

## **ON THE GROWTH DYNAMICS OF CITIES AND REGIONS – SEVEN LESSONS. A CANADIAN PERSPECTIVE WITH THOUGHTS ON REGIONAL AUSTRALIA**

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**ABSTRACT:** Seven trends/lessons in regional development are reviewed, taking Canada as reference point: 1) the forces of agglomeration will not lessen; 2) top cities will remain so; 3) distance continues to matter; 4) costs matter, a driver of non-metropolitan growth; 5) market access increasingly matters; 6) as do naturally amenities (sea and trees), but constrained by distance; 7) natural resources are a double-edged sword, both a driver of growth and possible impediment. For regional Australia, as for peripheral Canada, the chief discriminant factor is lesson 3 (distance). The transport costs for goods and information have fallen. But, relative distances have not changed. The cost of transporting people – prime input into knowledge-intensive production - has not fallen, and has arguably risen as the opportunity cost of time rises. The essential distinction is not between metropolitan and non-metropolitan areas, but between those that are close and those that are far.

**Key Words:** Regional Development, Canada, Australia, Regional Economics

Paper / Keynote Address: Annual Conference of the Australia and New Zealand Regional Science Association International (ANZRSIAI), University of Wollongong, 4-7 December 2012

**ACKNOWLEDGEMENTS:** The author thanks the Social Sciences and Humanities Research Council of Canada (SSHRC) for its generous financial support. The author holds the Senior Canada Research Chair in Urban and Regional Studies.

## 1. INTRODUCTION: CANADA AS A MIRROR OF AUSTRALIA<sup>1</sup>

As national economies develop, some places will grow, others will decline. Economic growth is not geographically neutral. Studying the spatial transformations of national economies is the bread and butter of regional scientists and economic geographers. Regional development trends have been abundantly documented over the last fifty years in Europe, North America, and elsewhere. A rich literature has accumulated, too abundant to cite in detail<sup>2</sup>. In this paper, seven lessons are put forward, necessarily selective and influenced by a career as a researcher and sometime practitioner in Canada, the Americas, and Europe. The focus is on ‘regional’ development; that is, on the fortunes of places that often end up on the losing side or what in Australian parlance, as I understand it, is called ‘Regional’ Australia: i.e. places outside the five large metropolitan areas.

Canada is used as the principal point of reference for two reasons. First, because it is the nation for which the best data was available. Second, and more to the point, Canada shares many similarities with Australia besides being a fellow member of the Commonwealth, an old Dominion, and a federal state. Like Australia, the Canadian economy is heavily dependent on natural resources with a national currency whose value fluctuates in tandem with international demand. Canada, like Australia, weathered the 2007-2008 recession fairly well. However it exhibits symptoms of Dutch Disease<sup>3</sup>, which will be further discussed throughout this paper.. In addition Australia and Canada are continent-sized lands, sparsely populated, with most of the population concentrated in a few large metropolitan areas strung along its southern tier (near the US border in Canada, along the coast in Australia). Both countries are characterised by vast nearly-empty interiors, too cold in Canada and too hot and dry in Australia. These areas are dotted with isolated resource-dependent communities and indigenous populations.

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<sup>1</sup> My apologies to our Kiwi friends for the focus on Australia; but a comparison between Canada and New Zealand is rather difficult to defend.

<sup>2</sup> At the risk of (founded) accusations of self-promotion, I direct the reader to Polèse (2009) for an overview of the literature.

<sup>3</sup> A term coined the 1970s following the discovery of natural gas deposits in Dutch territorial waters, driving up the value of the Dutch currency, in turn undermining the international competitiveness of Dutch manufacturing.

Per capita regional income and production disparities are of similar order, rarely deviating more than 20% from the national average. This is a sign of mobile populations and highly integrated national economies. It is not difficult to find similarities between Canadian provinces and Australian states. Newfoundland, historically Canada's have-not province<sup>4</sup>, could be compared to Tasmania (both are islands). The resource-rich, high-income, province of Alberta might be compared to Western Australia, while the two industrial heartland provinces of Ontario and Quebec could be seen as Canada's New South Wales and Victoria. With a little imagination, Toronto can be thought of as Canada's Sydney, Montreal as Canada's Melbourne, and Vancouver on the West Coast as Canada's Perth. However, comparisons should not be carried too far. That said, the first lesson will now be addressed.

## **2. LESSON # 1**

### ***The Forces Driving Agglomeration have not Lessened and are Unlikely to Lessen in the Future***

Agglomeration economies are not about to disappear. The explanation of the micro-economic foundations of agglomeration lies at the very heart of the so-called New Economic Geography (Fujita and Thisse 2002, Duranton and Puga 2004). The principal drivers are not all that different from those that drove agglomeration in the past. This paper focuses on three:

- Structural shifts towards industries *relatively* more sensitive to agglomeration economies;
- Falling transport and communications costs, facilitating the centralization of production.
- Agglomeration economies founded increasingly on the facilitation of human interaction rather than the exchange of goods.

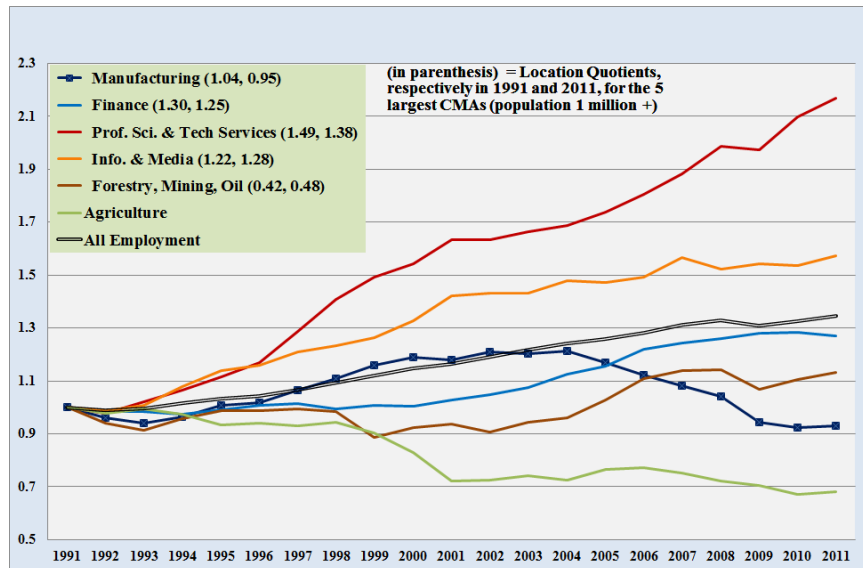
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<sup>4</sup> Since the late 1990s, Newfoundland's fortunes have dramatically reversed, following the discovery of off-shore oil and natural gas deposits.

### ***The Spatial Impact of Long-Term Structural Shifts***

To understand the role of structural shifts, it is useful to take a step back into history. For advanced economies like Australia and Canada, the great epoch of urbanization now lies behind us. No industrialized nation has escaped urbanization. The relationship between sustained increases in income and product per capita and urbanization is well-documented and constitutes one of the rare irrefutable rules of economic geography (Henderson 2003). The explanation is founded in basic economics. As incomes rise, the share of foodstuffs in household consumption falls (Engel's law) while labour productivity in agriculture rises. The inevitable outcome of the two is a decline in the demand for labour on the land (with predictable downward pressure on wages) and a corresponding shift in labour from agriculture to industry. In a nutshell, demand shifted from industries *relatively* unaffected by agglomeration economies to those more profitably produced in cities.

Very much the same thing is happening today. Figure 1 shows employment shifts in the Canadian economy over the last two decades. The impact of the post-2001 resource boom and rising Canadian dollar is clearly visible. The Canadian dollar hit its all-time low to the US dollar (US\$ 0.62) in January 2002. Since then it has shot up to and sometimes beyond parity, where it hovers at the time of writing. True to Dutch Disease, employment in manufacturing has declined since 2002. However, this is largely a cyclical occurrence whose duration it is impossible to predict. More to the point is the continued growth in professional, scientific, and technical services and, to a lesser extent, in media, recreation, and information-related services. The former class includes a wide range of consulting services (computer, engineering, design, management, etc...), advertising, out-of-house research, and varied knowledge-rich business services. The media class includes broadcasting, telecom, software publishers, Internet-related services as well as activities related to the arts and entertainment. Both of these broad knowledge-rich sectors have consistently grown above the national average. This is not unique to Canada. Data for Australia would undoubtedly reveal a similar pattern.



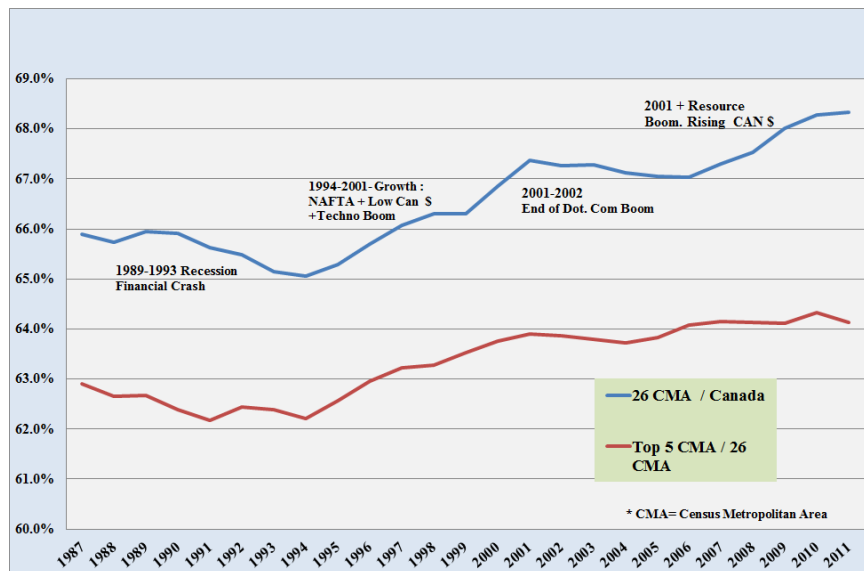
**Figure 1.** Employment in six industries. Canada 1991-2011 (1991=1.0).  
Source: Stat Can (on-line).

In addition to employment shifts, figure 1 also gives location quotients<sup>5</sup> for employment in industries (agriculture is excluded for obvious reasons) for Canada's five largest CMAs (Census Metropolitan Areas) which have populations over one million. The two highest quotients in 2011 are for the two knowledge-rich sectors identified above. Just as in the past labour moved from agriculture (relatively insensitive to agglomeration economies) to manufacturing (relatively sensitive to agglomeration economies), so labour today is shifting from industries for which agglomeration economies matter *relatively* less to those for which they matter *relatively* more. In economic geography, advantages are *relative*. Most manufacturing *is* sensitive to agglomeration economies, but management consultancies, broadcasters, and software designers are even more so. The latter class will push out the former; note the declining location quotient for manufacturing. The shift of manufacturing down the

<sup>5</sup> We assume that the reader is familiar with the location quotient measure. In a nutshell, the quotient is the ratio of the % of employment in industry x locally over the % of employment in industry x at the national level.

urban hierarchy is well documented and explained by Henderson, (1997) (for Canada, see Polèse and Shearmur 2006).

As was the case for urbanization in the past, the outcome is predictable. As long as the fastest growing sectors exhibit an above average propensity to concentrate in larger cities, economic growth will continue to spur the growth of large cities. A falling location quotient, a sign of a gradual dispersion process, does not alter the basic relationship, which applies as long as location quotients remain above unity for the fastest growing industries.



**Figure 2.** % employment in 26 CMAs 1987-2011. Source: Stat Can (on-line).

For Canada, the outcome is illustrated on figure 2. The share of Canadian employment in urban areas with populations over 100,000 has risen steadily over the past twenty-four years<sup>6</sup>. Figure 2 also shows the percentage of the 100k + urban population in Canada's five largest metropolitan areas: Toronto, Montreal, Vancouver, Ottawa, and Calgary. While the upward slope in both cases is unmistakable, the trend lines are not necessarily smooth. Both for the 26 city trend-line and the share in the largest five, the upward swing is sharpest during the growth cycle of

<sup>6</sup> The base year is 1987, the year for which Statistics Canada began to publish annual employment data (source: Stat Can On-line)

the IT (Information Technology) boom. This upward swing started in the early 1990s and ended with the bursting of the dot.com bubble in 2001, which in Canada saw the collapse of the Ottawa-based high-tech giant Nortel. This was also a period of trade liberalization (NAFTA<sup>7</sup> was signed in 1992) with the added stimulus of a low Canadian dollar. In sum, IT and trade liberalization accelerated the concentration of economic activity in cities particularly the largest ones, while concentration slackened during periods of recession.

Figure 2 also tells us that post-2001 resource-led growth (still on-going at the time of writing) caused urban concentration to accelerate again, but not necessarily in the largest urban centres. This reflects the new-found growth of mid-sized regional service centres (populations between 150,000 and 250,000) such as Saskatoon (Saskatchewan) and St. John's (Newfoundland) located in resource-rich regions far from major metropolitan areas. Figure 2 holds a parallel message, which leads in to the second factor driving agglomeration.

### ***The Spatial Impact of Falling Communications and Transport Costs***

The spatial impact of falling communications and transport costs requires little explanation, although it is not always understood. It seems that every time a new technology comes along that slashes communications costs, pundits emerge declaring the death of distance, that the earth is flat, or some other catchphrase suggesting that geography no longer matters. The truth is exactly the opposite. Falling transport and communication costs are powerful drivers of concentration. Again, it's an old story. Every new wave of innovation - the steamboat, railways, the telegraph, the telephone, the automobile, paved roadways, air travel, etc. - has ushered in a new era of urban growth. Fundamentally, there is no difference between the arrival of the telegraph in the mid-nineteenth century, the telephone a century ago, and the Internet and email today.

Falling communications costs allows activities to be centralized which before were dispersed. By the same token, it allows 'central' - more efficient - producers to service wider markets. The current move towards the centralization of stock exchanges is a case in point. The main impediments to total centralization in New York or London are the difference in time zones and institutional barriers to the totally free flow

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<sup>7</sup> North American Free Trade Agreement.

of information and capital. The same forces apply to natural resource exploitation. Where years ago ores and minerals needed to be analyzed on the spot, IT now allows one to send images back in real time to laboratories in the city. The giant dams and hydro-electric power stations in northern Quebec are largely monitored out of Montreal, thousands of kilometres to the south, in the main engineering division of the Provincial electric utility (Hydro-Quebec).

The centralizing effect of falling transport and communications costs is, again, an old story. The third factor is of more recent vintage.

### ***The Spatial Impact of the Growing Shift to Production Founded on Human Interaction***

We return to the structural shifts illustrated in figure 1. Many labels have been put forward to describe the shift to a 'new' economy these include: 'information economy', 'knowledge economy' and 'creative economy'. All of these point to the same fundamental shift: towards activities that require a high level of personal interaction. Much of the popular discourse on the death of distance is founded on the mistaken notion that IT is a substitute for face-to-face communication. It can be, but as Gasper and Glaeser (1998), Ghemawat (2001), and this author (Polèse and Shearmur 2004) have argued, IT is more often a *complement* to face-to-face meetings. As in the past for the telegraph and the telephone, electronic communication *increases* the demand for personal encounters. Business relationships initiated via IT are almost always followed up by face-to-face meetings if the relationship is to be sustained. How else is one to interpret the upsurge in business travel, conventions, trade fairs, seminars, etc. during the age of the Internet?

I do wish to belabour the point. The essential idea is this: the principal comparative of big cities is the facilitation of diverse face-to-face contacts and the bringing together of people, further buttressed by scale economies in the provision air travel, resulting in 'hub' cities that offer a greater diversity of potential contacts and are globally the most accessible. The name of the game is *people*: the transport cost of people is the essential variable, where the principal cost is the opportunity cost of time. One of the ironies of modern economic growth is that the opportunity cost of time is increasing; notably for knowledge and creative-type workers, be they managers, researchers, computer geeks or entertainers.



### **3. LESSON # 2**

#### ***The Top Cities are Unlikely to Change***

This can also be called The First Mover Advantage Theorem. The first city to emerge as the nation's chief corporate, financial, and cultural centre is likely to remain so unless dislodged by remarkable circumstances. The accumulated literature on the symmetry and the stability of urban hierarchies is impressive (Black and Henderson 1999, Davis and Weinstein 2002, Dobkins and Ioannides 2000, Eaton and Eckstein 1997, Gabaix and Ioannides 2004, Krugmann 1996, Rosen and Resnick 1980, Sharma 2003, Soo 2005). Krugmann (1996: 399) nicely sums up the gist of this literature: "The size distribution of cities in the United States is startlingly well described by a simpler power law (...). This simple regularity is puzzling; even more puzzling is the fact that it has apparently remained true for at least the past century". In France the population of Greater Paris relative to that of the next largest urban area (Lyon) - a ratio of seven to one - has remained unchanged over the past two century centuries. In Europe as whole, all top cities save one are still the same as in 1900. Urban hierarchies harden over time as settlement patterns mature.

The advantages of acquired size are the outcome of decades, sometimes centuries, of accumulated investments in infrastructures and institutions. Once in place, these accumulated investments define a good location. One need only look at a map of the rail and road systems of Britain or France: hub and spoke networks centred on London and Paris, reinforcing their initial good fortune. And here is the rub: each new smaller city connected to London or to Paris only serves to further increase the bigger city's market potential. The US, Canada, Australia, and other New World nations are somewhat different in that their settlement patterns are still in flux and populations more mobile, although the period of massive population shifts is past. Even in the US, despite the shift westward, New York is still the unchallenged corporate and financial centre of the nation. In recent times, the primary shift has been towards the so-called Sunbelt, which is further discussed in Lesson #6. In Canada, the attraction of the Pacific Coast – specifically near Vancouver – and the pull of oil-rich Alberta are the two the principal drivers of change in recent times. But,

Toronto in the East remains the undisputed financial and corporate centre of the nation<sup>8</sup>.

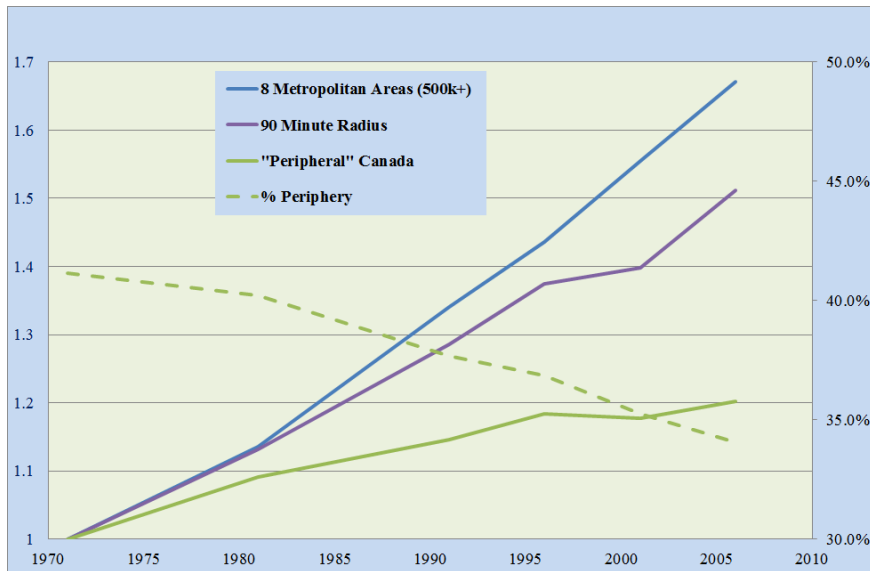
It does not follow from the above that only the largest cities will grow. On the contrary, the observed long-term stability of urban size distributions means that size is not a good predictor of growth, the crux of what Eeckhout (2004) calls Gibrat's Law for all cities. Size may be a good predictor of growth for given periods, but not for others. For Canada, econometric model applications do not point to a strong consistent relationship between size and employment growth (Shearmur et al. 2007, Shearmur and Polèse 2005, 2007). Location and industrial structure are as important, but with coefficients varying over time.

A corollary of the stability of city-size distributions is functional specialization across cities. One city will generally emerge as the nation's primary corporate and financial centre, however, this does not preclude others from specializing in knowledge-rich functions. Much depends on the geography and political structures. In Canada, due in a large part to its size and federal structure, at least three urban centres have emerged that can arguably be called world cities: Toronto, Montreal, and Vancouver with populations above two million. The similarity, as noted earlier, with Australia is evident with, however, a major difference. The English-French divide allows Montreal to play a metropolitan role – the media and corporate centre of French Canada – similar to that of a national centre. Francophone controlled multinational firms keep their head office in Montreal, not tempted to move up the urban hierarchy to Toronto. Studies for Canada suggest that the population threshold for above average specialization in knowledge-rich 'metropolitan' functions (location quotients above unity) is in the order of 500,000 (Bourne et al. 2011). In addition to the five cities mentioned earlier, the list includes Edmonton, Quebec City, and Winnipeg. Together, these eight urban centres can be said to define 'metropolitan' Canada. There is nothing to suggest that they will be superseded in the future by other larger metropolitan areas.

The above is of some importance for smaller places. These larger cities in essence come to define what 'distance' means (distance from where?). For 'non-metropolitan' places distance from (or, alternatively, proximity to) the top cities becomes, as we shall see, a primary determinant of economic structure and growth, which brings us to the next lesson.

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<sup>8</sup> The emergence of Toronto as Canada's first city, dislodging Montreal, is a truly unique event (on this, see Polèse and Denis-Jacob 2010, Polèse and Shearmur 2004a).



**Figure 3.** Population growth by city-size and location 1971- 2006. Source: the Author.

#### 4. LESSON # 3

##### *Distance Matters, Distance Matters a lot, but not in the Same Manner for all Industries*

Figure 3 illustrates population growth curves for: a) the eight largest metropolitan areas; b) areas falling within a ninety minute travel radius of the latter; c) urban areas located beyond that radius with populations above 100,000 (but below 500,000); d) smaller places also lying beyond the radius. The latter two classes make up 'Peripheral' Canada. Figure 3 also shows the evolution (dashed line) of the share of Peripheral Canada in total national population. Note that the ninety minute radiuses lie *beyond* the daily commuting sheds of the eight metropolitan areas (CMAs are delineated by commuting sheds), thus beyond what are normally considered suburban areas. The ninety minute radius approximately defines the zone of metropolitan interaction for frequent business travel (consultants, customer-supplier relationships, etc.) and long-distance

commuting for occupations that do not require a daily nine-to-five presence in the central metropolis.

The message conveyed by figure 3 is unambiguous. Proximity to size matters as much as size itself. Peripheral Canada's population share is systematically declining. Places within easy reach of metropolitan areas have grown roughly at the same pace as the eight large metropolitan areas<sup>9</sup>. Places within this radius are the primary beneficiaries of the general trend for larger metropolitan areas to shed mid-tech, space-extensive, manufacturing and related activities (Desmet, K. and M. Fafchamps (2005), Henderson 1997, Henderson et al. 2001). In Canada, as elsewhere, the result has been growth in mid-tech manufacturing employment and associated industries in small and mid-sized cities. These cities are located within, roughly, a ninety-minute radius of metropolitan areas, notably around Toronto and Montreal. Proximity is also a crucial factor for weekend tourism, secondary homes, and retirees fleeing the metropolis, which will be further discussed in lesson # 6.

Distance also acts as a protective shield for industries where face-to-face contact or physical presence remains essential. This largely explains the continued growth of 'peripheral' regional service centres with populations above 100,000. However, growth in these centres is still below that of the two 'central' classes. The main point here is that the continued weight of distance (from the largest urban centres) creates two very different non-metropolitan 'regional' worlds.

The difference between the two worlds is illustrated in figure 4, which documents the interplay between size and distance for four industry groups. For professional, scientific, and technical services the overwhelming weight of size is clearly visible. In no size class save the largest is the location quotient above unity. For leisure, telecom and media-related services both size and distance matter: the parallel protective function of distance allows 'peripheral' cities in the 100,000 to 500,000 size class to register location quotients above unity. The centre-periphery divide comes out most clearly for manufacturing. For mid-tech manufacturing, which includes a broad range of industries<sup>10</sup>, distance (or

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<sup>9</sup> The decrease in the growth of places within the 90 radius between 1996 and 2001 is a statistical artifact. CMA borders were redefined in 2001 to account for suburban expansion, gobbling up parts of such places, reducing their size. Once that is accounted for, these 'close' places resumed growth at their former rate.

<sup>10</sup> This heterogeneous class accounts for the majority of Canadian manufacturing employment, with the automotive and electronics industries important players.

rather proximity) trumps size. Here, smaller cities systematically register quotients above unity, but – this is the essential point- *only* those within close range of a large metropolis. Size does matter. Larger peripheral cities (100,000 to 500,000) approach unity; however, proximity matters more. Both matter for high-tech manufacturing<sup>11</sup>. The highest quotients are for the largest metropolitan areas and small places close to them.

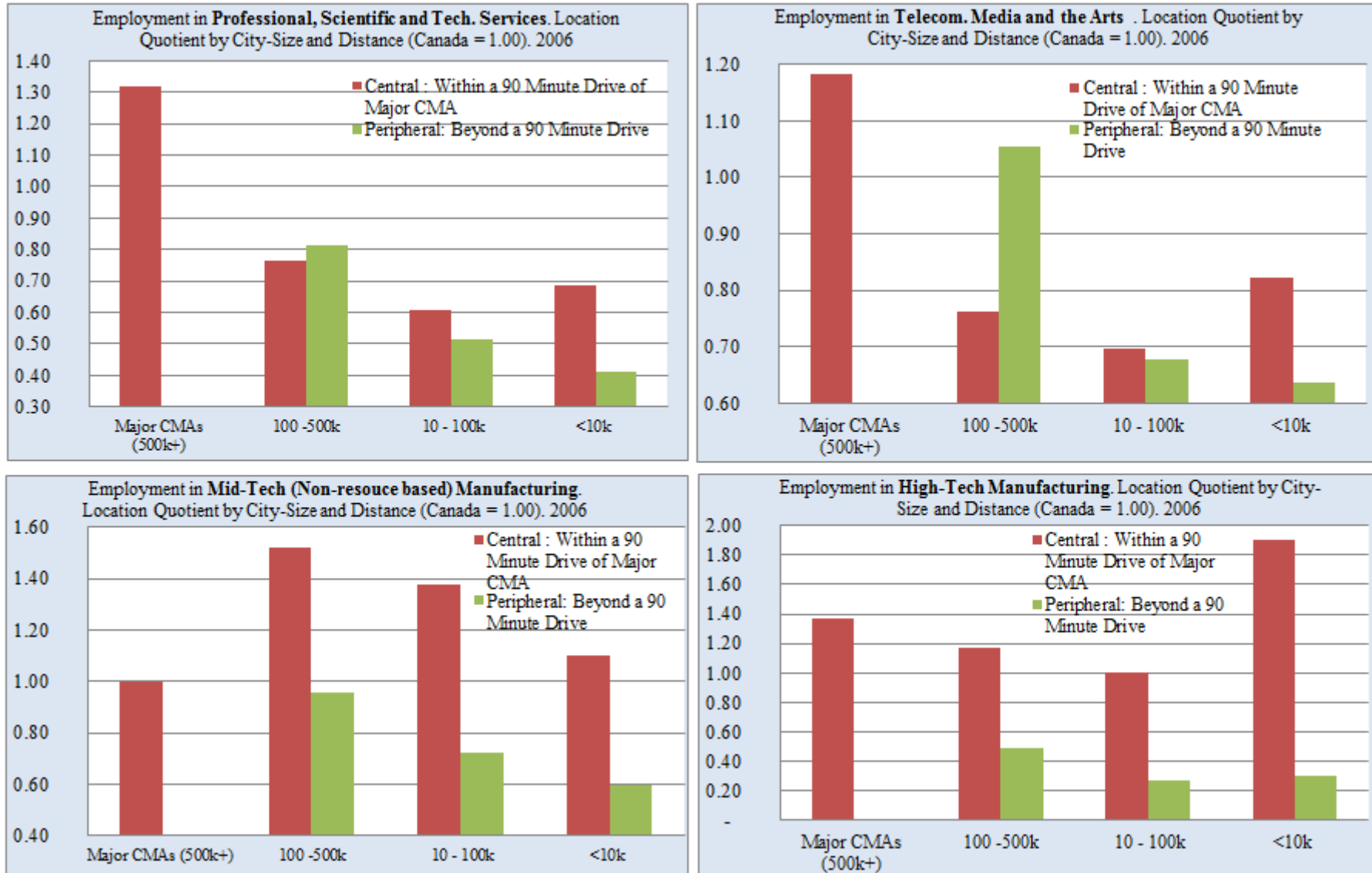
The geography produced by this interplay between distance and size is illustrated in figure 5. Employment in high-tech manufacturing is tightly clustered in and around Canada's two largest metropolitan areas. Outliers exist, but the overwhelming majority of high-tech employment is concentrated in a relatively dense region of various-sized urban areas, linking Montreal, Ottawa, and Toronto. This geography is not accidental, a mirror of the linkage between professional, scientific, and technical services in large urban centres and high-tech manufacturing in smaller cities nearby (figure 4). The constant interaction with service providers in large metropolitan areas (programmers, designers, engineers, marketing specialists, etc.) produces a ring of small and mid-sized 'high-tech' places. RIM (Research in Motion), producer of the BlackBerry, probably Canada's best-known high-tech firm, is located in Kitchener-Waterloo<sup>12</sup>, west of Toronto (figure 5).

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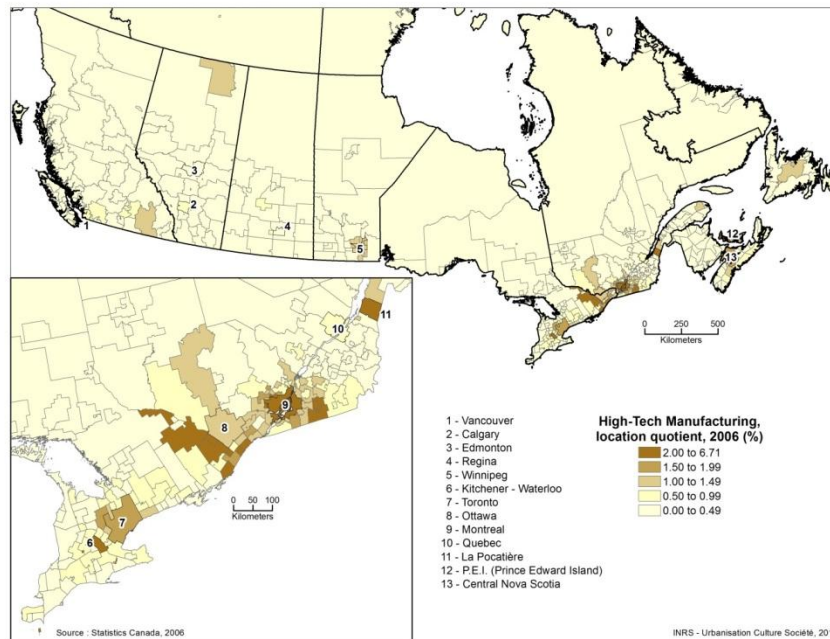
Resource-based manufacturing is excluded (pulp & paper, wood products, aluminum and ore smelting, etc...).

<sup>11</sup> This manufacturing class includes aerospace, computers & peripherals, pharmaceuticals, telecom equipment, and precision scientific & medical instruments.

<sup>12</sup> The presence of the University of Waterloo, with a strong engineering school, is an additional contributing factor.



**Figure 4.** Location Quotients by City Size and Distance - Four Industries. Source: the Author.

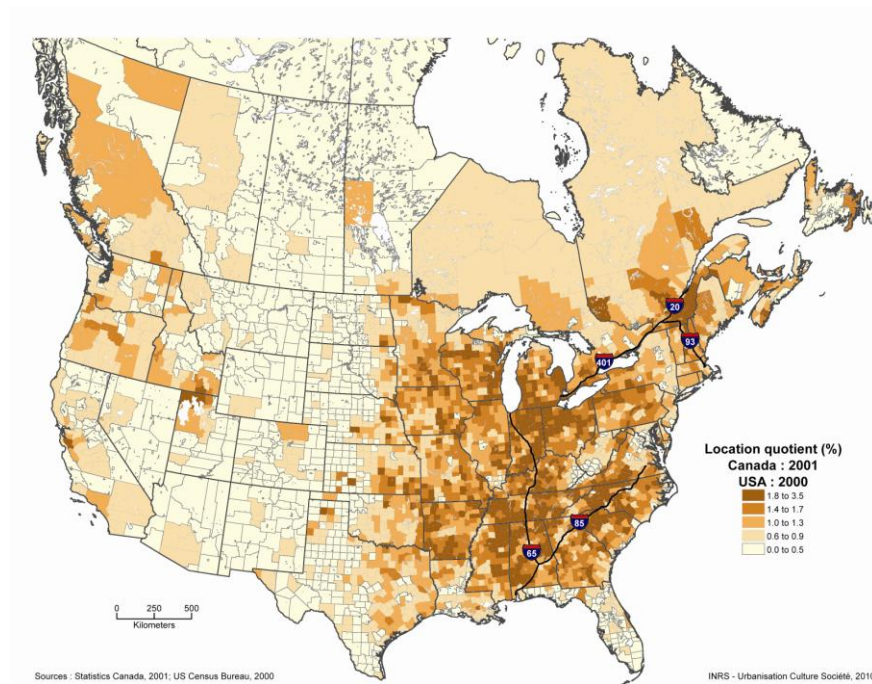


**Figure 5.** High-Tech Manufacturing Employment. Canada 2006

Striking in figure 5 is the relative absence of high-tech industries in the Canadian West. Neither Vancouver nor Calgary have emerged as major high-tech centres, notwithstanding the presence of engineering firms and other scientific services linked to resource exploitation. Various reasons can be put forward to explain the relative failure of Vancouver (a large and attractive metropolis by any measure) to develop a strong high-tech manufacturing base<sup>13</sup>. Among which is its relative isolation on the West Coast, although the proximity of Seattle (home of Microsoft and Amazon) largely precludes that explanation. A more likely explanation is relative costs. Vancouver's resource and amenity-driven economy has produced a high-cost environment where wages and especially housing costs are significantly above the Canadian average. The average house price (January 2012) in Vancouver was \$752,000, compared to \$462,000

<sup>13</sup> The location quotients (2006) for high-tech industry employment for Calgary and Vancouver were, respectively, 0.56 and 0.71, compared to 2.1, 1.3, and 1.4 for, respectively, Montreal, Ottawa, and Toronto.

in Toronto and \$311,000 in Montreal (LivCan 2012); which brings us to the next lesson.



**Figure 6.** Manufacturing Employment – North America

## 5. LESSON # 4

### *Cost Matter (Especially for Manufacturing and other Non-Resource-Based Export Industries)*

The dispersal of manufacturing and analogous industries to smaller places has, as noted above, been abundantly documented. The principal driver is costs, notably wage and land costs. The concentration of knowledge-rich services in the largest urban centres acts both as a factor driving the expulsion of manufacturing to smaller places (pushing up wages and land costs) and as a factor of retention, by ensuring that such industries do not move too far, notably those with a high knowledge content.



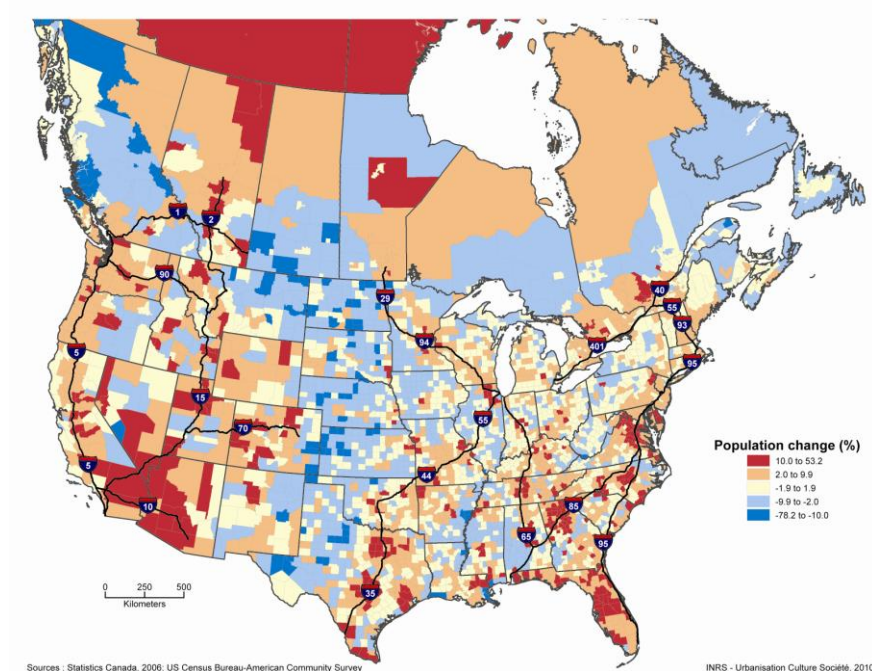
Figure 6 illustrates the distribution of manufacturing employment in North America. The historical core is the Atlantic Northeast and industrial Midwest around the Great Lakes, a legacy of the importance of water and waterways for manufacturing. Figure 6 also reveals that much manufacturing is concentrated in the American South, notably along major highways leading south (see next lesson). Why the South? The answer is not difficult to find. The Southern States have traditionally been low wage states, a legacy of their plantation-agricultural past (and the unfortunate legacy of slavery); and also of the introduction in more recent times of so-called 'Right-to-Work' laws which discourage unionization. As a result much mid-tech manufacturing, notably in the automotive, electronics, and textile industries, has moved south. The lesson here is not only that 'costs matters' and, consequently, that more outlying areas can attract mid-tech industries; but also that the shift requires, as a necessary condition, that such low cost locations exist.

Let me return to Canada, which has no equivalent poor south to which cost-sensitive industries might flee. The most visible concentration of manufacturing employment (high location quotients) is in south-eastern Quebec along the US border, an area with a string of small and mid-sized cities. What might explain this concentration? Proximity to Montreal is a first answer. These places nicely fit the definition of 'small but not too far'. Toronto is also surrounded by numerous smaller cities, but with no equivalent concentration of high location quotients. The answer to the puzzle is language. Quebec's French-speaking workers are less mobile and loath leaving their province making for a 'captive' labour force prepared to accept comparatively lower wages. The three Maritime Provinces (Nova Scotia, Prince Edward Island [PEI], and New Brunswick) have also historically been low wage areas, but without Quebec's location advantage. Small industrial concentrations are visible in the Maritimes (figure 6), another sign that a cost advantage can, given proper circumstances, compensate for distance. Econometric modelling applicants for Canada have found a positive relationship between local employment growth and lower wages, once other factors are controlled for (Dubé and Polèse 2012, Shearmur and Polèse 2007, Shearmur et al. 2007).

Returning to figure 5 (high-tech manufacturing), several outliers are visible, notably in PEI, central Nova Scotia, and Winnipeg. These, again, are comparatively low wage areas. Winnipeg has the lowest average wage among the eight major metropolitan areas. In most cases, including

southern Quebec communities (note the high quotients south of Montreal), ‘high-tech’ will refer to more standardized assembly-type functions within broader high-tech industry classes. In these industries research, conception, and design functions are carried out in the larger metropolis, another facet of the interrelationship between the two.

The concentration of manufacturing in southern Quebec points to an additional factor driving the location of industry, which brings us to the next lesson.



**Figure 7.** Population Change - North America 2001-2006

## 6. LESSON # 5

### *The Growing Importance of Market Accessibility and Trade Corridors*

Falling transport and communications costs, amplified by increasingly open borders, play out at another level: they stimulate interregional and international trade, increasing the weight of market access in industry location decisions. Accessibility is in turn shaped by the layout of transport infrastructures, favouring port locations and dense trade routes,

fuelled by the weight of scale economies in transportation, alluded to earlier. The predictable outcome is the growing draw of markets.

Figure 7 illustrates the distribution of population growth for North America between 2001 and 2006<sup>14</sup>. The positive relationship between growth and transport infrastructures is clearly visible as is the formation of linear urban conurbations. In North America, the best-known is the northeastern urban megalopolis of some sixty million people stretching from Boston to Washington D.C. The megalopolis has been expanding south along the principal interstate highways and today covers a broad band of growing cities stretching from Boston to Atlanta. An equally powerful growth corridor is emerging on the West Coast. In Canada, the 1100 kilometer Trans-Canada Highway stretch between Windsor and Quebec City is sometimes referred to as Canada's main street. The possibility of a high speed rail link is a recurrent theme. It is not difficult to draw an analogy with Australia's Brisbane - Melbourne corridor.

In Canada, the pull of trade and foreign markets introduces an additional element into the definition of peripherality. The U.S. constitutes by far the Canada's principal foreign market, traditionally accounting for 75% or more of export receipts. Peripherality, in this light, is equivalent to distance from U.S. markets. Corridors follow transport routes linking 'distant' Canadian locations to the nearest U.S. border. Such a corridor is visible in figure 7 in Alberta with Edmonton and Calgary linked into the U.S. highway system to the south. Studies for Canada point to a positive relationship (but with the strength varying between periods) between local employment growth and proximity to the US border as well as local employment growth and continental market accessibility (Apparicio et al. 2007, Shearmur et al. 2007a).

Figure 7 conveys two additional messages whose resemblance with 'Regional' Australia will not escape the reader: 1) the demographic decline – hollowing-out – of the dry continental middle; 2) the demographic vitality of the most northerly reaches, largely fuelled by the higher fertility rates of Aboriginal populations. In both continents, the availability of water is increasingly a constraint to settlement and to the development of industry. However, figure 7 conveys another message, which leads to our next lesson.

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<sup>14</sup> The most recent period for which we have compatible data across spatial units. Note that a map for 1991-2001 reveals almost exactly the same pattern (Polèse 2009).

## 7. LESSON # 6

### *The Growing Attraction of Sun, Sea, and Greenery; Whose Spatial Impact Will Differ Across Nations*

An abundant literature has accumulated for both the US and Europe documenting the movement in recent years in populations from colder climes and less pleasant environments to warmer climes and more pleasant natural surroundings (Cheshire and Magrini 2006, Rappaport 2007, Rappaport and Sachs 2003, Rodriguez-Pose and Ketterer 2012). For the U.S. the shift is easily discernible in figure 7: note the rapid population growth in Florida, Arizona, and Southern California. In Australia, ‘sea change’ and ‘tree change’ nicely sum up the evolving population shift (Argent 2011). The movement is primarily fuelled by the greying of populations in Western nations, producing growing cohorts of mobile retirees, and to a lesser extent by the new-found taste for greenery among young mobile professionals. There is little to add this growing literature.

However, the impact of ‘sea and tree’ search on the geography of regional growth will very much depend on the relative scarcity/abundance and the spatial distribution of ‘sea and trees’. In this respect, Australia and Canada are again very much alike; but for opposite reasons. Consider first relative scarcity/abundance. In Australia, the supply of ‘nice’ warm and sunny places is almost infinite, while terribly finite in Canada to the point of non-existence. Canada has nothing even mildly approximating Australia’s vast stretches of white, sunlit, beaches. Restated in the language of regional economics, sun, sea, and greenery are *relatively* less valuable traits in Australia than in Canada, because they are not rare. But, the key consideration is the spatial distribution of ‘sea and trees’. In this respect, a comparison between the US and Canada is instructive.

In the US, the search for the sun, sea, and trees has produced a veritable reversal in regional fortunes. The traditionally poor South, alluded to earlier, today finds itself a favoured destination for young retirees and others in search of warmer weather. It is useful to recall that the invention of air conditioning and the eradication of communicable tropical diseases were necessary preconditions (especially in Florida and other locations bordering the Gulf of Mexico). The welcoming regions grew because they enjoyed a clear climate advantage over sending regions to the North. The essential point, however, is this: the North was (and still is, but less and less so) the economic heartland of the nation. Migration to sea and

trees has, in short, produced a turnaround in regional fortunes. The old periphery is now witnessing net in-migration, especially in coastal communities, while much of the old heartland is saddled with chronic net-outmigration, especially in the industrial regions of the Midwest and Northeast (figure 7).

Nothing similar has occurred in Canada despite the pull of sea and trees. Growth continues to be concentrated in established destinations: the Toronto-Quebec City corridor, the Edmonton-Calgary corridor and Southern British Columbia<sup>15</sup>. In Canada, unlike the US, the search for sea and trees has not weakened the traditional areas of growth; nor does it herald significant regional turnarounds. In Canada, the largest urban areas are located in or near what are also, *comparatively*, the most pleasant (or, more appropriately, the least unpleasant) locations. Toronto and Montreal may well be cold and snowy in January (and Vancouver chilly and wet), but few places are less so. Canada has no California or Florida to attract young retirees. As a result, young retirees and like-minded mobile professionals (if they do not leave for Florida) tend to choose ‘attractive’ places within easy reach of their initial place of residence; which in most cases will be a major metropolitan area. We are back to the distinction between ‘central’ and ‘peripheral’ places and the importance of proximity (recall Lesson #3).

The principal beneficiaries of the search for sea and trees become those that are *both* close to a major metropolis and comparatively blessed by natural amenities, which in Canada generally means lakes, rivers or mountains (or coastlines in the case of Vancouver). Toronto and Montreal are both surrounded by strings of rapidly growing communities<sup>16</sup>, the playgrounds, weekend tourist destinations, and retirement sheds for their greying populations. Such communities are also often home to artist colonies catering to local demand and ‘artistic’ occupations (writers, actors, musicians...) that do not require a seven-day nine-to-five presence in the metropolis (Olfert and Partridge 2012, Polèse 2012); note the fairly high location quotient in figure 4 for media-related employment for small

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<sup>15</sup> Although barely visible on figure 7, most of the growth in the Maritime Province is concentrated along a corridor stretching along the Trans-Canada Highway between Halifax and Quebec border.

<sup>16</sup> Note the growing areas on figure 7 north of Toronto and Montreal, the so-called ‘cottage country’ for the former and the Laurentians (a mountainous area) for the latter.

‘central’ communities. Exceptions exist to the above rule, notably along the British Columbia coast and interior, which offers spectacular scenery and a relatively mild climate (for Canada) in locations at some distance from a major metropolis. But, growing ‘peripheral’ sea and tree-based communities are the exception in Canada.

The geography of Australia suggests a similar outcome. In Australia also, the population is already concentrated in the most temperate and pleasant areas, the first places to be settled and developed. Here also, the primary beneficiaries of the search for sea and trees should, we would expect, be places close to a major urban area. However, in Australia it is because the *abundance* of alternatives gives closer places an advantage over others equally blessed by sun and surf. In both Canada and Australia, it is suggested that, *location* (not sea and trees) is the principal discriminant variable guiding the migration of young retirees and analogous populations. In Australia also we should expect the search for sea and trees to generally reinforce existing growth trajectories in and around large metropolitan centres.

## 8. LESSON # 7

### ***Resource-Led Growth is a Double-Edged Sword, Acting Sometimes at Cross-Purposes with other Sources of Growth***

The last lesson focuses on what I have called ‘peripheral’ places. The essential distinction, as noted in the previous two lessons, is not between metropolitan and non-metropolitan places; but between those that are close and those that are far. Communities, even the smallest ones, within easy travel range of a large metropolis (the population threshold has been set at half a million) do not face the same challenges as communities that are located at some distance (the travel threshold has been set at ninety minutes, but this can vary by industry, and can probably be extended for sea and tree search).

**Table 1.** Peripheral Canada. Twelve Highest Employment Location Quotients by Industry 1981 and 2006. Twelve with greatest % increase.

	LQ 1981		LQ 2006		Δ 81-06	LQ 2006
Seafood product preparation & packaging	2.59	Fishing hunting and trapping	2.91	Aerospace product & parts manufacturing	108.9%	0.34
Metal ore mining	2.56	Metal ore mining	2.69	Tobacco manufacturing	106.8%	0.52
Fishing hunting and trapping	2.46	Seafood product preparation & packaging	2.68	Rubber product manufacturing	93.8%	1.48
Coal mining	2.36	Forestry & logging	2.42	Motion picture, sound recording studios	92.0%	0.44
Forestry & logging	2.26	Coal mining	2.24	Other manufacturing	85.7%	0.71
Other transportation equipment manufacturing	1.88	Non-metallic mineral mining & quarrying	2.12	Cleaning compound and toileteris	82.1%	0.32
RV parks & recreational camps	1.77	Water transportation	1.93	Other professional, scientific & tech. services	73.7%	1.00
Farms	1.72	Other transportation equipment manufacturing	1.85	Synthetic rubber and fibres	61.6%	1.37
Wood product manufacturing	1.67	Ship and boat building	1.80	Oil and gas extraction	58.6%	1.22
Non-metallic mineral mining & quarrying	1.62	Farms	1.78	Other chemical product manufacturing	51.3%	0.65
Water transportation	1.49	Wood product manufacturing	1.73	Paint % adhesive manufacturing	50.6%	0.50
Ship and boat building	1.49	RV parks & recreational camps	1.72	Software, computer services & data processing	47.7%	0.44

Source The Author

In table 1, Peripheral Canada<sup>17</sup> is treated as a single observation, identifying the twelve industries with the highest location quotients for 1981 and 2006. The right-hand columns also identify the twelve industries for which location quotients exhibited the greatest increase (in % terms) over the same twenty-five year time period. The results are both clear-cut and sobering. Exactly the same twelve industries appear on the 1981 and the 2006 list. The relative industrial specialization of Peripheral Canada (compared to the rest of Canada) has barely changed over twenty-five years. The relative rankings of industries may have changed slightly, but all remain in the first twelve. Thus, ‘seafood product preparation & packaging’, in first place in 1981 with a quotient of 2.59, fell to third place in 2006. Although its quotient rose (to 2.68) it was bypassed by ‘metal ore mining’ and ‘fishing, hunting & trapping’.

To test for the stability of relative employment specialization over time (for 126 possible industry classes), a Pearson correlation was carried out between the two years for all Peripheral Canada location quotients (126 X 126), rendering a correlation coefficient of 0.915, mirroring a remarkable degree of stability. The mix of industries in which Peripheral Canada is *relatively* more specialized (than ‘Central’ Canada) is basically the same in 2006 as twenty-five years earlier. Industries rarely move between the two worlds. Looking back at figure 1, the source of Peripheral Canada’s slow growth becomes clearer. All industries on table 1, save one (RV parks and recreational camps), are in classes that have either declined or grown below the national average. However, the essential point is the overwhelming presence of industries associated with natural resource exploitation, transformation, and transportation. In short, Peripheral Canada’s reliance on natural resources as a source of growth has not changed over the last twenty-five years (at least prior to 2006) and, if the results in table 1 are anything to go by, this is unlikely to change in the foreseeable future.

Natural resources are a potential source of growth. Many if not most communities in Peripheral Canada owe their very existence to natural resources. Yet, the portrait conveyed by table 1 begs the question of why most peripheral communities have seemingly failed to diversify into other sectors. A possible answer follows logically from the previous six lessons: the *relative* disadvantages of (small) size and distance have not changed. But, that is only half an answer. In lesson # 4 – costs matter –

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<sup>17</sup> Peripheral Canada accounted for 280 spatial units in 1981 and 296 in 2006. The difference is primarily due to border changes for certain rural Census Divisions (populations below 10 000).



we saw that high costs are major drivers pushing industries, specifically manufacturing, out of metropolitan areas to lower cost locations. Rich natural resource endowments, notably in extractive sectors such as mining, oil and gas, produce economic ‘rents’, translating into higher profits, royalties, and wages, which of course is all to the good of investors, governments, and workers who are the beneficiaries. However, high resource ‘rents’ become obstacles to diversification where they produce high-wage, high-cost, local economies; in essence producing local versions of Dutch Disease, where wages play the same role as exchange rates in national economies.

In other writings, we have dubbed this ‘The Intrusive Rentier Syndrome’, which in its extreme form creates local economies characterized simultaneously by above average wages and net out-migration, a priori incongruous combination (Dubé and Polèse 2012, Polèse and Shearmur 2006a). Thus, the small city of Baie-Comeau on Quebec’s North Shore, whose economy depends almost entirely on a large paper mill and a large aluminum smelter, has seen its population decline over the last twenty years although average wages are above those in Montreal. In short, ‘artificially’ high wages create a stunted labour market, producing a limited number of very well-paid jobs, but in turn crowding out other potential non-resource based industries, unable to pay the same wages. Freedman (2009) also finds evidence of a crowding-out of manufacturing associated with resource specialization for American states. More troubling, we find evidence of a negative relationship between education (% of population with a B.A. degree or higher) and resource specialization (specifically in extractive industries), the outcome, we suggest, of environments where the availability of high-paying blue-collar jobs creates a disincentive to go on to higher learning (Dubé and Polèse 2012).

In sum, resource specialization, although a source of growth during periods of high demand, can produce local environments that hamper diversification and longer-term growth. However, certain industries are shifting to peripheral locations. Of the twelve identified in table 1 (last three columns), eight are in manufacturing, in principal attracted by lower costs. The industry that registered the highest relative percentage shift towards Peripheral Canada (although with a quotient still well below unity) is aerospace product manufacturing. Inspection of the original

database reveals that this is largely due to PEI<sup>18</sup> (recall figure 5) a low cost province. In all the other cases, the principal beneficiaries are located in the Maritime Provinces and sometimes Quebec or the Prairies. All are communities with (resource) bases in fishing, farming, or forestry, not typically high cost sectors. The type of resource base is thus of some importance, where some are more conducive to diversification than others. A move from fish-processing plants to electronics or textiles is easier to achieve than from mining.

Of the other industries that witnessed a major relative shift to Peripheral Canada, only one can be associated with sea and tree search (motion picture & sound recording studies) for which inspection of the original data confirmed that the prime beneficiary was British Columbia's so-called Sunshine Coast. For the remaining sectors, the rising location quotients for two knowledge rich service classes (specifically, computer, scientific, and technical services) can be interpreted as the outcome of two parallel processes: a) spatial diffusion as new technologies spread to non-metropolitan areas; b) the role of certain places, as noted earlier, as support centres for growing resource industries, notably oil and gas exploration. However, whether such scientific and technical support functions can continue to grow independently of growing natural resource demand remains an open question. The Canadian experience suggests that once the boom ends - with the possible exception of the largest urban centres - the engineers, geologists, and programmers will leave for more promising horizons.

## 9. CONCLUSION

In this paper, we reviewed seven trends in regional development, using Canada and North America as reference points, in the hope of drawing useful lessons for 'Regional' Australia. The seven lessons are summarized as follows: 1) the forces of agglomeration will not lessen; 2) top cities will remain so; 3) distance continues to matter; 4) costs matter, a driver of non-metropolitan growth; 5) market access increasingly matters; 6) as do naturally amenities (sea and trees), but constrained by distance; 7) natural resources are a double-edged sword, both a driver of growth and possible impediment. For 'Regional' Australia, no less than

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<sup>18</sup> Specifically, this is largely due to the small town of Summerside, PEI (with a location quotient of 12.3 in 2006), site of a decommissioned air force base, which with the help of federal government succeeded in attracting a number airplane assembly firms.

for ‘Peripheral Canada’, the chief discriminant factor, we suggest, remains lesson 3 (distance). The principal distinction, we have argued, is not between metropolitan and non-metropolitan areas, but between those that are close and those that are far from the largest metropolitan areas. These areas are defined as the eight largest in Canada, analogous to the five largest in Australia.

Peripheral regions will continue to face very much the same challenges as in the past. True, the transport costs for goods and especially for information have fallen dramatically. But, *relative* distances have not fundamentally changed. More importantly, the cost of transporting people – the prime input into knowledge-intensive production - has not fallen, and has arguably risen as the opportunity cost of time rises.

Many peripheral places can and will grow. Peripheral places that succeed will in general do so on the basis of one (or a combination) of the following three: a) a labour cost advantage that allows them to capture industries fleeing the high costs of large metropolitan areas; b) a natural amenity advantage that allow them to attract young retirees and others in search of the sea, sun, and trees; c) a natural resource advantage. In Canada, (a) is an important source of peripheral growth; but unlikely to be similarly important in Australia. Advantage (b) is of minor importance in Canada because of the scarcity of peripheral sunny places. We suggest a similar outcome for Australia, but because of the over-abundance of sunny places where most sunny peripheral places hold no relative advantage over closer ones. In Australia, advantage (c) is most likely to remain the principal source of growth for peripheral areas; much of it concentrated in mid-sized service support centres. However, a major lesson of the Canadian experience is the contradictory nature of resource-led growth, which for both our nations will remain a major challenge.

## REFERENCES

- Apparicio, P., Dussault, G., Polèse, M. and Shearmur, R. (2007). Transport Infrastructures and Local Economic Development. A Study of the Relationship between Continental Accessibility and Employment Growth in Canadian Communities, 1971-2001. INRS, 2007, <http://projetic.ucs.inrs.ca/>
- Argent, N. (2011). Inter-Regional Migration Trends and Processes in Rural Australia: Regional Development Implications and Responses. *Regions*, 283, pp. 17-19.
- Black, D. and Henderson, V. (1999). Spatial Evolution of Population and Industry in the United States. *American Economic Review*, 89(2), pp. 321-327.
- Bourne, L.S., Brunelle, C., Polèse, M. and Simmons, J. (2011). Growth and Change in the Canadian Urban System. In L.S. Bourne, T. Hutton, R. Shearmur and J. Simmons (Eds) *Canadian Urban Regions. Trajectories of Growth and Change*, Oxford University Press.
- Cheshire, P. C. and Magrini, S. (2006.) Population Growth in European Cities: Weather Matters – But only Nationally. *Regional Studies*, 40(1), pp. 23-37.
- Davis, R.D. and Weinstein, D. E. (2002). Bones, Bombs, and Break Points: The Geography of Economic Activity. *American Economic Review*, 92(5), pp. 1269-1289.
- Desmet, K. and Fafchamps, M. (2005). Changes in the spatial concentration of employment across US counties: a sectoral analysis: 1972-2000. *Journal of Economic Geography*, 5, pp. 261-284.
- Dobkins, L. H., and Ioannides, Y. M. (2000). Dynamic evolution of the U.S. city size distribution. In J. Huriot and J. Thisse (Eds) *The Economics of Cities, Theoretical Perspectives*, Cambridge University Press, pp. 217—260.
- Dubé, J. and Polèse, M. (2012) Resource Curse and Regional Development: Does Dutch Disease Apply to Local Economies? A Combined Panel/SUR Model for 135 Canadian Urban Areas. Paper Presented at the Annual Meetings of the North American Regional Science Council, Ottawa, Canada, November 7-10, 2012.
- Duranton, G. and Puga, D. (2004). Micro-foundations of urban agglomeration economies. In J. V. Henderson and J. F. Thisse

- (Eds) *Handbook of Regional and Urban Economics*, Elsevier, edition 1, volume.
- Eaton, J., and Eckstein, Z. (1997). Cities and growth: theory and evidence from France and Japan. *Regional Science and Urban Economics* 27, pp. 701-731.
- Eeckhout, J (2004). Gibrat's Law for (All) Cities. *American Economic Review*, 94(5), pp. 1429-1451.
- Fujita and Thisse (2002). *Economics of Agglomeration*. Cambridge University Press. Cambridge (England).
- Gabaix, X. and Ioannides, Y. M. (2004). The Evolution of City Size Distributions. In J. V. Henderson and J.-F. Thisse (Eds) *Handbook of Regional and Urban Economics: Cities and Geography*, Elsevier / North Holland 2004: 2341-2375 (Chapter 53).
- Gaspar, J. and Glaeser, E. (1998). Information technology and the future of cities. *Journal of Urban Economics*, 43, pp. 136-56.
- Ghemawat, P. (2001). Distance still matters: The hard reality of global expansion. *Harvard Business Review*, September, pp. 131-47.
- Henderson, V. (1997). Medium sized cities. *Regional Science and Urban Economics*, 27, pp. 583-612.
- Henderson, V (2003). The Urbanization Process and Economic Growth: The So-What Question. *Journal of Economic Growth*, 8, pp. 47-71.
- Henderson, V., Z. Shalizi, and A.J. Venables (2001). Geography and development. *Journal of Economic Geography*, 1, pp. 81-205.
- Krugman, P. (1996). Confronting the Mystery of Urban Hierarchy. *Journal of the Japanese and International Economies*, 10, pp. 399–418.
- LivCan (2012). Living in Canada “Canadian House Prices”, Online version accessed October 2012, <http://www.livingin-canada.com/house-prices-canada.html>
- Olfert, M.R. and Partridge, M. (2011). Creating the Cultural Community: Ethnic Diversity vs. Agglomeration. *Spatial Economic Analysis*, 6(1), pp. 25-55.
- Polèse, M. (2012). The Arts and Local Economic Development: Can a strong art presence uplift local economies? A Study of 135 Canadian Cities. *Urban Studies*, 49(8), pp. 1811-1835.
- Polèse, M. (2009). *The Wealth and Poverty of regions. Why cities matter*. The University of Chicago Press: Chicago.

- Polèse, M. and Shearmur, R. (2004). Is Distance Really Dead? Comparing Industrial Location Patterns over Time in Canada. *International Regional Science Review*, 27(4), pp. 1-27.
- Polèse, M. and Shearmur, R. (2004a). Culture, Language and the Location of High-Order Service Functions: the Case of Montreal and Toronto. *Economic Geography*, 80(4), pp. 329-350.
- Polèse, M. and Shearmur, R. (2006). Growth and Location of Economic Activity: The Spatial Dynamics of Industries in Canada 1971-2001. *Growth and Change*, 37(3), pp. 362-395.
- Polèse, M. and Shearmur, R. (2006a). Why Some Regions will Decline: A Canadian Case Study with Thoughts on Local Economic Development. *Papers in Regional Science*, 85(1), pp. 23-46.
- Polèse, M. and Denis-Jacob, J. (2010). Changes at the Top: A Cross-country Examination over the 20th Century of the Rise (and Fall) in Rank of the Top Cities in National Urban Hierarchies. *Urban Studies*, 47(9), pp. 1843-1860.
- Rappaport, J. (2007). Moving to nice weather. *Regional Science and Urban Economics*, 37(3), pp. 375-398.
- Rappaport, J. and Sachs, S. (2003). The United States as a Coastal Nation. *Journal of Economic Growth*, 8, pp. 5-46.
- Rodriguez-Pose, A. and T. D. Ketterer (2012). Do local amenities affect the appeal of regions in Europe for migrants? *Journal of Regional Science*, 52(4), pp. 535-561.
- Rosen, K.T. and Resnick, M. (1980). The Size Distribution of Cities: An Examination of the Pareto Law and Primacy. *Journal of Urban Economics*, 8, pp. 165-86.
- Sharma, S. (2003). Persistence and Stability in City Growth. *Journal of Urban Economics*, 53, pp. 300-320.
- Shearmur, R. and Polèse, M. (2005). Diversity and employment growth in Canada, 1971-2001: Can diversification policies succeed? *The Canadian Geographer*, 49(3), pp. 272-290.
- Shearmur, R. and Polèse, M. (2007). Do Local Factors Explain Local Employment Growth? Evidence from Canada 1971-2001. *Regional Studies*, 41(4), pp. 453-471.
- Shearmur, R., Apparicio, Ph., Lizion, P. and Polèse, M. (2007). Space, Time and Local Employment Growth : An Application of Spatial Regression Analysis. *Growth and Change*, 8(4), pp. 691-717.

- Shearmur, R., Polèse, M. and Apparicio, P. (2007a). The Evolving Impact of Continental Accessibility on Local Employment Growth, 1971-2001. *Inédits/ Working Papers*, No. 4, INRS-UCS, 2007, [http://www.ucs.inrs.ca/pdf/inedit2007\\_04.pdf](http://www.ucs.inrs.ca/pdf/inedit2007_04.pdf)
- Soo, K. T. (2005). Zipf's Law for cities: a cross-country investigation. *Regional Science and Urban Economics*, 35, pp. 239-263.
- Stat Can (on-line) *Labour Force Survey (LFS)*. Statistics Canada, Ottawa, released monthly:  
<http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3701&lang=en&db=imdb&adm=8&dis=2>