10
13	Sechelt-Gibsons (British Columbia)	1.45	**291**	Fort McMurray (Alberta)	-2.05
14	Masset-Skeena (British Columbia)	1.41	**290**	Ramea (Newfoundland and Labrador)	-1.93
15	South Brook (Newfoundland and Labrador)	1.37	**289**	Minton (Saskatchewan)	-1.85
16	Imperial (Saskatchewan)	1.35	**288**	Port McNeill (British Columbia)	-1.71

17	Mount Waddington-Alert Bay (British Columbia)	1.35	**287**	Prince Rupert (British Columbia)	-1.70
18	Vanderhoof (British Columbia)	1.32	**286**	Port Hardy (British Columbia)	-1.65
19	Creston-Central Kootenay (British Columbia)	1.29	**285**	Ituna (Saskatchewan)	-1.64
20	Cut Knife (Saskatchewan)	1.27	**284**	Hartney (Manitoba)	-1.57

Source: Authors' computation based on Census of Population 2006 data.

Map 4, 5 and 6 further illustrate the distribution of residuals for the three age cohorts (young adults, core-working-age and seniors) across rural SLAs in Canada.

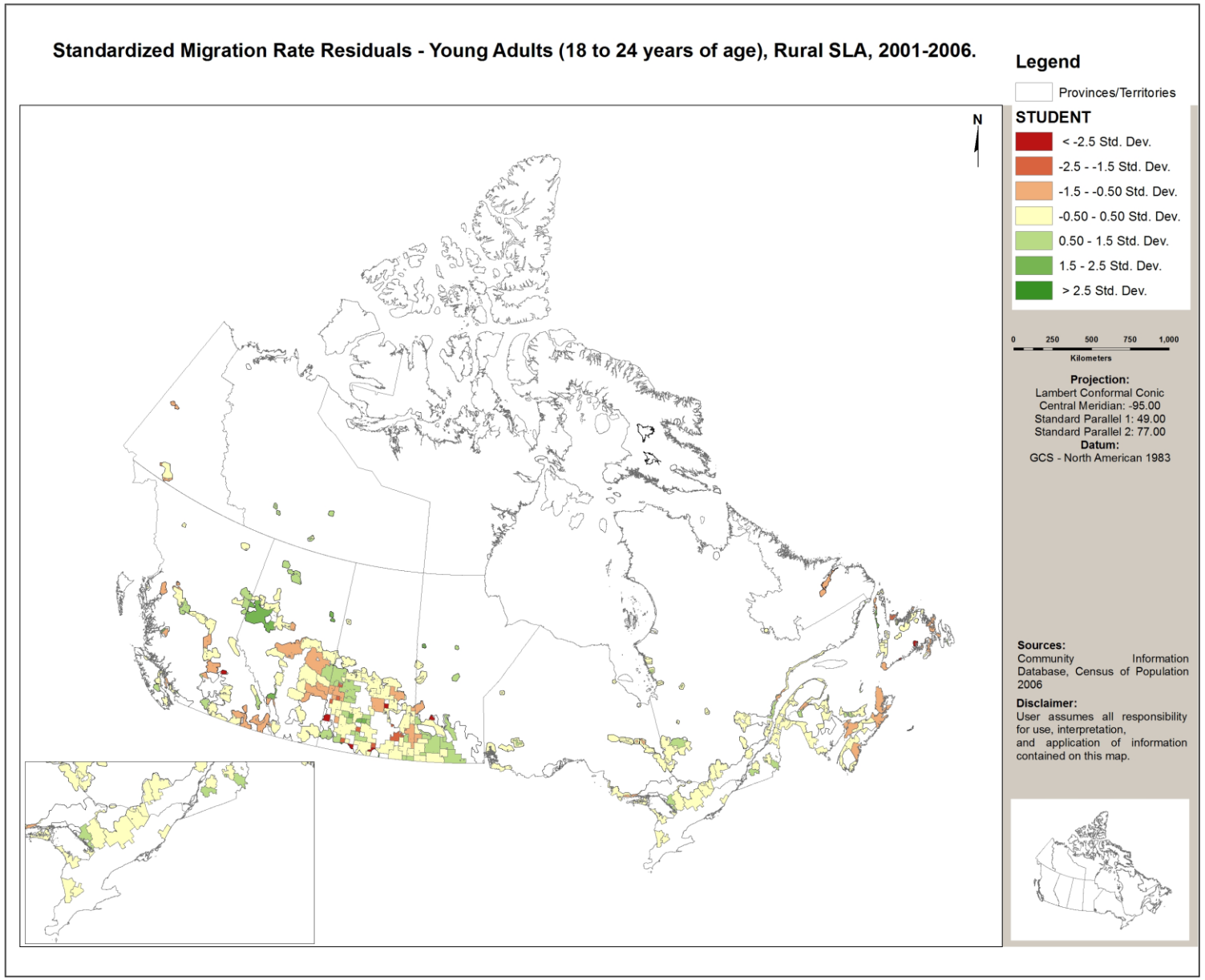
A visual scan of the juxtaposition of red and green, for Maps 4 and 5 specifically, suggests a frequent geographic proximity between opposites (i.e. negative (red) and positive (green) outliers). This reinforces the perception that many moves are over relatively short distances (i.e. between declining Prairie / Alberta agricultural communities and (nearby) growing mining and oil & gas communities, for example, or between fishing communities and other expanding resource economies in Atlantic Canada).

The Grand Prairie region in Northwestern Alberta, more specifically in Map 4 (dark green), illustrates the extent of the oil and gas industry boom on the attraction of youth for this time period – its core city population increased 27.3% between 2001 and 2006 (Statistics Canada, 2006), making it one of Canada's fastest growing cities during that period. Other than the well-known case of the Fort McMurray / Wood Buffalo SLA in Northeastern Alberta, it is also worth noting the dark green SLA east of Calgary in Map 4; namely the Chestermere town area, which is considered a bedroom community for the fast growing city of Calgary. According to Statistics Canada (2006), Chestermere was ranked as the municipality with the highest population growth among municipalities in Canada with a population of 5,000 and over between 2001 and 2006, with a 148.0% increase from 2001.

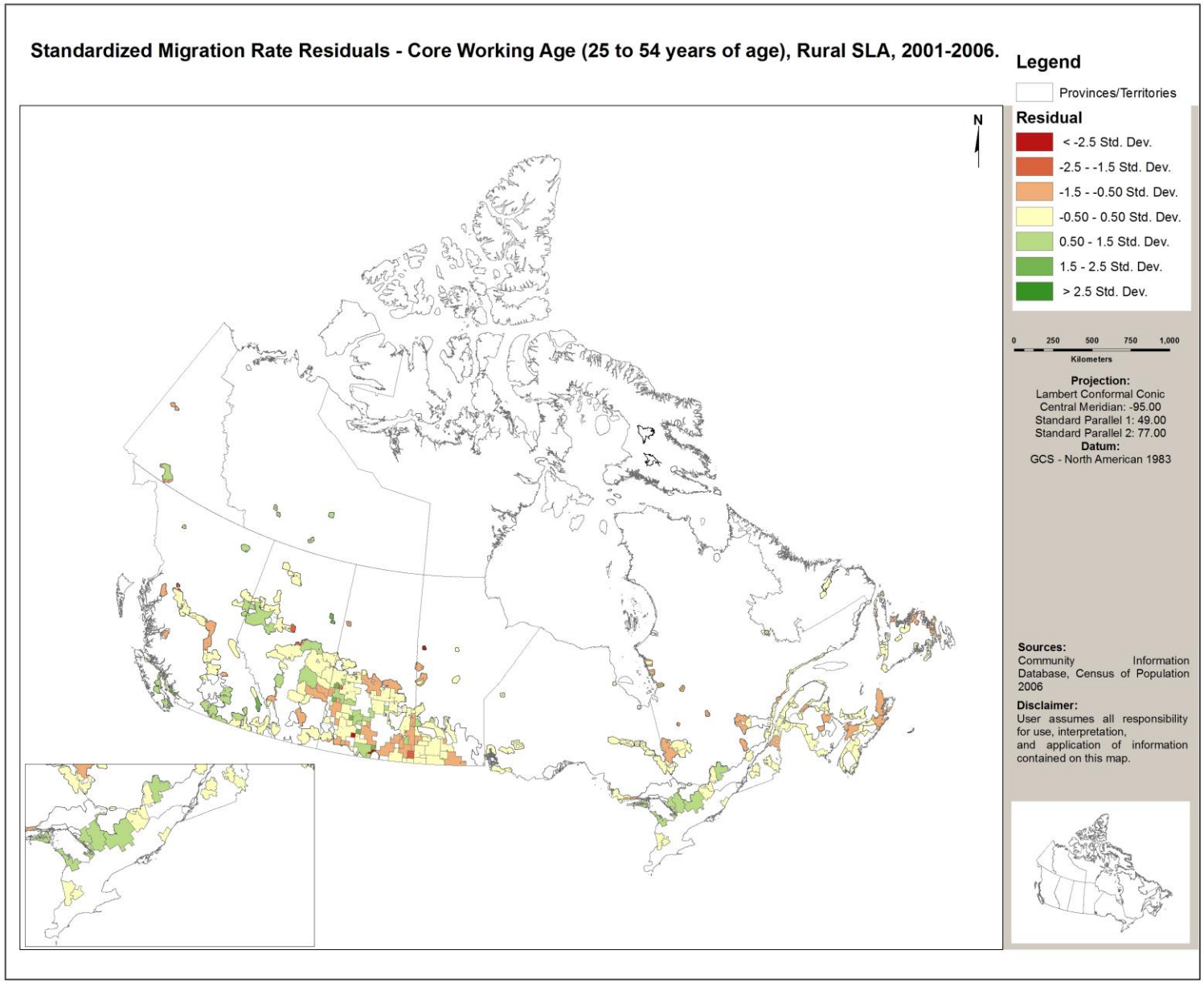
Finally, these observations coupled with the fact that many rural SLAs are non-contiguous in their construction and distribution (due in part to the absence of urban areas in this analysis) suggest that a Moran analysis would not have revealed significant spatial autocorrelation due to the nature of the rural spatial units. That being said, an in-depth qualitative analysis including fieldwork using extreme residual rural regions which do not lend themselves to easy explanations would be a better means to capture the rationale behind the irregularities found in the maps.

Finally, it is worth noting the presence of many under-performing regions in the prairies as well as the Atlantic regions for young adults and core-working-age groups but not in the case of seniors, who presumably have more freedom in terms of migratory destinations. Furthermore, many rural regions located around large urban areas, such as just outside commuting zones of Toronto or Montreal, seem to be attractive to core-working-age and seniors, but not necessarily for young adults. These differences suggest that the use of age cohorts and other potential personal attributes (e.g. education, occupation, immigration status, etc.) is a promising avenue to build upon in future migration studies.

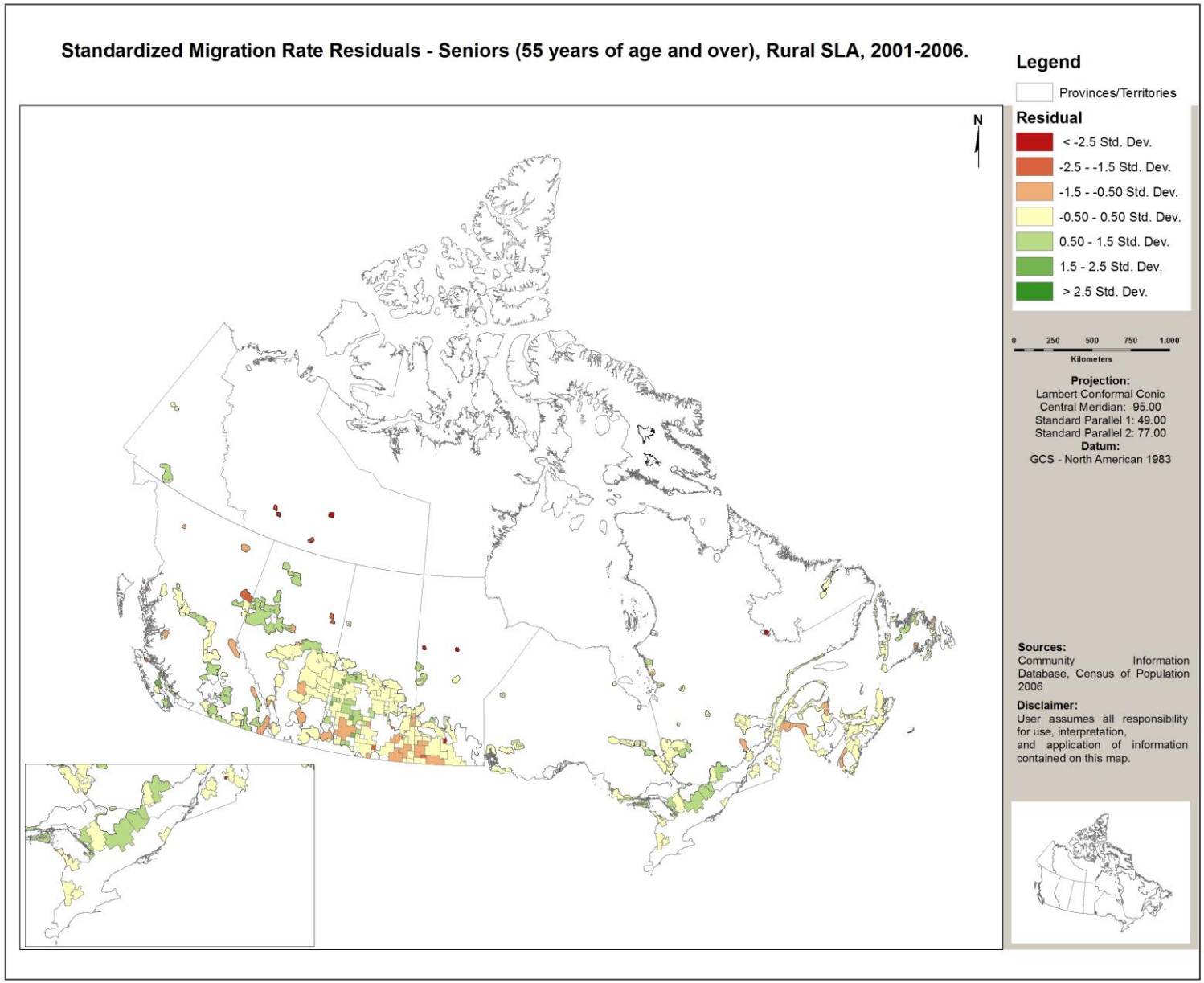
Map 4. Standardized Migration Rate Residuals – Young Adults (18 to 24 years of age), Rural Self-contained Labour Areas, 2001-2006.



Map 5. Standardized Migration Rate Residuals – Core Working Age (25 to 54 years of age), Rural Self-contained Labour Areas, 2001-2006.



Map 6. Standardized Migration Rate Residuals – Seniors (55 years of age and over), Rural Self-contained Labour Areas, 2001-2006.



6.5 Conclusions

Starting from an econometric model of internal migration rates, applied to Canada (2001–2006), this paper analyzes residuals - relative to model predictions - over space with a focus on rural communities that have exceeded migratory expectation. Few regional economic studies in Canada have used labour markets as their spatial units of analysis and thus, the use of SLAs in the study of rural migration is a novel addition to the literature.

The model's explanatory power for rural only SLAs suggests that rural regions are more volatile in their growth patterns than larger urban areas. This is in part due to the period of study, characterized by resource-led growth, a rapidly-rising Canadian dollar and falling employment in manufacturing, not necessarily representative of pre-2001 or post-2006 trends. Thus, many of the most positive residuals - especially for younger cohorts - were found to be for resource-based communities, especially in the oil and gas industry.

While the analysis reveals that rural migrants are not entirely different from other migrants (i.e. not a unique set of individuals), the use of age cohorts to classify migrants suggests that rural migrants are not a homogeneous group of individuals. In that sense, younger rural migrants may indeed be different from younger urban migrants. The former group may be looking for short-term work in temporary high paying industries (e.g. paying off student loans) while the latter may be looking for experience to advance their professional careers. Older rural migrants, for example, may be looking for waterfront properties with limited services and little employment opportunities while older urban migrants may be more attracted by easy access to health care facilities. Notwithstanding the reasons underlying the individual decisions, our results are consistent with the literature in that seniors are more attracted to rural areas than other age cohorts. Finally, some rural migrants may be "unique" in their life-cycle situation but not necessarily unique in their overarching motivations.

In sum, rural community leaders seeking to attract migrants to their region would be wise to recognize which types of migrants they can realistically hope to attract. As mentioned above, the ability to attract migrants is in part dependent on a fortuitous combination of various geo-local factors, some of which are unalterable but local dynamics can still play a role in making a community or region more or less attractive to potential visitors and later residents. It would be advisable to develop a series of amenities indices to be included in a future iteration of this model, to determine whether or not amenities factor heavily in the decision to migrate for different age groups. There are important limitations to our conclusions, as we cannot determine from these analyses the extent of information that migrants hold on their potential migratory destinations, nor the presence and influence of family ties in those regions, for example. Further research is required in the field of rural migration – potentially through the use of qualitative case studies and in-depth interviews - if we are to answer the questions raised by this analysis.

CONCLUSION

In this thesis, we have attempted to shed light on several dimensions of a far-reaching topic; namely, local economic development in rural Canada through internal migration.

In today's new demographic reality (i.e. low birth rates), rural development necessarily involves positive migration. That being said, our focus on rural in-migrants is in itself, a novelty in quantitative migration studies in Canada as most relevant empirical research analyzing urban-rural migration in Canada has recently been qualitative in nature (Guimond and Simard, 2008; 2010). Furthermore, much of the quantitative research on migration flows in Canada focuses on macro-levels geographies (i.e. provinces, city-regions) (Courchene, 1970; Newbold, 1996; Lin, 1998; Vachon and Vaillancourt, 1998; Finnie, 2004; Coulombe, 2006) or when examining rural migration, usually does so from the standpoint of out-migration (Dupuy *et al.*, 2000; Audas and McDonald, 2004). In this thesis, we highlight migration findings from a perspective toward local rural communities and regions in Canada.

At the individual level, we endeavoured to understand the personal factors that influence the propensity to migrate across the rural-urban gradient. We find that rural migrants are not unique in their migratory decisions; they follow the general "laws" of migration first postulated by Ravenstein (1885) but that some characteristics or stages in one's life-cycle may lead some individuals to be more prone to moving toward rural areas. This is important information for decisions-makers and community leaders wishing to attract target demographic migrants to their rural communities.

At the migration flow level, we were able to examine the differential effects of origin-destination regional characteristics at a finer geographical level than used in Courchene's (1970) seminal work in Canada. Again, rural migrants are not irrational in their collective migratory decisions but younger migrants do appear to be less sensitive to distance than other migrants, an interesting revelation. This is likely skewed by the time period analyzed – a time of resource-led growth, especially in the oil and gas industries – but again, this is important information to provide to governments aiming to facilitate migration across the country – from areas where employment is scarce to other areas experiencing labour shortages – by decreasing the costs associated with migrating through social and economic policy.

At the community or regional level, we isolated rural places that outperformed econometric expectations in terms of attracting internal migrants using an adapted Coffey-Polèse-Shearmur model (Shearmur and Polèse, 2007). There is much to be learned from such outlying regions, as this type of analysis had never been conducted using only rural spatial units nor with specially constructed self-contained labour areas (Munro *et al.*, 2010). In some cases, the residuals can be explained by the boom in oil prices for the chosen time period but other regions do not lend themselves to such easy explanations. Communities that successfully attract a larger share of seniors than expected may be developing into retirement destinations. This again, is important information to be held by local decision-makers in order to plan for future services and respond to demand on local amenities.

In sum, each article brought forth different perspectives a tradition that is deeply rooted in this country's history: lest we forget that all Canadians are themselves migrants and/or descendants of migrants – with varying levels of seniority. From the first humans who crossed the Bering Strait from Asia to North America, to the first French settlers who survived the winter on l'Île Sainte-Croix in 1604, to the Westernization of Canada via the transnational railroad: this relatively young country was built on migration. As Canada finalizes its own urbanization phase, rural areas are now being reacquainted with a potential for regeneration through migration back to their hinterland and beyond. It is with this notion in mind that we join a renewed interest in rural development through the perspective of migration. We hope that this work will be useful to policy-makers and local leaders alike who wish to direct migration flows in favour of rural Canada and ensure its future prosperity.

In this final chapter, we revisit results cross-sectionally through the three articles, re-examine limitations of our data and methodologies and close with a few final remarks.

7.1 Revisiting Results

Generally speaking, all models throughout the three articles showed the overall expected results found in other migration studies. This consistency is partially disappointing and encouraging, at the same time, as it suggests that the models fit the data as they are intended; thus, rural migrants are not a truly "unique" subset of individuals. However, the fact that some of our models do not fit the data equally as well when using rural only data - albeit the smaller sample size effects - suggests that migration patterns, and thus population dynamics in rural areas, are more volatile and less predictable. This further suggests that theories and models developed by economic geographers – generally founded upon urbanization trends, agglomeration economies and the emergence of larger cities in Canada and around the world – may need to be revisited or new ones developed specifically, better suited for understanding rural and small town development through migration. Furthermore, the interaction of individual and community variables in all articles – using age cohorts in the second and third articles and adding other personal characteristics in the first article models – further suggests that certain subsets of rural migrants may react differently than their urban counterparts generally and differently to rural specific attractive and repulsive local factors.

Demographics

As discussed in the literature, younger people are generally more likely to migrate, as are highly educated individuals. We found that younger people tend to change residence for economic or educational reasons, as highlighted by the attraction of same age-cohort on migration decisions for young adults; possibly representing the attractiveness of post-secondary education institutions on youth. Core-working-age migrants moving to rural areas are the most standard or "rational" migrants, attracted to economic opportunities and higher wages, even across long distances. This may reflect the fact that as people evolve professionally, they accumulate information on job markets over a growing range of potential destinations with also a growing range of contacts (i.e. secure job offers).

In all models, older migrants were the most likely to migrate towards rural areas, for presumably non-economic reasons. In Canada, amenity migration has not proven to be been a major phenomenon (Ferguson *et al.*, 2007) – and warm weather is not a determining factor in explaining population growth patterns like in some parts of the United States or Europe - but there are signs that this is changing in parts of British Columbia and for many sea-side communities of Atlantic Canada (Polèse, 2010), in the Laurentians regions or around the Great Lakes, at least to a greater extent amongst certain sub-population groups (e.g. pre-retirement aged individuals, etc.). Our findings are thus consistent with the literature in that economic variables tend to lose some of their influence on migration in rural areas as people age (Liao, 2000). That being said, retirement led growth is also not a fully sustainable option locally unless there is a constant flow of retirees migrate to compensate for the loss due to later death. Youth migration, unless exclusively tied to schooling, or better yet young adult migration, can be self-sustained by itself due to higher levels of natural increase in the years that follow migration (Bourne and Simmons, 2004).

Immigrants and visible minorities are also more likely to migrate but we find that a disproportionately low share of these migrants move towards rural areas. This result deserves further attention as it may reflect deeply rooted repulsive effects of a lack of openness to other cultures found in some rural areas but may also be the result of strong attractiveness of one's own ethnic ties and cultural background concentration usually found in larger urban areas in Canada (i.e. Chinatown, Little Italy, etc). Overall, overarching frameworks aiming to explain rural migration as a whole may be overlooking some of the motivations of certain sub-groups of the migrant population.

Local factors

Rural communities are often categorized under the common label "rural" - as does the title of this present thesis - but all rural communities are not equally rural. This underlies the main rationale behind the development of the metropolitan influence zone (MIZ) classification by Statistics Canada. Most

importantly for this analysis, it is found that local factors and the degree of rurality of the community impact migratory decisions in a different way for different migrants. For example, rural destination migrants travel shorter distances than typical urban-urban migrants. However, younger migrants are found to be less sensitive to distance and more willing to migrate to remote a rural community; that is, if the economic opportunities are sufficiently attractive. This may be the result of increased opportunities for long-distance commuting driven by improvements in air service, such as the addition of daily flights from Corner Brook to Fort McMurray, for example. This result may also be exacerbated and in part reflect Canada's unique geography; where the poorest and richest regions, for this time period, are at two geographical extremes of the nation. Working-age and senior populations, on the other hand, are not as predisposed to choosing remote rural locations, no matter how strong the economic attractive force may be.

In light of these findings, communities and regions may potentially help reduce the flow of out-migration from their respective communities if they understand what sub-groups of individuals are seeking in terms of geo-structural features. They can also hope to attract certain sub-groups of the population if they understand the role that location plays in the migratory decision; for example, attracting seniors presumably wishing to keep in touch with the city they departed (i.e. settling in a rural area neighbouring a large city).

Generally speaking, rural communities closer to urban areas have been more successful at attracting internal migrants than more remote communities. While geographic location itself is not policy amenable, policies resulting in the growth of urban areas may have an impact on neighbouring rural regions; such as the case with the Chestermere town area near booming Calgary, Alberta, during the period of study. These rural communities can make themselves more attractive to potential migrants by improving upon their local amenities and services. However, policies focused on urban regions – along with the past efforts of growth-pole theory implementations – will likely do little to sustainably attract migrants to the country's more rural remote areas. The most rural remote communities and regions in Canada require strong attractive economic features – oil and gas, mining operations, etc. - in order to keep attracting migrants over time.

Origin-Destination

Another set of interesting results was found by analyzing rural migrants based on their communities of origin. There are differences worth examining between rural-rural migrants and rural-urban migrants. For example, pre-retirement aged individuals and aboriginals are more likely to migrate out of an urban area and into a rural community when compared with other groups. Rural gentrification, caused in part by migration from urban areas to rural areas (or "counterurbanization") is a different phenomenon than rural to rural migration; for example, from an economically depressed area to a more vibrant rural area. In the migration flows model, the inter-regional migration from rural to rural was likely due to the latter explanation (i.e. migration towards booming resource towns from other smaller towns and regions offering limited economic opportunities). Policies or investments aiming to attract or retain one type of migrant (e.g. "rural gentrifiers") might not always be successful in achieving results for another type or group of migrant (e.g. "rural gold-rushers").

Natural resources

Again, it should be reiterated that this particular period of study (2001 to 2006) – characterized by resource-led development (especially in the oil and gas extraction and mining industries), a rapidly-rising Canadian dollar, and falling employment in manufacturing - is atypical for rural Canada and not necessarily representative of pre-2001 trends (see Figure 3, Annex 2). Over the last 30 years, many resource-based rural communities (i.e. forestry and fishing towns, agricultural villages, etc.) have seen their population numbers dwindling. As was reported through some of our results, much of the migration toward rural communities for the period 2001 to 2006 was directed towards oil and gas development in Western Canada. The picture might be different for the 2006 to 2011 period, and

beyond, with new oil and gas sites being developed off the coast of Nova Scotia and Newfoundland; in which case we might see a reversed migration trend. Finally, despite its benefits to some smaller rural communities, natural resource led growth of rural communities is not necessarily a solid foundation for sustainable growth as variations in commodity prices are cyclical by definition, and so is the demand for jobs associated with these resources.

7.2 Data and Methodological Limitations

We were extremely fortunate to have been granted access to micro-data on individuals from Statistics Canada's Census of Population (2006) in order to conduct all analyses included in this thesis. We are also fortunate that the Community Information Database provided by the Rural Secretariat includes rural community data at the 2006 census subdivision geographic level for the year 2001 – used as the year of origin and/or base year for our models. All and all, the census data collected by an agency who was - at one point in time - revered as one of the greatest statistical agencies in the world, allowed us to perform analyses otherwise impossible to conduct with aggregate data. For that we are grateful. That being said, there are several important limitations from the data used in our analyses.

Data

First, the fact that Canada still uses a "paper-based" census – as opposed to a registry-based database system, such as that used in many Scandinavian countries – limits the data availability to once every five years; certainly due to the high costs of running such a survey. As mentioned before, the data does not account for multiple or return migrants (migration between 2001 and 2006); thus, migrations that occurred within the five-year period are not recorded in the census, and neither are chains of migrations over the period.

Secondly, the confidentially agreements with data providers (e.g. citizens) involved in the Census of Population precludes researchers from linking respondents to previous census years, 1996 or 1991, using social insurance numbers, for example. This necessarily limits us to internal migration for one census period at a time (unlike the, albeit imperfect, indicator of population change over a series of census periods, for example).

Third, as a direct consequence of the first and second points, several important determinants of migration cannot be estimated due to the inability to link migrants to their family members and ancestries, for example. In theory, researchers could easily link individual migrant data to their parents, siblings and other relatives since birth – as each household in Canada must necessarily fill out a Census form for their children as well as themselves – and thus, isolate (or control for) the impact of family location on migration decisions. Many migrants will move to be closer with other members of their families, whether immediate or historic, and there is reason to believe that this effect could be different across the country and across the rural-urban gradient.

There would also be immense potential in combining unconventional data sources (e.g. social media) with Census micro-data in order to assess the effect of social networks (i.e. where people live, where they went to school and where their friends with whom they keep regular contact via social media reside) on migration choices over time. Alas, there is an engrained cultural fear in North America with regards to "Big Data" usage, almost synonymous with "Big Brother", especially when involving government collected data, even solely in the name of advancing research and knowledge.

Finally, the exclusion of international migrants – outmigrants by virtue of the fact that they are no longer present in Canada to complete the census, and international in-migrants who cannot be assigned to a community of origin – limits our analysis to a subset of Canadians, thereby omitting the variation that could potentially be observed with recent immigrants choosing to relocate to rural areas for various reasons (e.g. professional incentives or natural amenities).

Methodology

Every methodological choice is accompanied by limitations. Choosing quantitative models limits us to using secondary data whereas qualitative methods would have limited our sample size to a handful

of communities. Furthermore, limitations arise at every step of the process within the selected quantitative methods.

For instance, while the self-contained labour areas are amongst the most advanced spatial units in Canada that we could use for this type of analysis, an ideal spatial unit would have been one more comparable to *'bassins de vie'* used in France (INSEE, 2003). Our spatial units did not contained information regarding service provision (e.g. health care, education, shopping centres, etc.) and these factors would likely be important decision taken into account when migrants choose a location of destination, especially rural.

Furthermore, our migration flows, for example, do not take into account individual factors except for age (groups) while our individual migrant models do not allow us to isolate residuals on a map. Each method has its strengths and weaknesses. For this reason, we assess a single phenomenon – rural migration - through three different lenses: individual migrants, migration flows and migration rates, across the three articles. In all analyses, there is a danger of multicollinearity between explanatory variables when using many locational factors. A variance inflation factor analysis was always conducted, where applicable, revealing that there were no issues within these models. That being said, there are many other local factors that could be used in such analyses (e.g. natural amenities, local leadership, social capital, political participation, etc.) which would likely compound the risk of multicollinearity. Finally, the interpretation of what lies behind regression results necessarily entails an element of subjective/qualitative analysis. That being the case, the combined use of quantitative methods to select case studies for future qualitative analysis (e.g. in-depth interviews with migrants from outlying communities) would be the best case scenario for pursuing the research on rural migration initiated in this thesis.

7.3 Final Words

This thesis set out to shed light on the wide ranging topic of internal migration and its impact on rural Canada from a quantitative perspective. However, many more questions were raised along the process and clever solutions were presented; the first one being "what is rural?". In defining and analyzing rurality, one is presented with various options that were not entirely satisfactory for our analysis. The creation of the standardized self-contained labour area (SLA) spatial unit and its application in our models was the first of its kind in Canada, as far we are aware. Furthermore, the use of econometric models as a means of identifying outliers (e.g. residuals) for subsequent analysis can be seen as a breakthrough in the rural research literature. Finally, the exploratory analysis introducing the interaction between community and individuals in the migratory decision opens up a whole new world for multi-level analysis to push the boundaries of knowledge even further.

In sum, it is impossible to claim to have answered all relevant questions pertaining to the field of study in a single thesis but it is hoped that we have made some progress towards a greater understanding the dynamics of migration and local economic development in rural Canada. Migration choices are influenced by many different combinations of environmental circumstances and personal preferences. Some workers feel the need to migrate toward the bigger cities in order to maximize their financial potential while others choose to migrate to smaller areas in order to be closer to their roots and families, or vice-versa. The rural localities who do manage to attract migrants often do so because of a fortuitous combination of attributes but there is no magic formula for making oneself attractive to everyone. Some regions will be able to market themselves as retirement communities and attract seniors; others with natural resource endowment and economic conditions favorable for their industries will be successful at attracting young workforce and potentially working-age populations for the longer term. Other rural communities will not be so fortunate; but that is the reality of Canada's geography and worldwide economic trends. If Canada wishes to be competitive in today's world economy, the process of migration and mobility needs to be facilitated in order to efficiently allocate the human resources where they are most needed. Whether this implies aiding families to permanently relocate when employment is scarce in one area and when there is shortage of labour in another, or if this involves ensuring that workers' qualifications are officially recognized in other provinces in order to ensure a fluid transition to work, government policies should harness the power of migration as a socially and

economically positive phenomenon by assisting individuals in this important decision and not making it any harder than it needs to be. By helping to decrease the costs associated with migrating through social and economic policy, more people would end up where they want to be; for some people this would mean living in dense cities while for others this would mean a smooth transition back to their rural roots, but in the end, everyone would be made better off.

ANNEX 1 : LIST OF VARIABLES

Table 26 : Definition of the variables

Individual migration model

Dependant variables	Migration status
Rural resident 2001	Takes the value of 0 if the individual was living in a rural CSD in 2001 and has not migrated between Census years; 1 if the individual was living in a rural CSD in 2001 and has migrated over 100km to another rural CSD between 2001 and 2006; and 2 if the individual was living in a rural CSD in 2001 and has migrated over 100km to an urban CSD between 2001 and 2006.
Urban resident 2001	Takes the value of 0 if the individual was living in an urban CSD in 2001 and has not migrated between Census years; 1 if the individual was living in an urban CSD in 2001 and has migrated over 100km to another urban CSD between 2001 and 2006; and 2 if the individual was living in an urban CSD in 2001 and has migrated over 100km to a rural CSD between 2001 and 2006.
Independent variables	**Individual factors; Community characteristics and Interaction terms**
Gender	Gender is entered as a dummy variable which takes the value of 1 if the individual is male, and 0 if female.
Age	A set of six dummy variables is used to assign individuals to their respective age cohorts in 2001: individuals between *25 and 29 years of age* take the value of 1, and 0 otherwise

	(omitted category); individuals between *30 and 34 years of age* take the value of 1, and 0 otherwise; individuals between *35 and 39 years of age* take the value of 1, and 0 otherwise; individuals between *40 and 44 years of age* take the value of 1, and 0 otherwise; individuals between *45 and 49 years of age* take the value of 1, and 0 otherwise; individuals between *50 and 54 years of age* take the value of 1, and 0 otherwise.
Education level	A set of four dummy variables account for the effect of educational attainments: *Less than High School Diploma* takes the value 1 if the individual has not completed high school, and 0 otherwise (omitted category); *High School* takes the value 1 if the individual has a secondary school certificate and 0 otherwise; *College or University below bachelor* takes the value 1 if the individual has completed some College, apprenticeship/trade, CEGEP or university education below bachelor level, with or without diploma, and 0 otherwise; University degree takes the value 1 if the individual has a bachelor degree or higher university degrees, and 0 otherwise.
Aboriginal Identity	Aboriginal identity is entered as a dummy variable which takes the value of 1 if the individual is *Aboriginal*, and 0 if *Non-aboriginal*.
Migratory antecedents	*Migratory antecedents* is entered as a dummy variable which takes the value of 1 if the individual was living in a different province in 2001 as the reported province of birth or if born outside Canada (*Migrated at least once*) and a value of 0 if

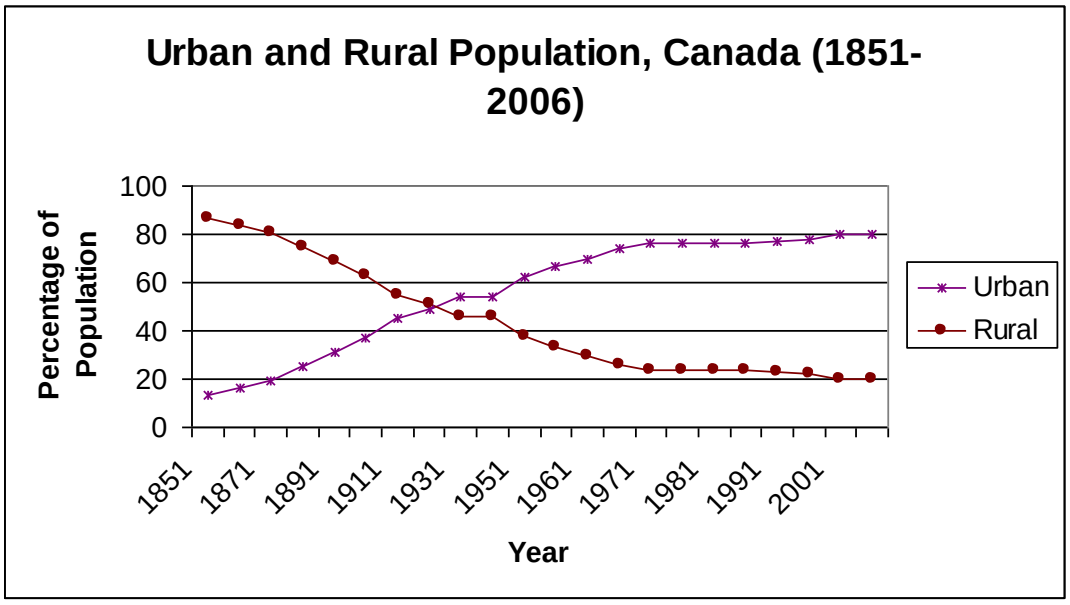
	the individual was living in the same province in 2001 as the reported province of birth (*Assumed never migrated*).
Macro-region of residence	A set of five dummy variables is used to assign each individual to macro-region of residence in 2001: *Atlantic Provinces* takes the value of 1 if the individual was living in either Newfoundland and Labrador, Prince Edward Island, Nova Scotia or New Brunswick, and a value of 0 otherwise; *Quebec* takes the value of 1 if the individual was living in Quebec and a value of 0 otherwise; *Ontario* takes the value of 1 if the individual was living in Ontario and a value of 0 otherwise (omitted category); *Prairies* takes the value of 1 if the individual was living in either Manitoba or Saskatchewan, and a value of 0 otherwise; *West* takes the value of 1 if the individual was living in either Alberta or British Columbia, and a value of 0 otherwise.
Community Factors	**Community factors are entered as continuous variables**
Total population	Natural logarithm of the total population of the CSD
Population density	Natural logarithm of the total non-institutional population of a census consolidated subdivision (CSD) divided by the total area of the CSD.
Distance to CMA/CA (km)	Distance between CSD centroid and centroid of the closest or census agglomeration (CA) or census metropolitan area (CMA).
Distance to large CMA (km)	Distance between CSD centroid and centroid of the closest census agglomeration (CA) or census metropolitan area (CMA) of more than 500,000 people.

Interaction terms	**Interaction variables computed by multiplying individual factors by the standardized community characteristics.**

Notes: Each community variable is computed using 2001 Census of population data.

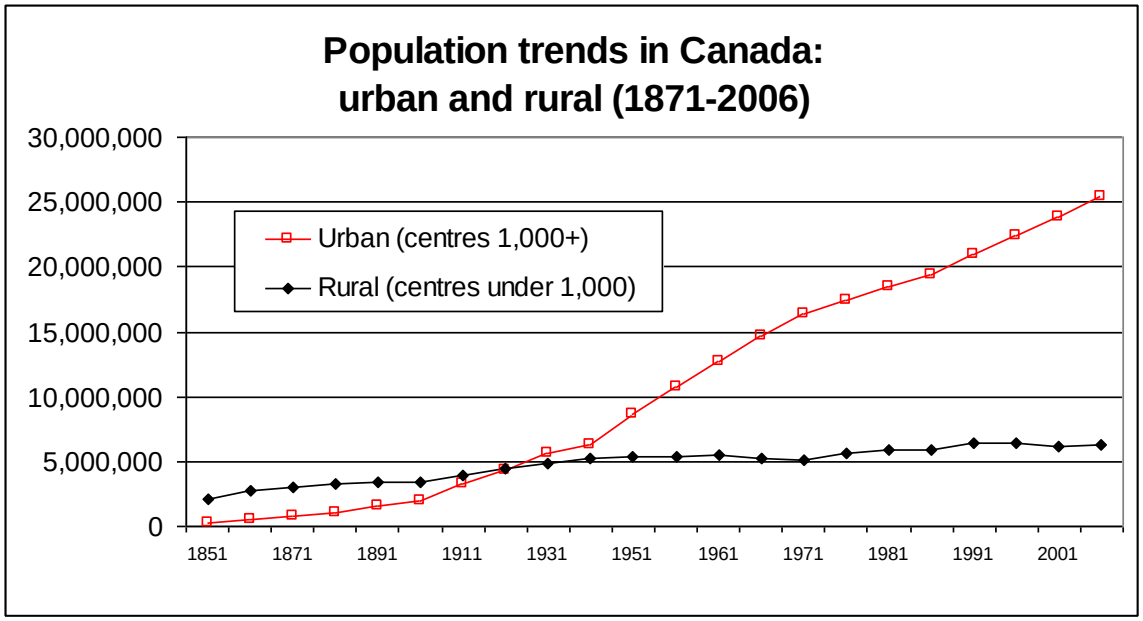
ANNEX 2 : FIGURES

Figure 1. Urban and Rural Population, Canada, 1851-2006.



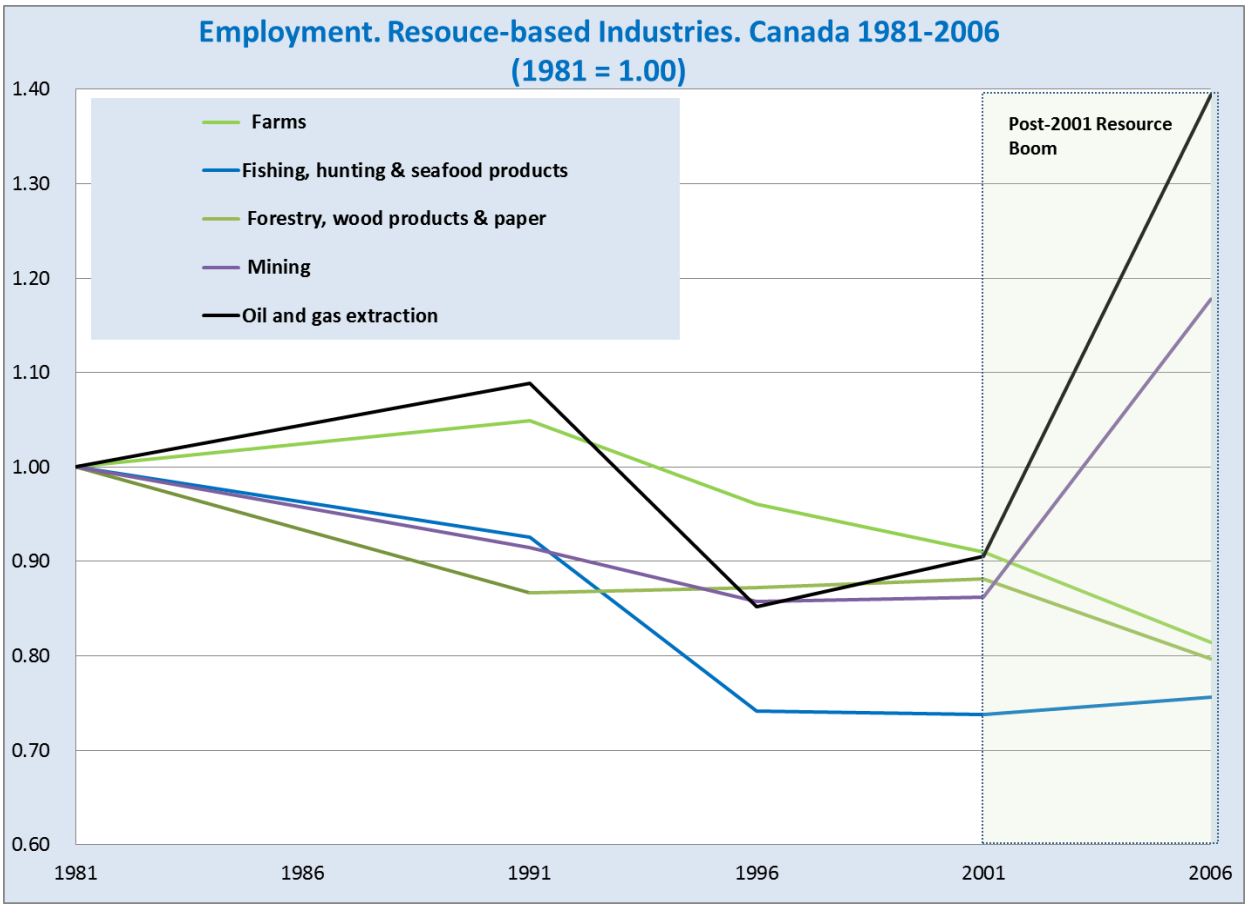
Note: The rural population for 1981 to 2006 refers to persons living outside centres with a population of 1,000 AND outside areas with 400 persons per square kilometre. Previous to 1981, the definitions differed slightly but consistently referred to populations outside centres of 1,000 population.
Source: Statistics Canada, Census of Population, 1851 to 2006.

Figure 2. Population trends in Canada: urban and rural (1871-2006).



Note: Data are tabulated in the boundaries applicable at the time of the given census.
Source: Statistics Canada. Census of Population, 1851 to 2006.

Figure 3. Employment. Resource-based Industries. Canada 1981-2006.



Source: Spatial Analysis and Regional Economics Laboratory (SAREL), Statistics Canada, 1981-2006.

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