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The Canadian Urban System, 1971-2001

Responses to a Changing World

Jim Simmons and Larry S. Bourne

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Abstract

Canada is now overwhelmingly an urban nation. More than 80% of Canadians now live in urban areas and over 60% in the larger metropolitan regions. As those cities change, so too does the nation. In recent decades, Canadian cities and the entire urban system have undergone a substantial transformation, not least because the context – national and international – in which Canadian cities have developed has changed. As the factors driving change have evolved, so must our ideas evolve about how the urban system is organized.

Drawing on an extensive body of research on urban Canada over the last thirty years, much of it undertaken through the Centre for Urban and Community Studies, this paper provides an overview of change in the Canadian urban system for the period from 1971 to 2001. It begins with a critical review of the early ideas that guided that research and offers a revised and more comprehensive conceptual framework. Particular attention is paid to the importance of changes in the national environment – in the economy, the demography, and the public sector – and to shifts in the global environment that have in combination reshaped the urban system.

The empirical analysis then demonstrates how that system has responded. Each change in the external environment produces a different pattern of linkages within the urban system and with cities outside the country, and thus a new geography of urban growth and change. The paper concludes with a review of current forecasts of anticipated urban growth to 2026 and speculates on the future evolution of the urban system within a rapidly changing continental and global environment. That system will certainly continue to evolve, but often in unpredictable ways. Growth is likely to become more uneven, with further concentration in a few large metropolitan regions and with much of the rest of the country in relative decline. The direction of evolution of the urban system is likely to become more dependent on forces emanating from outside the country.

Acknowledgements

We wish to thank our research assistant, Linda Lum, for her diligent work on the database; Shizue Kamikihara for preparing the maps and charts; and Philippa Campsie for her editorial expertise in putting the paper into publishable form. We should also acknowledge the generations of students over the years who have waited more or less patiently while we tried to sort out these patterns during classes and seminars. Finally, we wish to acknowledge the generous support of the Social Sciences and Humanities Research Council for research on the Canadian urban system at the University of Toronto.

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Preface

The principal impetus for this paper was a series of requests to prepare overviews of the Canadian urban system (CUS) for international conferences and publications on comparative urbanization (Bourne, 2000a; Bourne and Simmons, 2002, 2003). Writing these papers forced us to rethink our ideas about the way the CUS is organized, how it operates, and how it is evolving. This, in turn, suggested the need for a more comprehensive evaluation of the directions of change in the CUS, and in Canada generally, that we have been tracking over the last 30 years.

Our original ideas about the CUS originated in a flurry of Canadian urban research that took place during the late 1960s and early 1970s. Continued high levels of immigration into Canada, coupled with high rates of natural increase (the baby boom), had produced forecasts of explosive urban growth, which would absorb huge amounts of land, resources, and capital. Suddenly, urban growth was seen as a problem! Several government agencies emerged to fund urban research, including Canada Mortgage and Housing Corporation (CMHC), the Canadian Council on Urban and Regional Research (CCURR), and the federal Ministry of State for Urban Affairs (MSUA). Universities across the country responded to the research funding by hiring professors and setting up programs and institutes to study urban issues (including the Centre for Urban and Community Studies at the University of Toronto).

Research on cities surged, including Stone's (1967) book on urbanization in Canada, an urban textbook by Simmons and Simmons (1969), a series of empirical studies on alternative urban futures for the Central Canada corridor sponsored by Bell Canada (Bourne et al., 1972, 1973, 1974), and a major overview of the characteristics and growth of Canadian cities by Statistics Canada based on the 1971 Census of Canada (Ray et al., 1976). These materials shaped our image of the CUS and how it grew for the next three decades. The image was one of rapid and widespread urban growth, directed by the expansion of production in staple economies and manufacturing as well as rapid natural increase and immigration, and shaped by tariffs and policies developed by domestic institutions.

By 1976 the baby boom was over, and the issues of rapid population growth had given way to concerns about economic growth, especially the need to create jobs for millions of baby-boomers. Many of the urban agencies closed down or reduced their activities. Nonetheless, we continued to update our empirical studies of the CUS (Bourne and Simmons, 1979, 1984, 1989; Bourne and Olvet, 1995), and in a number of studies of particular themes (Simmons, 1974,

1976, 1979b, 1980, 1984, 1986a). These studies were largely based on the same conceptual framework. By 2003, however, the original concepts were getting a bit frayed, and it seemed like an appropriate time to re-examine the CUS, to evaluate the accumulated changes in the urban system and the underlying growth processes we have observed over a 30-year period, and to rethink the concepts, even the terminology, and their applicability in the context of significant changes in the environment of urbanization—at national, continental, and international scales.

This document has been released in this series to make it widely available as a reference for students, researchers, and communities. The subsequent generation can take up the challenge of any further updating of the ideas or information after the next census in 2006.

Jim Simmons and Larry Bourne

Victoria and Toronto, 2003

1. Introduction

The importance of the Canadian Urban System (CUS) within Canada is now well established and widely recognized. In 2001, almost 80% of Canada's population lived in cities[1] with more than 10,000 population; 37% live in the four largest centres of Toronto, Montreal, Vancouver, and Ottawa-Gatineau. Canada is an urban nation in every sense: economic cycles, demographic trends, even political debates, take place largely within urban environments. The well-being of Canadians depends on the characteristics of the urban centre in which they live. The size and growth rate of their particular city, in turn, shape their opportunities for jobs, income, housing, education—even marriage.

During the last census period, 1996-2001, the four largest metropolitan areas captured 62% of the total population growth, while non-urban places actually lost population in aggregate. Cities, effectively, now define what it means to be Canadian; they shape our lifestyles, affect our health, and alter our attitudes to immigrants and our views on social issues and policies.

The recognition of the increasing importance of cities is one of the many significant changes that have occurred since 1971. At that time, many Canadians preferred to think of Canada in terms of rural and small town settings and regional environments. But cities[2]—and the set (or aggregation) of interdependent cities and metropolitan areas that we have defined here as the CUS—have changed remarkably over the last 30 years. Accordingly, the ways that we think about cities, and especially our perception of the processes that shape them, must change as well. This paper begins with an overview of the major changes in the CUS over the last 30 years, including its rate of growth, degree of spatial concentration, and patterns of interaction. These changes in the CUS are significant, but perhaps less so than the changes that have occurred in the processes that shape such urban systems: the parallel economic, demographic, and political evolution of Canada, the North American continent, and the rest of the world that affects the location of people, jobs, and power. The CUS continues to grow, but now the growth processes are different, and for this reason, the locations at which that growth is expressed have changed.

1. Census metropolitan areas (CMAs) or census agglomerations (CAs).
2. In this paper we use the term "cities" as a convenient short-hand, but in all cases (except those references to political municipalities) we mean "functional" urban regions—the census metropolitan areas (CMAs) and census agglomerations (CAs)—defined by Statistics Canada.

Discussion of these processes is the subject of the second part of the paper, followed by an analysis in the third part that tracks the urban system's response to these changes. In the fourth section we offer a critique of traditional concepts and approaches to the urban system, and then try to reformulate our ideas about the CUS and how it is evolving at the beginning of the 21st century. In sum, the urban system has changed, but the processes that shape it have changed even more. In this section we also speculate on the future of the CUS within new continental and global environments. What will the CUS and its neighbouring urban systems look like in another 20 to 30 years?

In aggregate, the Canadian urban system increasingly represents the human geography of Canada. As such it embodies most if not all the major economic, social, and political processes at work within the country. When disaggregated, however, each component in the urban system—each individual city—represents a unique combination of population size, economic specialization, and rate of growth that defines the economic and social opportunities open to each resident. In this sense, the urban system is the reality of Canada as seen and experienced by individuals, families, and firms going about their daily routines. The significance of understanding the urban system for researchers, planners, and policy-makers lies in the variety of processes that link the local realities of everyday life to the larger entities—the context—of which they are a part.

How much variation in growth performance, or differentiation in characteristics and living conditions, can exist among cities, and within what kind of geographical pattern? What forces determine the characteristics of particular urban places? And, of course, what factors and processes determine the attributes of entire urban systems? For example, all national urban systems share certain regularities in their characteristics and growth processes. These include:

- the standard log-normal distribution of urban population sizes, in which cities are ordered by size in a more-or-less consistent fashion;
- some form of city size/distance-decay relationship governing the levels of interaction, the flows and linkages (travel or communication) among cities;
- the presence of boundary effects that reduce the level of interaction across national borders and accentuate the contrasts between the core and the periphery;
- a growth regime in which larger cities in the core region approximate the national growth rate, while smaller cities—especially those in the periphery—exhibit much greater variability in their growth rates and economic viability.

1.1 The Canadian Urban System (CUS) in 2001

The Census of Canada 2001 marked a turning point for Canadian cities. While the popular press made much of continued urban concentration and the rapid growth taking place in the very largest cities, it is equally significant that the postwar pattern of continuing growth no longer holds for most urban centres. Of the 139 Census Metropolitan Areas (CMAs) and Census Agglomerations (CAs) identified by the census in 2001, 44% have declined in population since 1996, and another 12% grew by less than 1%. Only 31 places (22%) grew by more than 5% over the last five-year census period. (See Appendixes A and B for details.)

At the same time, the very largest metropolitan areas—Toronto, Vancouver, Calgary, Edmonton, Ottawa, and their near neighbours—continued to grow rapidly. The resulting differences between high-growth and no-growth cities will lead to very different urban conditions and living environments in the years to come, with distinctive social, economic, and policy challenges. Fortunately, most Canadians will live in the cities that are most likely to grow, since these are the largest places. For other places, however, slow and uneven growth poses a number of issues for policy-makers at both local and senior levels of government.

The spatial organization of the CUS in 2001 is displayed in Table 1 and Figure 1a. The 139 CMA/CAs house a population of 23.8 million, or 79.4% of the Canadian population. The four largest places account for 37.2% of the population, and the 15 metropolitan areas with more than 300,000 population contribute 57.5% of the total. Canada is not only urban, but increasingly metropolitan as well. Central Canada (southern Ontario and southern Quebec) is home to 51% of all cities, and 65% of the total urban population. The typical Canadian, if there is such a person, now lives in a large urban area in Central Canada.

Table 1: The Canadian Urban System, 2001

Number of cities						
Size/Region	**B.C.**	**Prairies**	**Ontario**	**Quebec**	**Atlantic**	**Canada**
Over 1 m.	1	0	2	1	0	4
300-1,000k.	1	3	5	1	1	11
100-300k.	2	2	8	3	4	19
30-100k.	9	8	15	13	4	49
10-30k.	14	11	11	12	8	56
Total	27	24	41	30	17	139
Urban Population (in 000s)						
Over 1 m.	1,987	0	5,489*	3,684	0	11,160
300-1,000k.	312	2,561	2,194	683	359	6,109
100-300k.	295	419	1,197	446	523	2,879
30-100k.	540	392	867	619	221	2,638
10-30k.	273	184	183	244	160	1,044
Total Urban	**3,407**	**3,556**	**9,929***	**5,676**	**1,262**	**23,830**
Rural	594	1,518	1,481	1,561	1,023	6,177
Region	4,001	5,074	11,410	7,237	2,285	30,007

Territories cities grouped with British Columbia

*Note that Ontario excludes the 258,000 residents of the Ottawa-Gatineau CMA who live in Gatineau. Quebec includes them.

Source: Statistics Canada, Census of Canada, 2001.

The second version of the map (Figure 1b) reveals an important point about the relative size and spatial organization of the CUS by putting the urban system into a continental context.

Figure 1a: The Canadian Urban System, 2001

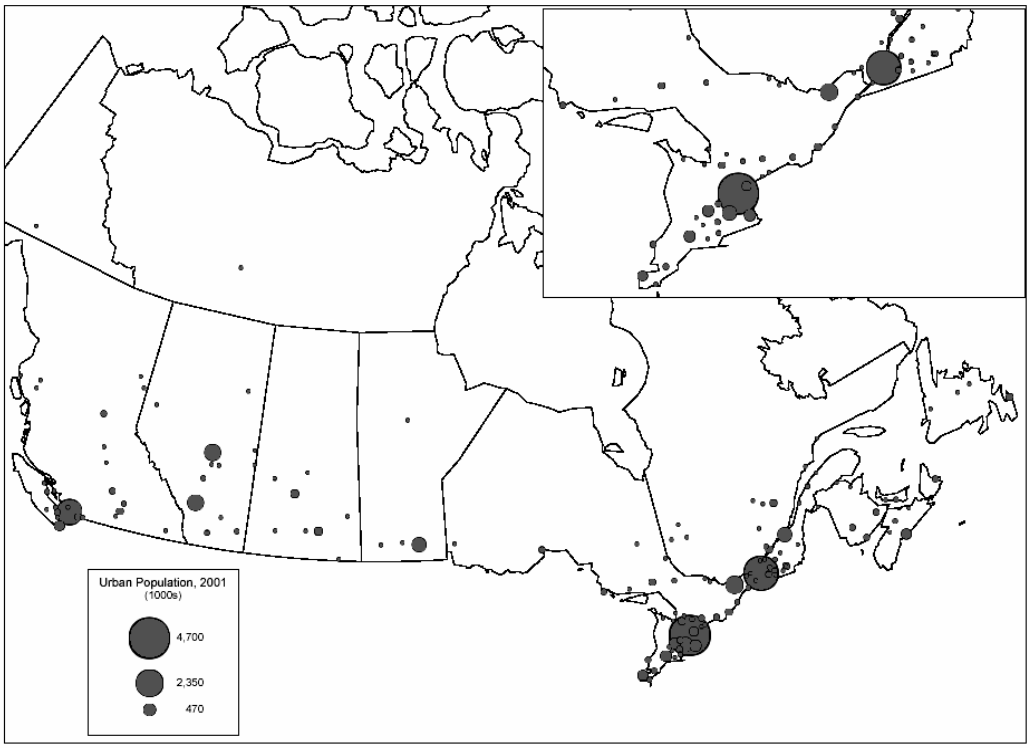
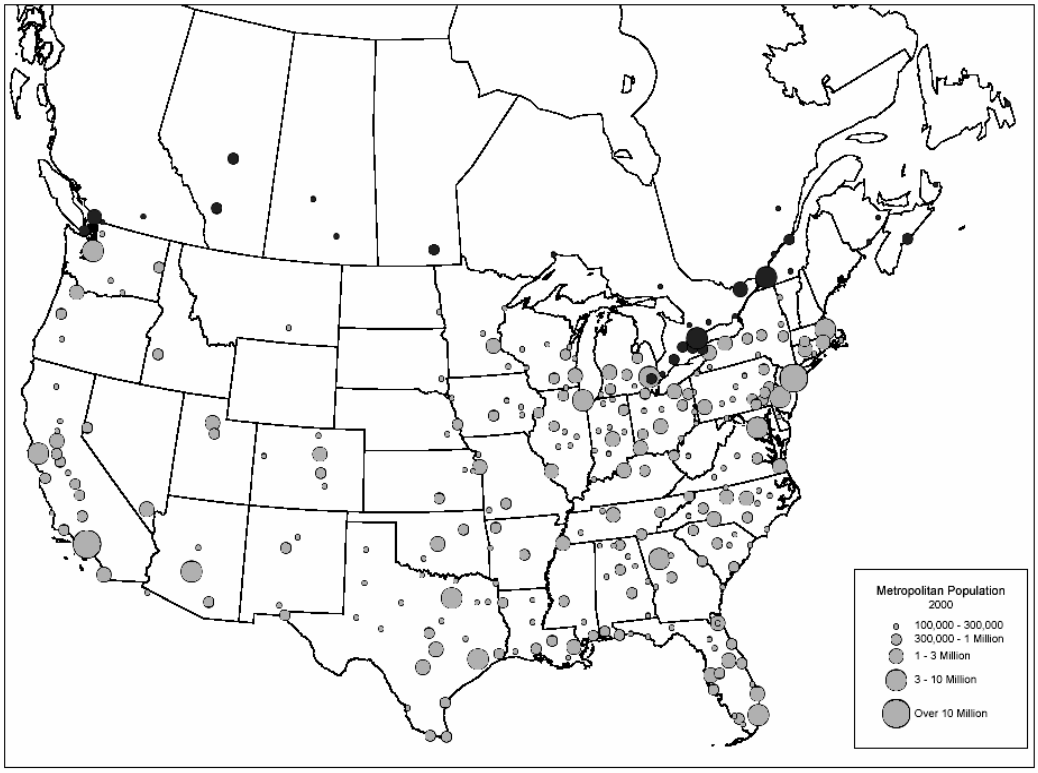


Figure 1b: The CUS in a Continental Context, 2001



Canada's population is roughly one-tenth the size of the population of the United States; with one-tenth of the cities, and that population is scattered across a much larger territory. Plotted on a continental scale, the CUS appears to be small and peripheral relative to North American cities in total. Many Canadian cities are closer geographically to their immediate American neighbours than they are to other Canadian cities. To the degree that information, people, money, and goods flow increasingly easily across the border, the traditional east-west connections that define the CUS may be overwhelmed by continental linkages. The border still matters, as we demonstrate later, but for how long and for what kinds of connections is uncertain.

The geographical distribution of urban growth over the last five years (1996-2001) is far more concentrated than the overall population distribution (Table 2). The four largest cities—Toronto, Montreal, Vancouver, and Ottawa—generated 62% of the population growth, and the 15 cities with populations over 300,000 received 92% of the country's urban growth. Meanwhile, non-urban areas as a whole lost 25,000 people. Regionally, almost all of the urban growth occurred west of the Quebec border, with 93.5% of the growth in Ontario, the Prairies, and British Columbia. Ontario alone contributed 55% of the urban population growth, including 419,000 additional residents in the Toronto region. This represents more than one-third of all the population growth in Canada.

Table 2: Population Growth within the Canadian Urban System, 1996-2001

Urban Population Growth (1000s)						
Size/Region	**B.C.**	**Prairies**	**Ontario**	**Quebec**	**Atlantic**	**Canada**
Over 1 m.	155	0	473*	111	0	739
300-1,000k.	8	209	111	11	16	355
100-300k.	22	6	56	-4	-9	72
30-100k.	8	28	-5	-3	2	33
10-30k.	-5	4	-2	-3	-7	-15
Total Urban	188	247	633*	112	3	1185
Rural	-8	26	23	-14	-52	-25
Total Region	180	273	656	98	-49	1160
Growth Rate (%)						
Over 1 m.	8.5	0	9.2*	3.0	0	7.1
300-1,000k.	2.5	8.9	5.3	1.6	4.7	6.2
100-300k.	8.1	1.4	4.9	-0.9	-1.6	2.6
30-100k.	1.5	7.7	-0.5	-0.5	1.1	1.2
10-30k.	-1.7	2.1	-0.9	-1.2	-4.0	-1.2
Total	**5.9**	**7.5**	**6.8**	**1.9**	**0.3**	**5.2**
Rural	-1.3	1.7	1.5	-0.9	-4.8	-0.4
Region	4.7	6.1	6.1	1.4	-2.1	4.0

Territories cities grouped with British Columbia

*Ontario excludes the 11,000 population growth that occurred in Gatineau. It is credited to Quebec.

Source: Statistics Canada, Census of Canada, 2001.

When this absolute growth is translated into growth rates, a regular variation in urban growth rates occurs by city size category, ranging from –1.2% for the smallest cities (under 30,000) to +7.1% for the largest places. This is the third consecutive census in which this pattern—of growth increasing with city size—has been observed, and the pattern is now stronger than ever. There appears to be a breakpoint around 150,000 population: above that population, most cities are growing; below it, the smaller cities are declining. Only Alberta overcomes this pattern by generating growth among all city size groups, even rural municipalities. The Alberta government has maintained a substantial program of fiscal transfers to smaller centres for the provision of various services, in effect producing a spatial redistribution of the revenues from the oil and gas bonanza.

The maps of urban growth (Figures 2a and 2b) present some striking images that illustrate Table 2. In absolute terms, population growth is highly concentrated in southern Ontario and Quebec and the two westernmost provinces. Changes in all other locations are minute, whether positive or negative. In terms of growth rates, however, the positive and negative rates differentiate the extensive urban cores in southern Ontario/Quebec, Alberta, and the settled parts of southern British Columbia, from all of the peripheral zones to the North. The Canadian frontier appears to be retreating southward at a rapid rate.

Figure 2a: Urban Growth and Decline, 1996-2001

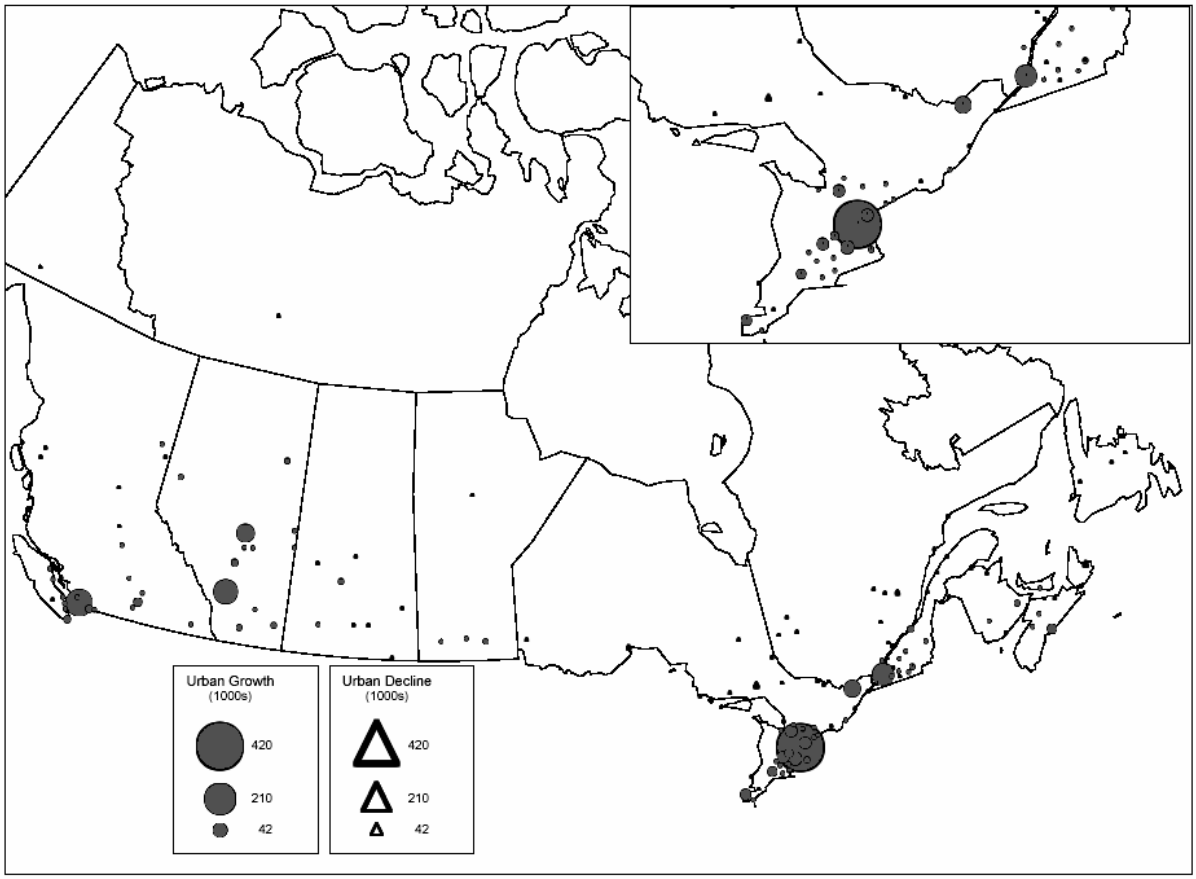
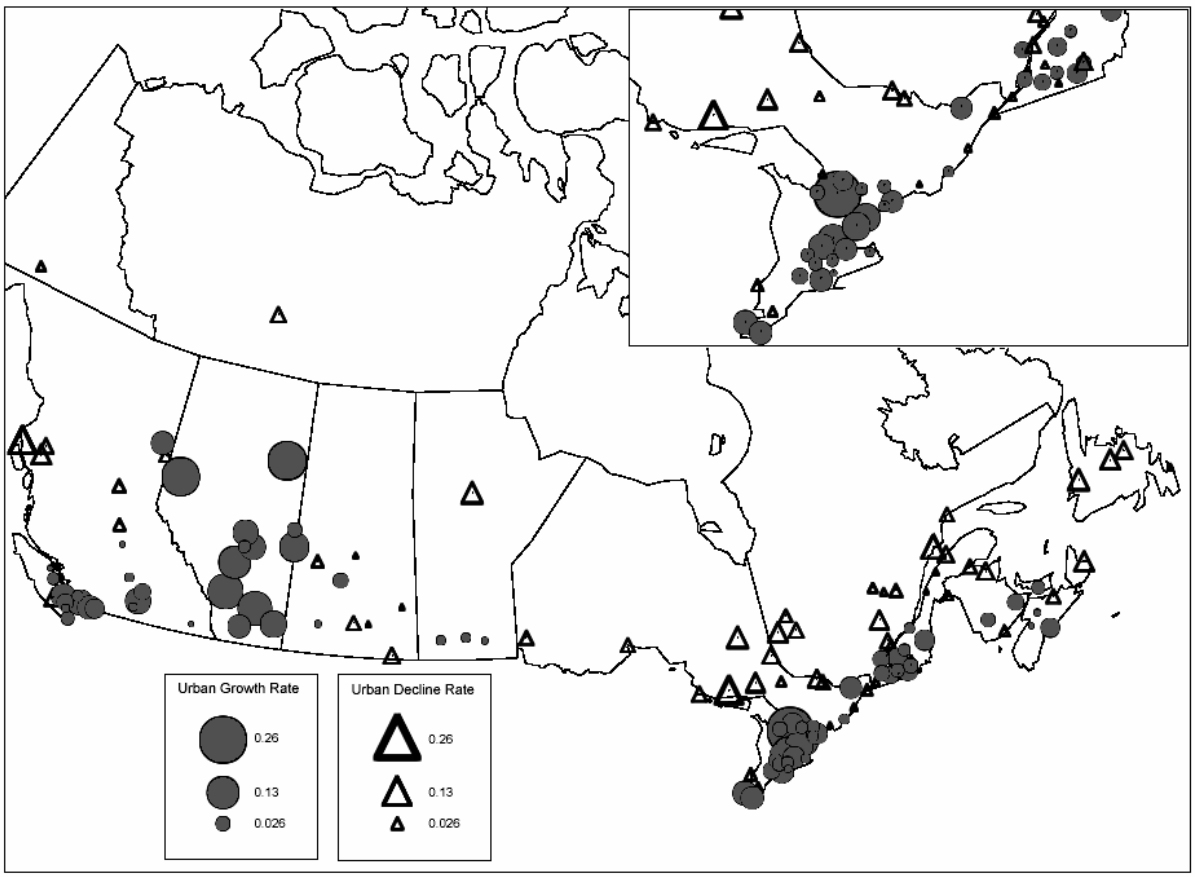


Figure 2b: Urban Growth and Decline Rate, 1996-2001



The concentration of Canadians in the largest cities has accelerated, and as we have argued above, these are now the environments that shape our lives. Our political institutions have not yet responded, however, in terms of political representation, fiscal autonomy, or public administration. Agricultural ministries, programs, and subsidies seem to go on forever; while urban issues seldom make the national news. Statistics Canada recognized the role and needs of metropolitan areas long before the provincial governments did.

The problem of declining urban centres is going to become prominent, however, as more and more households find that their jobs, their assets (houses), and the public services they expect are eroded by factors beyond their control. Is it possible to plan for decline? How can we compensate people who happen to live in the wrong place? Is there a rate of urban decline that is socially and politically unacceptable? Sixty-four cities lost population between 1996 and 2001. Ten cities lost more than 6.9% of their population during this period—all of them peripheral resource communities—with Prince Rupert, British Columbia (–12.1%), and Elliot Lake, Ontario (–11.8%), leading the way.

The other essential element in the description of the CUS is the pattern of interdependence among the cities, as well as the links to neighbouring cities in the United States. An overview of the pattern of economic connections among major cities, derived from the movements of air passengers, is shown in Figure 3. Most air passengers are travelling on business; thus,

Figure 3a: Air Passenger Flow, 1999

(passengers per route)

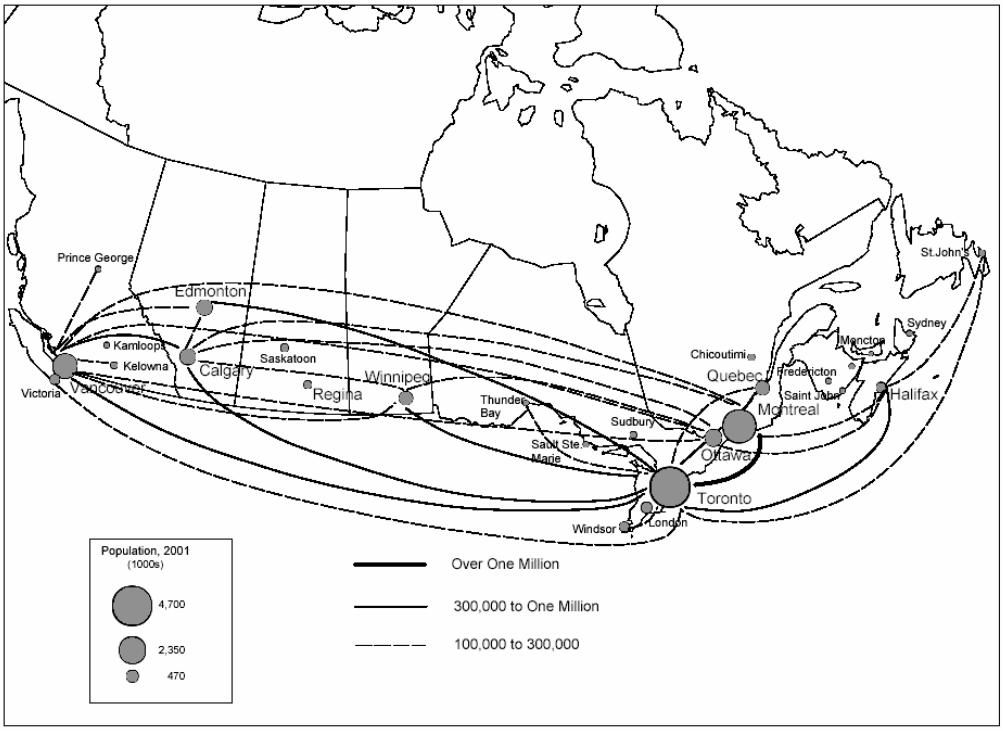
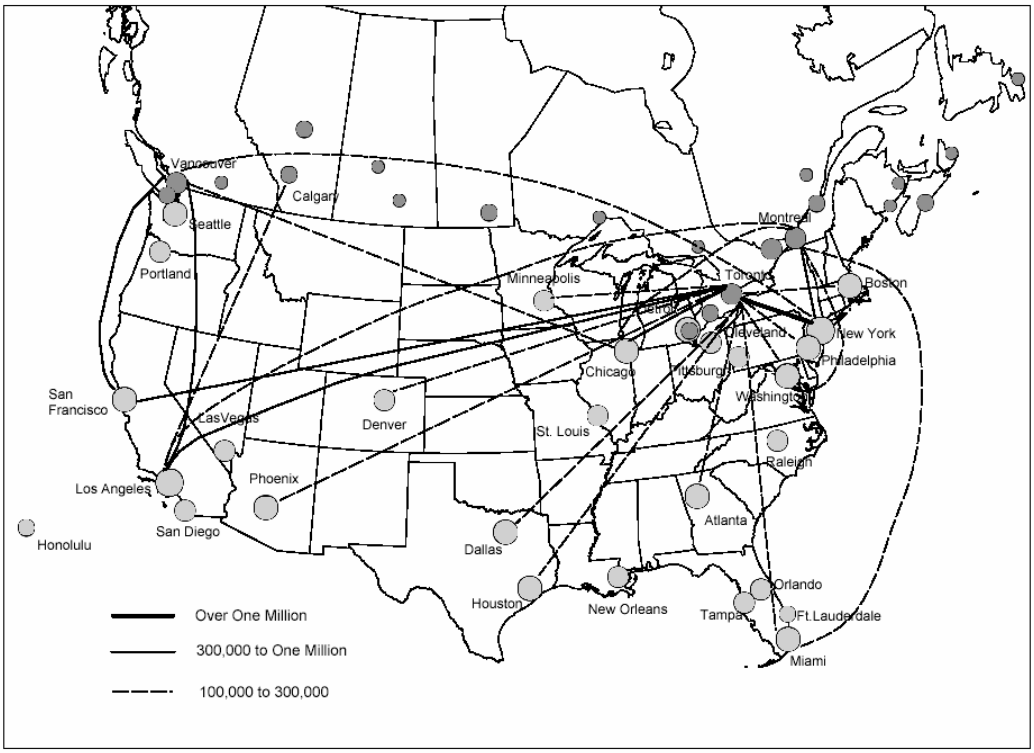


Figure 3b: Air Passenger Flow to U.S. Cities, 1999

(passengers per route)



airports and flight schedules are designed to serve them. Figure 3a illustrates the intense concentration of flows within the Windsor-Quebec corridor, even though trains, buses, and cars offer alternative means for making short trips. The most popular route, not surprisingly, is the Toronto-Montreal connection. Toronto-Vancouver is next, followed by Toronto-Ottawa.

All the evidence on economic links emphasizes the intensity of intercity contacts within the Windsor-Quebec corridor, as both inputs and outputs that flow readily among different sectors and locations. As expected, given their size, Toronto and Montreal anchor seven of the ten largest flows in the urban system. Beyond the corridor, the main flows are spatially defined, typically in the form of links between a regional urban centre and nearby cities (e.g., Vancouver-Kelowna, Halifax-St. John's), and then through each regional centre to cities in the corridor, especially Toronto. The regional centres are the largest cities outside the corridor: Vancouver, Calgary and Edmonton, Winnipeg, and Halifax; and they also interact with each other. The Calgary-Vancouver link is the fourth largest in the system.

Some of the largest airline links connect Canadian cities to cities in the United States (Figure 3b). The largest cities—Toronto and Montreal—are linked to the largest American cities—New York and Los Angeles. Canadians also have strong links with holiday centres in Florida, Hawaii, and Mexico. Tourism aside, however, flows to the major cities of the United States are roughly one-fifth the volume that would be expected to flow to Canadian cities of comparable size and distance apart. Thus, borders still matter. The predominant links for the CUS are still east-west, although the patterns continue to evolve toward increased continental integration.

1.2 The Changing Urban System: 1971-2001

The picture of the CUS in 2001 and the patterns of growth for the period 1996-2001 provide a snapshot of an urban system and a set of growth processes that have changed substantially since 1971. Over the last 30 years, the number of urban places (CMAs and CAs over 10,000 population) has increased only marginally, from 135 to 145, while the overall urban population has grown by more than 40%, from 16.2 to 23.8 million. There have also been substantial shifts in the rank of cities and in the relationships among them. At the same time, the patterns of growth and change have themselves evolved substantially from one census period to the next. In some decades, but especially since 1986, the largest cities have grown faster; in other times, smaller places do better. For the most part, urban growth rates are neutral with respect to city population, but vary widely by region; led, first, by Ontario, then perhaps Alberta, or British Columbia. This section compares the CUS in 2001 with the CUS of 1971, which was described in a landmark study by Ray et al. (1976).

The development of an internally consistent time series of data for Canadian cities since 1971 turned out to be a complicated task, largely because of frequent boundary changes for CMAs/CAs (see Appendix A for a fuller discussion). Table 3 summarizes the growth patterns since 1971, based on the estimated values (using the boundary correction) in 1971. The upper half of the table shows the location of absolute growth; the lower half converts the absolute growth to growth rates. Each part of the table has two versions of the totals, at first excluding the 12 small cities that entered the system during the period (that is, their populations

passed the 10,000 threshold), and then adding them all together. The urban system has gained more than 7.2 million residents since 1971, for an overall growth rate of 43.4%. This compares with the national growth of 8.4 million and 39.1%. The urban system has contributed about 85% of all population growth during the three decades.

Table 3: Population Growth within the Canadian Urban System, 1971-2001

Urban Population Growth (1000s)							
Size in 1971	**B.C.**	**Prairies**	**Ontario**	**Quebec**	**Atlantic**	**Canada**	
Over 1m.	904.5	—	1,897.7	566.6	—	3,368.9	
300-1,000k.	—	1013.4	699.1	174.7	—	1,887.2	
100-300k.	109.6	103.0	376.0	65.1	117.1	770.8	
30-100k.	229.3	66.0	246.9	68.2	73.9	684.4	
10-30k.	249.2	69.2	32.1	30.3	0.5	381.4	
Total	1,492.7	1,251.6	3,251.9	905.0	191.4	7,092.7	
<10k.*	41.9	66.0	8.9	—	1.8	118.5	
Total Urban	**1,534.6**	**1,317.6**	**3,260.8**	**905.0**	**193.2**	**7,211.2**	
Rural	228.0	214.0	446.0	304.0	34.0	1,228.0	
Total Region	1,763.0	1,532.0	3,707.0	1,209.0	227.0	8,439.2	
Growth Rate (%)							**C. of V.****
Over 1m.	83.6	—	68.1	19.8	—	50.1	0.58
300-1,000k.	—	65.5	38.1	34.4	—	48.5	0.75
100-300k.	54.2	32.6	35.2	17.1	18.1	29.5	0.99
30-100k.	93.5	36.9	29.9	13.4	25.5	33.4	1.30
10-30k.	76.5	41.3	11.0	10.9	0.3	30.6	2.73
Total	**80.4**	**58.9**	**47.8**	**20.0**	**17.2**	**42.5**	**1.67**
< 10k.*	142.9	187.1	51.6	—	18.3	118.5	
Total Urban	**81.4**	**58.7**	**47.8**	**20.0**	**17.2**	**43.4**	
Rural	64.6	16.5	50.7	20.4	3.6	24.7	
Total Region	78.8	43.3	48.1	20.1	11.0	39.1	
C. of V.	1.04	1.45	1.71	1.75	2.75	1.67	

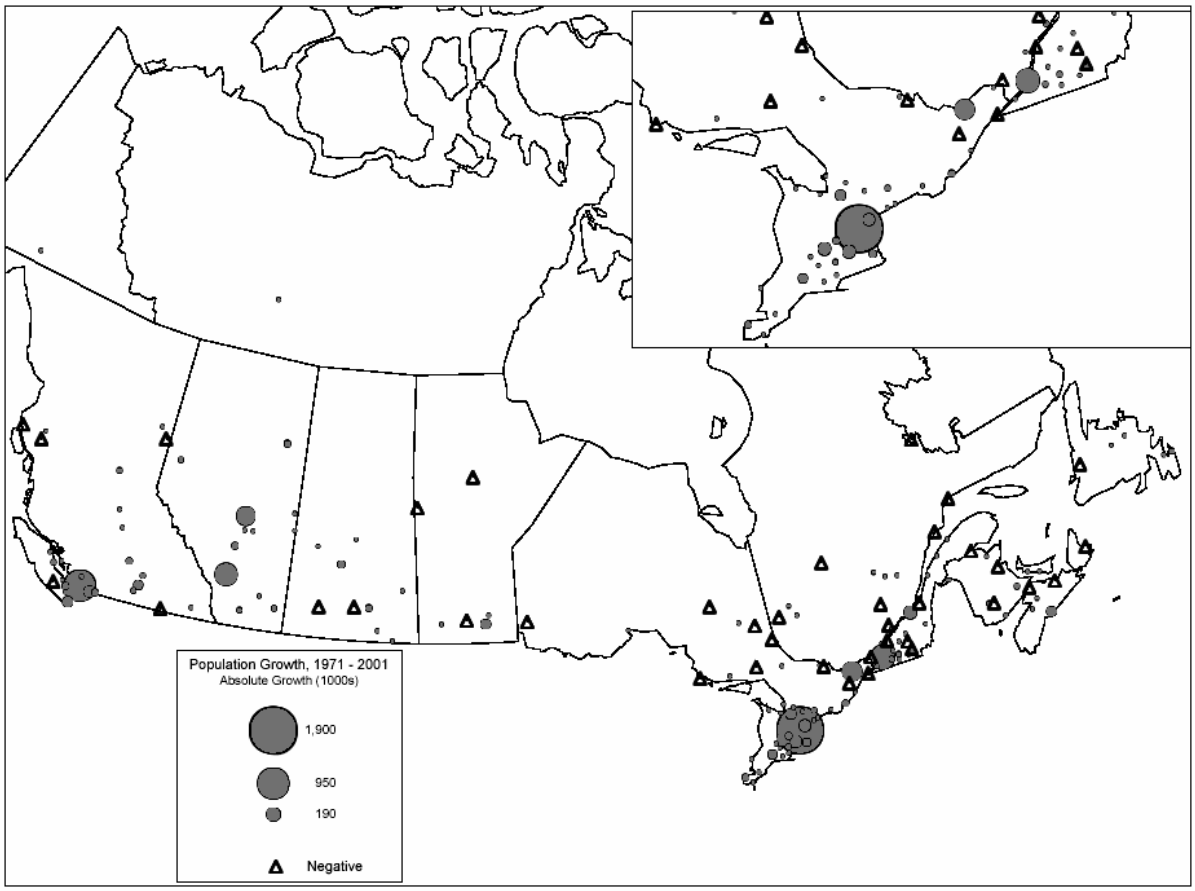
*These are places that had fewer than 10,000 population in 1971, but emerged later as cities.

**C. of V. is the Coefficient of Variation, defined as the Average Growth Rate/ Standard Deviation.

Source: Statistics Canada, Census of Canada, various years.

Most of the population growth took place in large cities, especially the three largest metropolitan areas, which contributed 47% of the urban growth. Together, all cities over 300,000 population accounted for 73% of urban growth. The amount of growth and the rate of growth are lowest for the smaller urban areas. The two largest urban size groups grew at a rate of close to 50%, while the other size groups were closer to 30%. Meanwhile, rural areas grew at a rate of only 25% over the period. The most dramatic variations occur among regions, with urban growth rates averaging only 17% in the Atlantic region, but more than 80% in British Columbia (Figures 4a and 4b).

Figure 4a: Absolute Urban Growth, 1971-2001



The growth rates vary from east to west, with Alberta's growth rate substantially higher than that of Manitoba and Saskatchewan. Ontario, with its large urban population base in 1971 and its high rate of subsequent growth, has generated 45% of Canada's urban growth since 1971. Only 15% of all urban growth occurred east of the Ontario border.

The coefficient of variation in growth rates describes the variability of growth by city size and region (see Table 3). The larger cities grew in a more predictable fashion, approximating the overall national growth rate. Smaller cities tended to be more specialized in one or two economic activities, and their growth rates therefore tended to be more erratic; in other words, they have higher coefficients of variation. During this period the coefficient also declines from east to west, suggesting that the national pattern is dominated by the regional differences in growth rates. In fact, the Prairies and British Columbia have higher standard deviations of growth rates than the rest of the country.

Figure 4b: Urban Growth Rate, 1971-2001

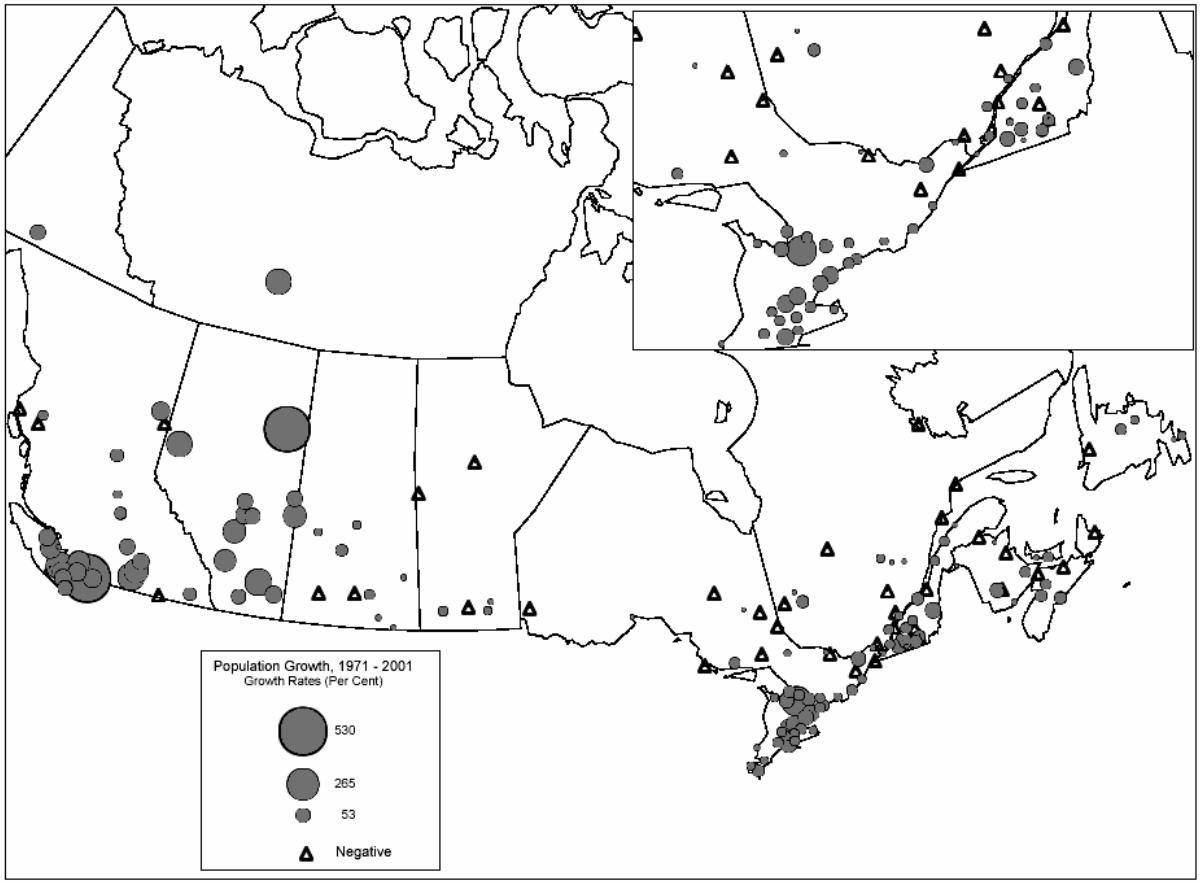
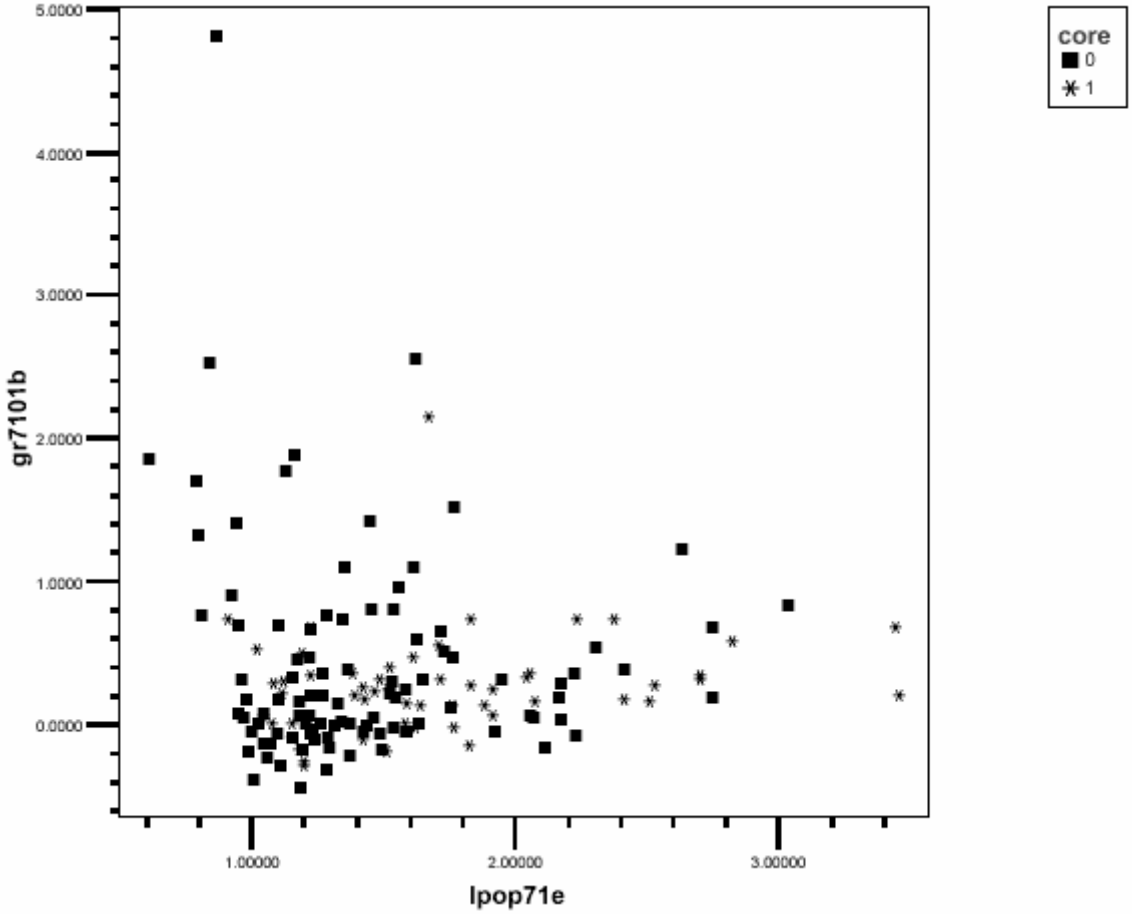


Figure 5 plots the growth rate for 1971-2001 against population size in 1971. The scatter of points demonstrates urban system relationships in which the size and growth of particular cities is constrained by the properties of the larger distribution. Note, for example, the roughly log-normal distribution of city population sizes, with many more smaller places than large ones. The growth rates of the largest cities, as suggested above, are far more uniform and approximate the national growth rate (actually, they surpass it), while the growth rates of smaller cities vary widely. As a result, only smaller places have negative growth rates.

In most countries, in most time periods, there is no significant correlation between city size and growth rate; although in Canada, during the last two decades, larger cities appear to have an advantage. The graph also differentiates cities in the core (=1) and the periphery (=0), and it is apparent that urban growth rates are far more variable in the latter. Core cities depend on their location advantages for growth; cities of the periphery depend on the local resource base, and thus on commodity prices. The latter can, and do, fluctuate widely.

The interpretation of overall changes in the Canadian urban system in this paper largely reflects events and processes that vary regionally and by city size; inevitably, the discussion focuses on factors determining the growth of larger places such as Toronto, Montreal, Calgary, and Vancouver. Despite the level of overall growth and the variability by city size and region, the hierarchy of urban places has remained remarkably stable over time (Table 4).

Figure 5: City Size and Growth Rate, 1971-2001



Note: gr7101b is the rate of population growth, 1971-2001; lpop71e is the log of the estimated population in 1971; and core identifies cities in southern Ontario and southern Quebec

The size differences among larger cities are so great that the ranking does not change easily. Most of the same cities remain on the list of the 25 largest places; and the urban rankings are similar at each census.

By far the most significant shift was the replacement of Montreal by Toronto in the first position between 1971 and 1981, and the subsequent intensification of that dominance. The shifts in rank among Calgary, Edmonton, and Winnipeg have been important within western Canada, while Halifax and St. John's have grown in importance relative to other cities in the Atlantic region. Sherbrooke dominates the eastern townships of Quebec. No new cities have broken into the top nine places, but several newcomers have appeared at the lower end of the list: Sherbrooke, Barrie, Kelowna, and Abbotsford have replaced Cape Breton (originally Sydney), Thunder Bay, Kingston, and Saint John in the list of the top 25 cities.

Table 4: Shifts in Population Rank of Canadian Metropolitan Areas, 1971-2001

1971	1981	1991	2001	Gain
1. Montreal	Toronto	Toronto	Toronto	+1
2. Toronto	Montreal	Montreal	Montreal	-1
3. Vancouver	Vancouver	Vancouver	Vancouver	0
4. Ottawa	Ottawa	Ottawa	Ottawa	0
5. Winnipeg	Edmonton	Edmonton	Calgary	+4
6. Hamilton	Calgary	Calgary	Edmonton	+2
7. Quebec City	Winnipeg	Winnipeg	Quebec City	0
8. Edmonton	Quebec City	Quebec City	Winnipeg	-3
9. Calgary	Hamilton	Hamilton	Hamilton	-3
10. London	St. Catharines	London	London	0
11. St. Catharines	London	St. Catharines	Kitchener	+3
12. Halifax	Kitchener	Kitchener	St. Catharines	-1
13. Windsor	Halifax	Halifax	Halifax	-1
14. Kitchener	Windsor	Victoria	Victoria	+1
15. Victoria	Victoria	Windsor	Windsor	-2
16. Oshawa	Oshawa	Oshawa	Oshawa	0
17. Sudbury	Saskatoon	Saskatoon	Saskatoon	+1
18. Saskatoon	Regina	Regina	Regina	+1
19. Chicoutimi	Chicoutimi	St. John’s	St. John’s	+2
20. Regina	Sudbury	Chicoutimi	Sudbury	-3
21. St. John's	St. John’s	Sudbury	Chicoutimi	-2
22. Cape Breton	Trois-Rivières	Sherbrooke	Sherbrooke	enter
23. Thunder Bay	Sherbrooke	Kingston	Barrie	enter
24. Kingston	Cape Breton	Trois-Rivières	Kelowna	enter
25. Saint John	Thunder Bay	Saint John	Abbotsford	enter

Source: Statistics Canada, Census of Canada, various years.

Changes in the patterns of connections among the cities are less well-known, but may be more significant than the population changes (Figure 6a). Our database records the number of air passenger movements among the 27 largest urban centres in the country at five-year intervals between 1971 and 1999. During this period, the number of air passengers in Canada grew much more rapidly than the population, at a rate of 124%, compared to the population growth of 39%. Higher incomes, lower airfares, and improved air transport technology contributed to this growth, but it also reflects the intensification of linkages among the different parts of the country. The majority of air passenger traffic is motivated by business connections, and increasingly these connections are national (or international) rather than regional in scale. For instance, air traffic within Canada’s regions grew at a rate of 61%, while interregional links grew at a rate of 147% (Table 5). At the same time, the destinations became moderately more centralized, with the share of total traffic represented by the largest 27 destinations increasing from 89% to 92% of the total.

Table 5: Changes in Air Passenger Flows, 1971-1999

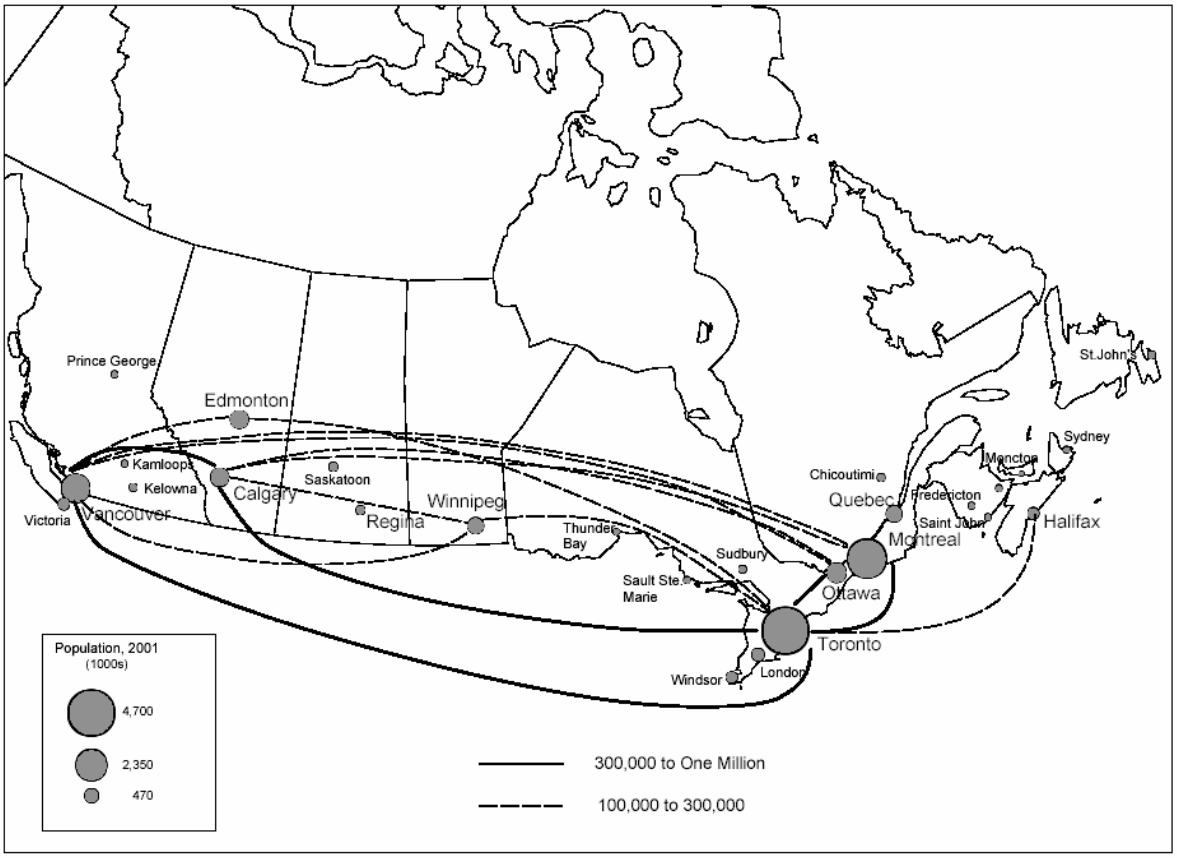
Passengers in 1000s Among Canadian Regions										
	Pattern of Flows in 1999					Change (%)				
	Atl.	Que.	Ont.	Pr.	B.C.	Atl.	Que.	Ont.	Pr.	B.C.
Atlantic	294	-	-	-	-	44.7	-	-	-	-
Quebec	280	103	-	-	-	19.9	-24.5	-	-	-
Ontario	1,016	1,517	1,314	-	-	244.5	64.6	77.6	-	-
Prairies	281	386	1,976	800	-	519.8	173.7	249.3	43.8	-
B.C.	135	292	1,439	1,470	448	570.3	224.0	407.6	157.2	96.0
Total	2,006	2,578	7,262	4,913	3,784	143.2	69.3	153.6	168.6	217.2
To U.S.	377	1,989	5,398	1,734	2,355	169.5	120.5	295.9	562.3	520.0
Grand Total	**2,383**	**4,567**	**12,660**	**6,647**	**6,139**	**146.9**	**88.3**	**199.5**	**377.9**	**290.3**

Air passenger flows among 27 Canadian cities, and 28 destinations in the USA. The rows designate origins; the columns destinations. The diagonal entries indicate flows within the region.

Source: Statistics Canada. "Air Passenger Origin and Destination, Domestic." Catalogue 51-204; "Air Passenger Origin and Destination, Canada-United States." Catalogue 51-205, various years.

Figure 6a: Changes in Air Passenger Flows, 1971-1999

(passengers per route)



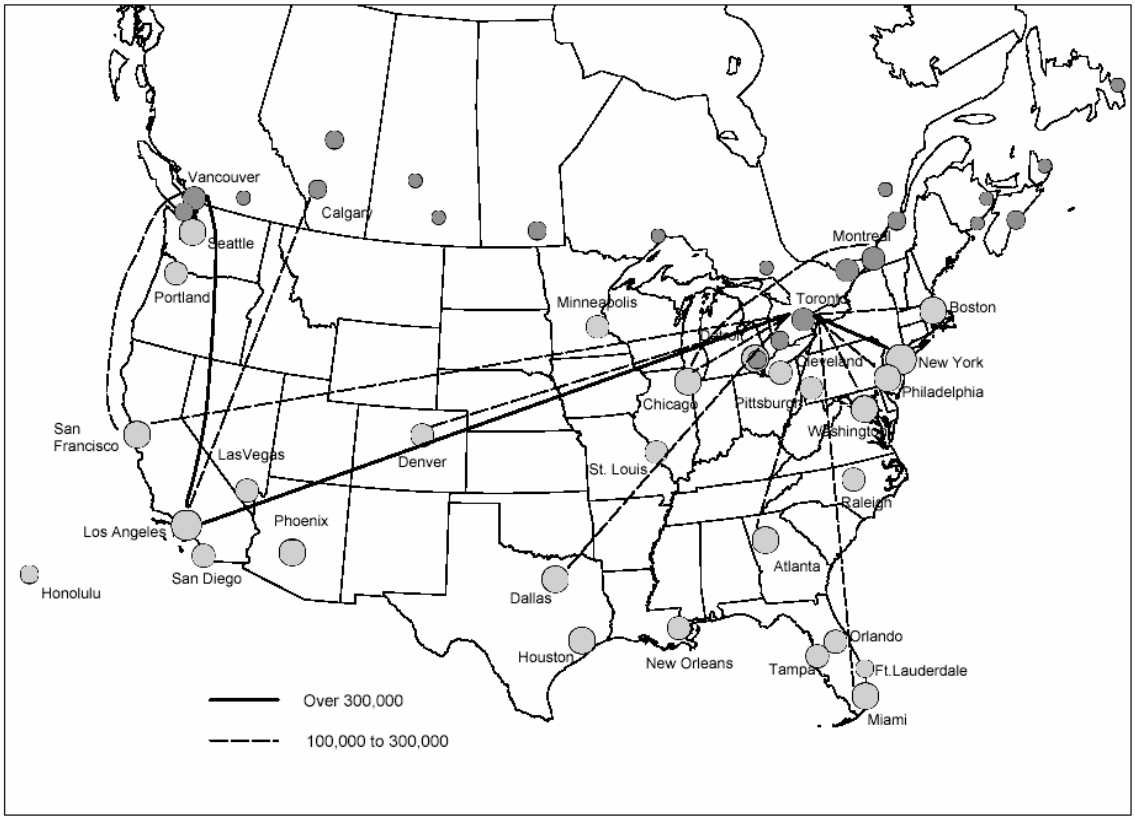
Within this network, the biggest winners were Toronto, which completely dominates the network by 1999, followed by Vancouver and Calgary. In 1999, Toronto generated 24.1% of all air passenger flows in Canada, compared to 20.9% in 1971; while Montreal dropped from 14.8% to 10.4%, and Vancouver and Calgary grew from 11.7% to 14.2% and from 7.0% to 10.2%, respectively. The volume of domestic air traffic through Vancouver has now surpassed that of Montreal, and Calgary is not far behind.

Whatever the volume and direction of air passenger travel actually measure—be it level of economic influence, the location of head offices, or simple centrality—the networks of connections among places and economic activities have certainly shifted westward over the study period. As a result, Calgary and Vancouver are now very closely tied to Toronto, rather than to some of the alternatives in the American Midwest or West Coast.

The network of connections with cities in the United States reveals a slightly different pattern of change over time (Figure 6b). First, the rate of growth for cross-border flights was significantly higher than for domestic traffic: 301%, compared to 124% for the 1971-99 study period. During this period, the ratio of cross-border flights to domestic flights increased from 0.64 to 1.15, as the spatial integration of the CUS extended to include the rest of the continent. Recall, though, that the United States has roughly ten times the population and number of cities as Canada, so that air passenger traffic is still disproportionately domestic when compared to the potential destinations across the continent.

Figure 6b: Changes in Air Passenger Flows to U.S. Cities, 1971-1999

(passengers per route)



Second, the connections to cities in the United States are becoming much more widely diffused, as the share of total passenger traffic going to the largest 28 American cities declined from 42.7% to 40.8%. New York's share of Canadian destinations dropped from 13.4% to 6.5%—now slightly more than Edmonton. Chicago declined from 3.6% to 3.0%, while Los Angeles increased from 3.0% to 4.6%; but clearly there is no city in the United States with the dominance that Toronto exerts on the domestic Canadian network. The increased integration with the United States urban system suggests an overall intensification of business contacts among a variety of smaller centres. On the Canadian side of the border, the links are also becoming more diffused. Toronto's share of cross-border flights has dropped slightly from 19.9% to 19.3%—little more than its share of the Canadian market. Montreal has dropped significantly, from 13.4% to 7.8%; while Vancouver increased its share from 3.6% to 4.6% and Calgary from 2.0% to 3.9%, respectively.

In sum, the CUS has grown substantially, and some places have grown much more rapidly than others. As well, the matrix of connections among the cities—the glue that binds the cities together as a system—has intensified, but again, some places have become much more closely linked than others. Does this suggest that the population growth pattern in the CUS has altered the pattern of interdependence among cities, and the nature of the growth processes? Or have the growth processes themselves evolved over time to produce these patterns of change?

1.3 The Original Conceptualization of the Canadian Urban System

Papers written during the 1970s (cf. Simmons, 1974, 1979a) reveal three dominant themes:

- the relative isolation of the national urban system—at least in the minds of urbanists—from its external context;
- the strong core-periphery differentiation in the economic role of cities;
- the importance of the urban hierarchy in channelling growth through the urban system.

The two diagrams in Figure 7, drawn from that earlier period of research, convey the simplicity of the conceptualization.

Figure 7a: The Urban Hierarchy Circa 1970: Economic Flows

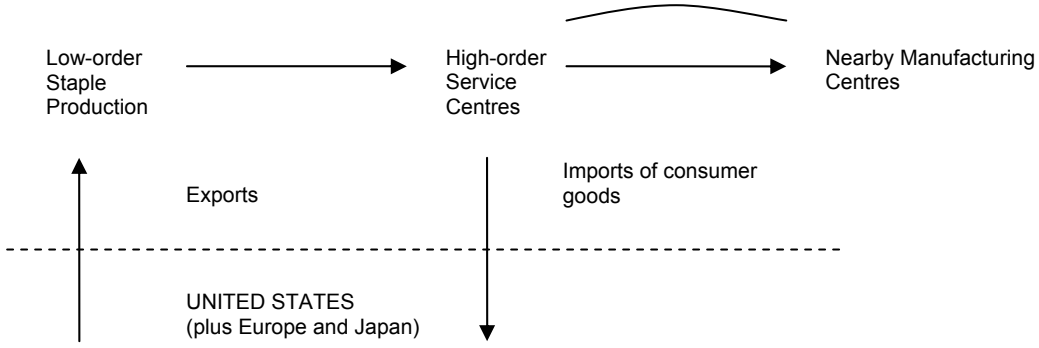
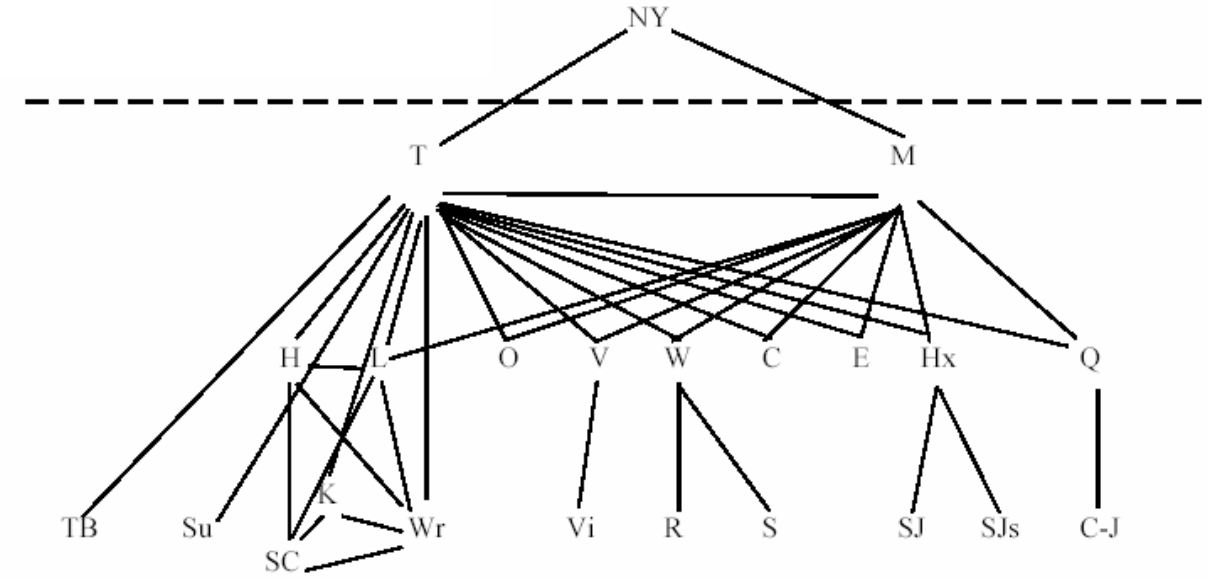


Figure 7b: The Urban Hierarchy circa 1970



C	Calgary	NY	New York	Su	Sudbury
CJ	Chicoutimi-Jonquière	O	Ottawa	T	Toronto
E	Edmonton	Q	Quebec	TB	Thunder Bay
H	Hamilton	R	Regina	V	Vancouver
Hx	Halifax	S	Saskatoon	Vi	Victoria
K	Kitchener	SC	St. Catharines	W	Winnipeg
L	London	SJ	Saint John	Wr	Windsor
M	Montreal	SJs	St. John's		

The notion of "isolation" requires some qualification. The importance of export markets in determining the location of economic activity in Canada has been widely acknowledged, notably in the classic "staple" model of economic growth (Watkins, 1977). In this model, the demand for an export commodity—the staple—stimulated growth at the point of production, such as a mine or mill, and at other locations connected to that point by three kinds of linkages: forward (transportation), backward (sources of supplies), and final demand (consumption). But the external connections were not specified, by either sector or location; and imports were assumed to be filtered by and through a variety of tariffs and regulations. The export stimuli clearly influenced growth at the point of production, but the remainder of the urban system was largely unaffected by other external influences. A variety of unilateral regulations restricted foreign ownership and maintained the integrity of the Canadian market. The importance of immigration for population growth, especially in the post–World War II period, was also recognized; but again, Canada was perceived as an island, as if it were separated from the rest of the world by a substantial body of water, instead of as a peripheral location along the edge of a huge and aggressive economy, and penetrated by a continuous flows of information, culture, ideas, goods, investment, and personnel from the United States. Perhaps we were simply "in denial."

The notion of the border, permeable to exports but controlled for imports, supported the theme of the core-periphery differentiation, as illustrated in the upper part of Figure 7a. The core was the Windsor–Quebec corridor, essentially the regions surrounding the two metropolitan poles, Toronto and Montreal. The periphery was the remaining 90% of the national territory. Canada's economic development was driven primarily by investment and growth in various staple activities within the periphery (reflecting the local resource base) and the level of international prices. Resource exports generated sales and income in the periphery. Various institutional arrangements managed by interests in Central Canada channelled the periphery's linkages—the forward, backward, and final demand links—through the core, where the production of goods and services for the national market occurred, and where selected imports were processed. Urban growth in the periphery fluctuated with the weather (such as droughts) and the prices of resource commodities; but growth in the core reflected the average value of all growth rates across the entire periphery. Migrants, both international and domestic, were attracted to the locations of job creation in both the core and periphery.

This version of the Canadian economy is still quite relevant, but the simplicity of the model has been weakened in several ways. The erosion of tariffs and other restrictions on foreign goods and services through trade liberalization has weakened the control of the core over the periphery. The latter can now import goods and capital directly from the United States. Energy has become the key export commodity, but it generates minimal employment at the point of production and provides few spatial linkages except through final demand (consumption). Alberta has become the richest province, thanks to oil and gas resources. Meanwhile, the core has also developed export markets for manufactured goods, especially the system of automobile production that integrates the economy of southern Ontario with the American Midwest. The presence of the United States is felt everywhere in Canada, providing markets and alternative sources of goods, and in turn modifying the distribution system for all goods.

In the original conceptual framework, the economic relationships within the core and the periphery and between the two were structured by the urban hierarchy. A preoccupation of the early research on the CUS was the actual structure of intercity relationships (see Simmons, 1979b) and how they determined urban growth—hence the hierarchical approach. Initial crude assumptions about population and distance gave way to the study of actual flows by telephone, migration, and trade.

As Figure 7b suggests, each urban centre was linked upward to a single larger centre, and downward to a number of smaller places. Growth stimuli moved upward and downward through these hierarchical linkages. Within the periphery, the urban hierarchy described the forward and backward linkages of staples, especially the final demand connections. People in smaller centres turned to the next largest place to buy more sophisticated goods and services. Larger cities in the periphery competed for service areas. And these service areas, in turn, provided a steady flow of domestic in-migrants to cities during the 1950s and 1960s as the growth of services compensated for the gradual decline in the number of primary workers in agriculture, forestry, and mining. The structure of the transportation system—notably rail and road—reinforced the spatial hierarchy. Toronto and Montreal—which were roughly equal in size at the time—shared the top spot in the urban hierarchy, each one connected to the regional centres that controlled the local hierarchies. Within the core region, urban hierarchies were less clearly defined, principally because of shorter distances among cities and

greater specialization in production. These intercity linkages were often nested and overlapped in a complex fashion.

The urban hierarchy, too, has evolved. As noted earlier, shifts in the population size rankings mirror the changing relationships among cities. More important, though, are the variety of alternative markets and sources for goods and services that have eroded the traditional concept of "service area." Automobiles and inexpensive communications media have weakened the effects of distance, so that any firm in any town can now deal directly with Toronto or New York. American firms and distribution centres now provide direct competition for firms located in Central Canada. At the same time, we will show that the Canadian market remains a distinct entity within North America.

1.4 The Changing Environment of the Urban System

Canada in 2003 is a very different place from Canada in 1971, and the world in which it is increasingly embedded has changed dramatically as well. Both the CUS and the processes that shape it have evolved in response. This section of the paper outlines the variety of changes that have occurred, both within Canada and in Canada's relationships with the rest of the world. The following section examines the responses of the urban system to these changes through the years. The changes are grouped into three themes—economic, demographic, and the public sector—but the themes interact with each other, in addition to their direct impacts on the CUS.

The Economy

At least three aspects of change in the Canadian economy shaped the Canadian urban system between 1971 and 2001.

First, this has been a period of substantial growth, as the population has increased by almost 40%, and the GDP grew by more than 140%. The location of this added economic activity determines much of the pattern of spatial change of population.

Second, as part of this overall growth, the economy has shifted in its sectoral composition; not so much in terms of GDP, but in terms of employment—hence in the spatial distribution of jobs and population. Private-sector services, and the large cities that support them, have gained most of the jobs, while the primary and manufacturing activities have lagged behind.

Finally, changes in the world economy and the overall liberalization of international trade, in which Canada actively participated, have significantly increased the levels of imports and exports relative to GDP—and these in turn have modified the sectoral and spatial patterns of economic activity, as well as the networks of connections among places.

The economic growth of Canada since 1961 is summarized in Figure 8. All variables have been set to the value 1.0 in 1971, so that their growth rates can be directly compared. The value of production (GDP) in constant dollars has grown more than three times as fast as the population, so that income levels (roughly equivalent to GDP per capita) have grown by 67%. The increase in the level of income alters the choices and lifestyles of Canadians—for

example, when combined with the increases in longevity, the result is substantial numbers of migrant retirees. Part of the reason for the increase in income is the higher proportion of the population in the labour force (the participation rate), now that there are fewer children, more adults, and more employment and career opportunities for women. The level of employment has increased more than twice as fast as the population, creating about 7 million more jobs and increasing the ratio of jobs to population from 0.37 in 1971 to 0.49 in 2001. As a result, overall dependency rates (combining the proportions of children and the elderly) have declined.

In summary, over the period the equivalent of an entire economy has been superimposed upon the pre-existing pattern. The types and locations of jobs created in the newly added economy largely determine the degree of change in the urban system. One source of stability for the urban system, however, is also evident. To the degree that the growth of the economy reflects the employment of larger proportions of the existing population, that is, the increased participation rate, then that growth will tend to reinforce the economies of the pre-existing urban centres rather than support growth in new locations. In earlier times, the development of new economic staples tended to open up new regions to development, each with a new urban subsystem to support that growth.

A closer look at Figure 8 indicates that the 1970s continued the high growth rates of the 1960s, but subsequent decades reveal uneven growth patterns for the economic variables, although the population continued to grow regularly. Major downturns are apparent in the early 1980s and early 1990s in the growth of employment and GDP. In fact, the ratio of jobs to population has not grown substantially since 1989, and GDP per capita has not done much better. As will be evident later, the dramatic slowdown in economic growth in the early 1980s, following a long period of rapid growth, also led to crises in the public-sector economy that were to continue for more than a decade.

Figure 8: The Growth of the Canadian Economy, 1961-2001

(relative to 1971 = 100)

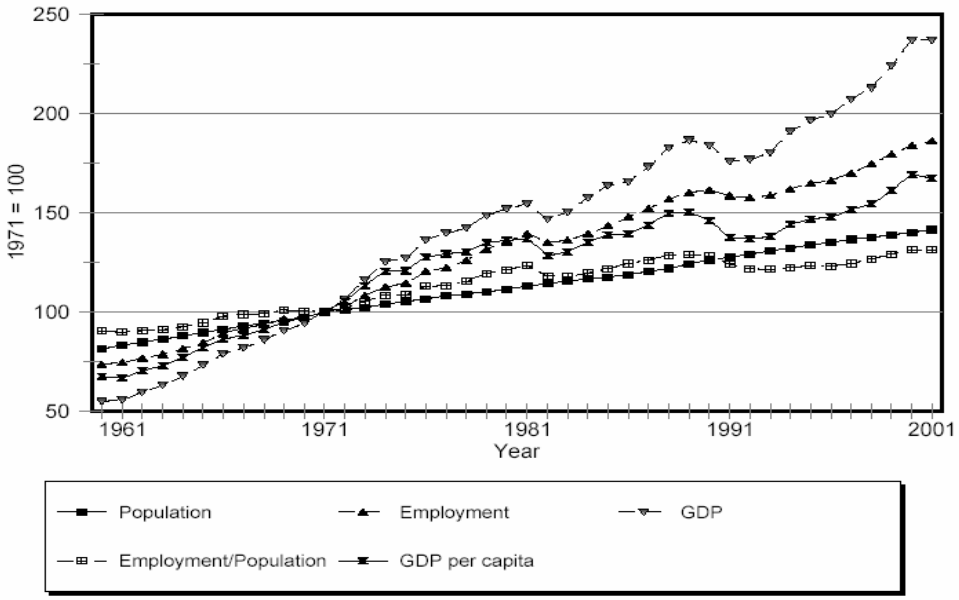


Figure 9a: GDP Share by Industry, 1961-2001

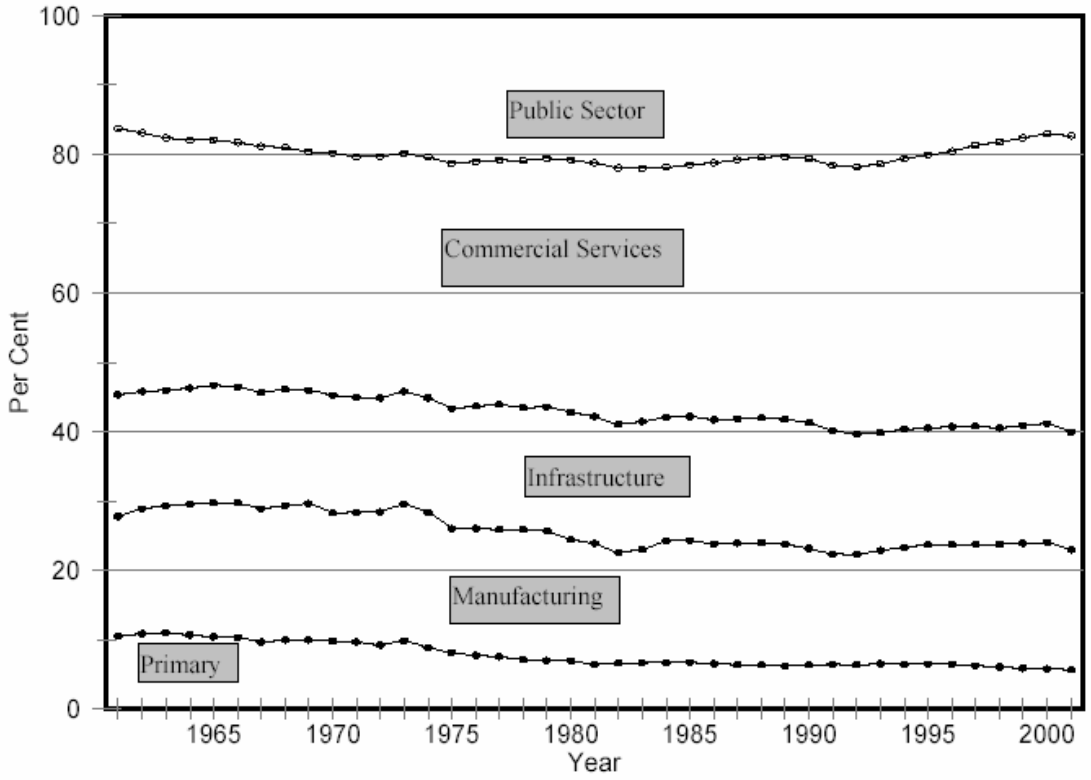
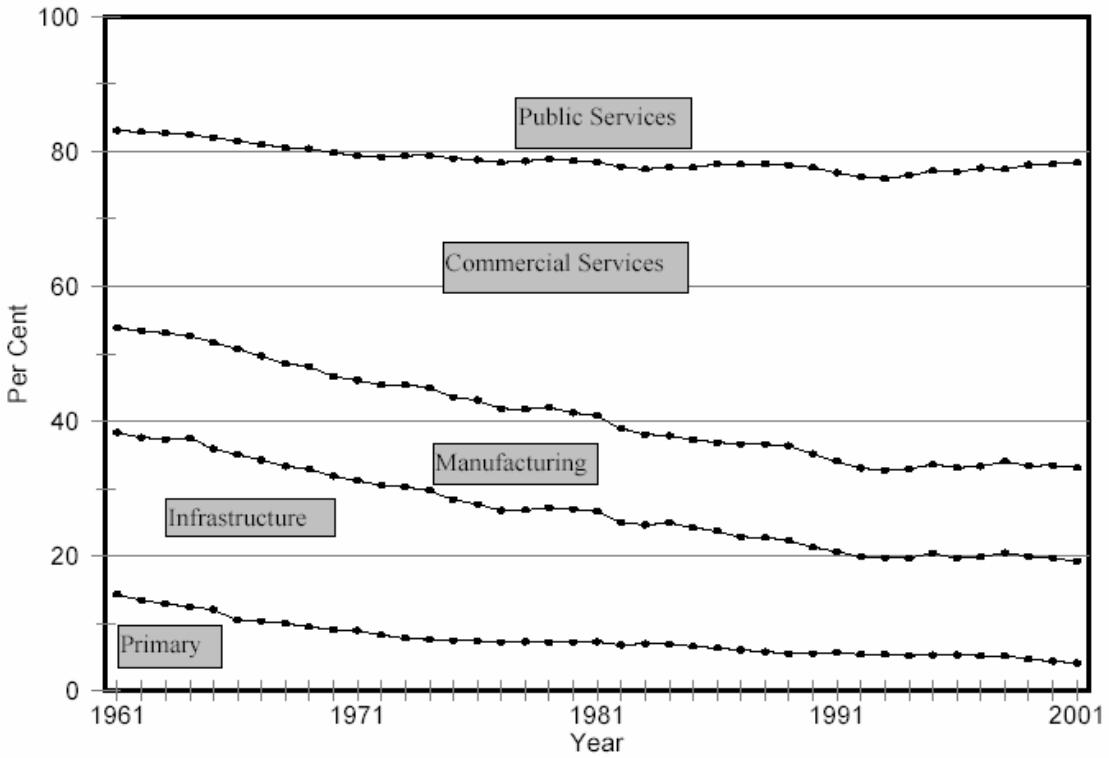


Figure 9b: Employment Share by Industry, 1961-2001



The allocation of economic growth among the country's major industrial sectors is illustrated in Figure 9. Depending on the data used, two quite different results emerge. Figure 9a shows the GDP, which more than quadrupled from $220 billion in 1961 to $938 billion in 2001 (using constant dollars). But as the graph indicates, the shares of the major industrial sectors changed very little. The primary sector lost three or four percentiles, while the manufacturing share remained virtually unchanged. The contribution of infrastructure—including construction, transportation, utilities, and communications—is also unchanged. The commercial services sector, especially business services, picked up the share lost by the primary sector. The public sector (including education and health) first expanded, as the economy grew rapidly, but has declined since the early 1980s. Thus, in the broadest sense, the composition of the Canadian economy has changed relatively little since 1971. The economic growth that has been added reinforces the earlier sectoral—hence spatial—patterns of change.

The composition of employment, however, shows substantial differences in rates of change that have surely modified the urban system (Figure 9b and Table 6). The rate of job creation varies widely among the five major sectors. The primary sector has declined by 12% since 1971, and now provides 90,000 fewer jobs. Manufacturing has grown by 28%, creating more than 500,000 jobs, but the growth rate is only one-third of the overall employment growth rate. Employment in infrastructure activities has grown at a rate of 76%. The great majority of new jobs have been created in the services, both private and public; a total of 4.1 and 1.7 million jobs respectively. These new jobs are a potential source of change in the urban system.

Table 6: Employment Growth by Sector, 1961-2001

	Employment in 1000s					
Year	Total Jobs	Primary[a]	Manu-facturing	Infra-structure[b]	Commercial Services[c]	Public Services[d]
1961	6,055	865	1,452	939	1,773	1,024
1971	7,958	713	1,766	1,184	2,647	1,572
1981	11,398	827	2,204	1,618	4,282	2,466
1991	13,107	752	1,956	1,754	5,599	3,047
2001	15,080	622	2,275	2,093	6,817	3,274
Growth, 1971-2001	7,122	-91	509	909	4,170	1,702
Growth Rate, 1971-2001	89.5%	-12.8	28.8	76.8	157.5	108.3

a Agriculture, fishing and trapping forestry and mining
b Construction, transportation, utilities, communication
c Trade, finance, business and personal services
d Education, health, public administration
Source: Statistics Canada. Census of Canada, various years.

Services are more likely to be found in urban centres than in small town or rural areas, and high-order services (such as business and professional services) are more likely to locate in the largest cities. At the same time, these new service jobs are disproportionately filled by women—most of whom are already living in urban centres; and directly or indirectly the services provided are linked to the same kinds of primary and secondary activities (or their

workers) that drove the economy in the first place. The jobs in professional services serve nearby farms and factories; the public revenues from resource industries pay for the educators and health care workers of the provinces that collect the money. In short, there are constraints on the opportunities for spatial change in the urban system.

One other aspect of the changing economy has direct implications for the urban system. A series of trade agreements and the general trend toward the globalization of the economy have increased Canada's orientation toward export markets (Figure 10a). While the GDP overall has grown by 136%, the value of exports increased fivefold, by 424%, and the shipments to domestic markets by only 62%. Figure 10b compares the level of exports with the level of trade among the provinces. While the latter interprovincial trade has grown only modestly since 1981, exports have more than doubled, especially since the Free Trade Agreement in 1989. The implications of this shift for the urban system are threefold.

First, those cities and regions that produce exports will be favoured over those that produce for the domestic market. Figure 10a also shows the dramatic growth in value of two important export products: automobiles (southern Ontario) and energy products (British Columbia, Alberta, and Quebec). Both Ontario and Alberta have boomed during this period.

Second, the locations that are most accessible to the growing export markets have prospered. The external markets that have grown most rapidly are in Asia (served by Vancouver) and the United States, to which southern Ontario is so closely linked.

Figure 10a: Gross Domestic Product, 1971-2001

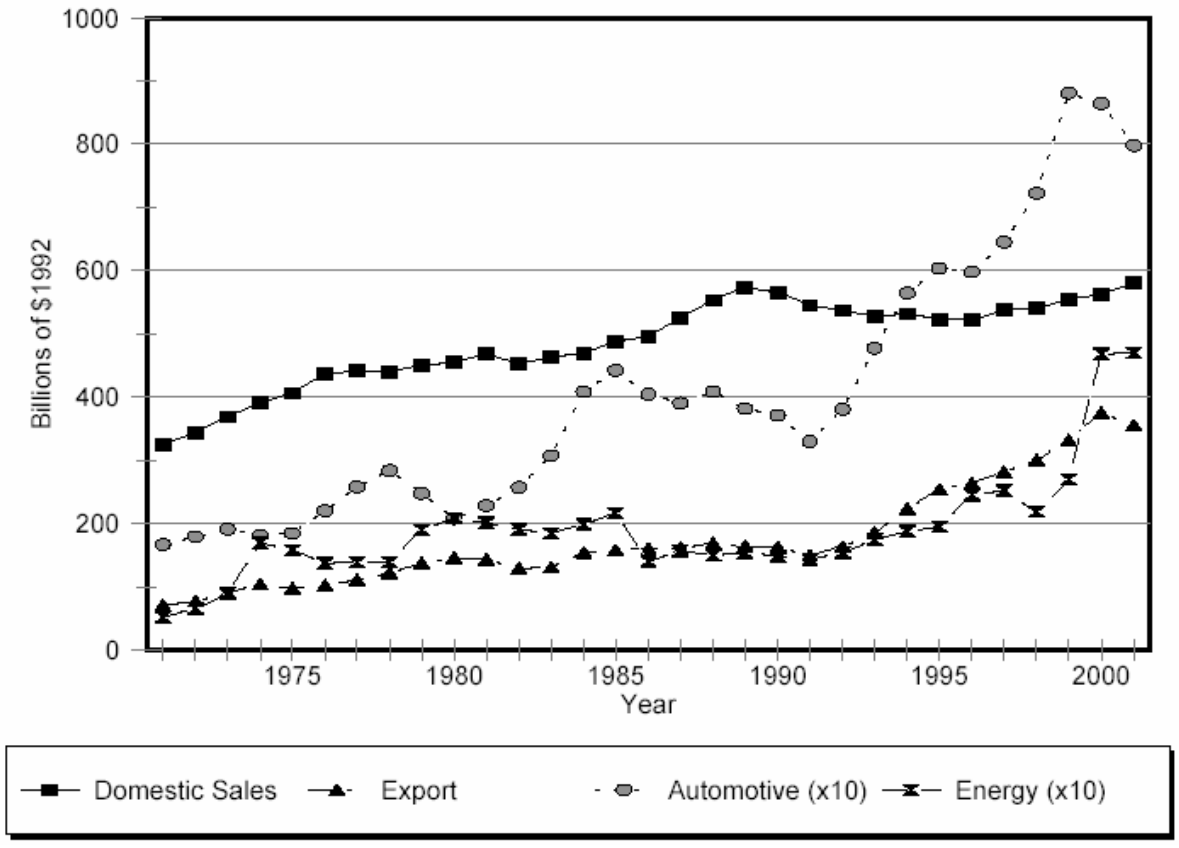
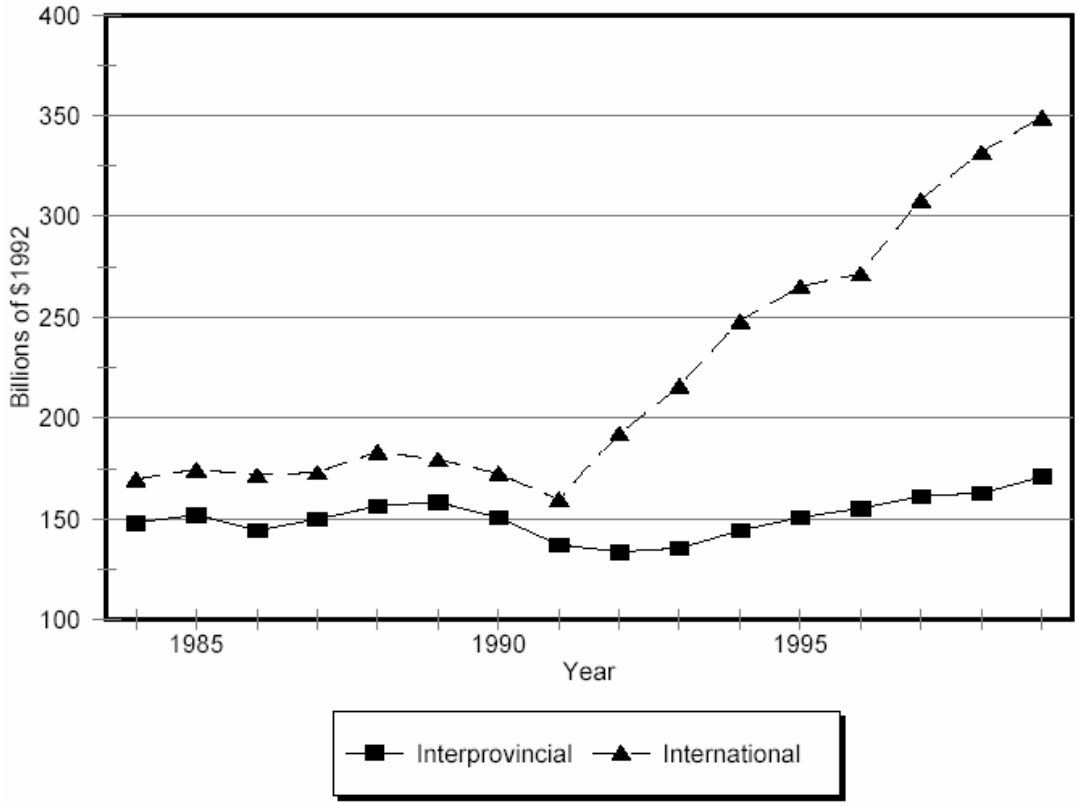


Figure 10b: Trade Flows, 1984-2000



Third, as Courchene and Telmer (1998) have argued, the decline in the relative importance of domestic trade flows and markets relative to exports reduces the incentives for richer and increasingly export-oriented provinces to share revenues with poorer provinces. The latter are no longer viewed as essential to the domestic market, but as part of the competition for export markets lying outside the country. The pressures to maintain the political and economic integration of the country are thereby reduced (Bourne and Simmons, 2003).

A recent study by Brown (2003) summarizes the current pattern of trade flows within North America and concludes that the overall level of interprovincial trade (controlling for size and distance) is still six times stronger than interstate trade. This, in turn, implies an asymmetry in border effects: the border reduces flows originating in the United States by one half (relative to interstate flows), but reduces cross-border flows from Canada to one in 12 (relative to interprovincial flows). Although trade flows are adjusting to the North American Free Trade Agreement (NAFTA), the hierarchical linkages within Canada are still very powerful.

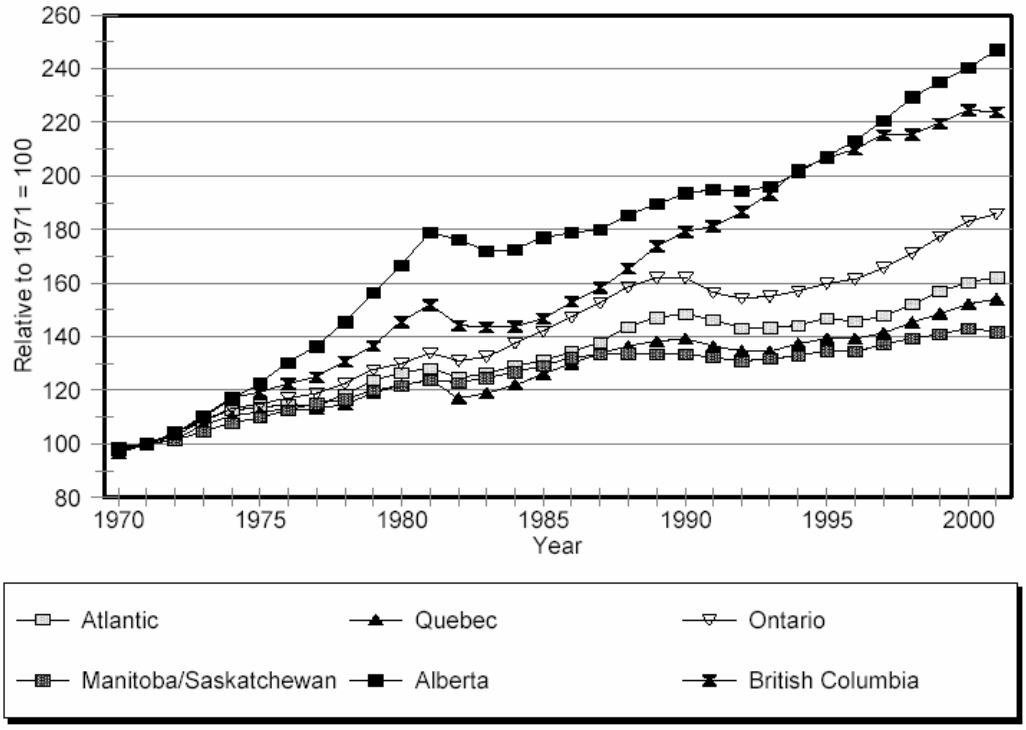
The net results of these economic shifts can be seen in Figure 11, which shows differences in the employment growth rates by region. Since 1971 Canadian employment as a whole has grown by about 86%—approximately the same rate as Ontario. Two regions, Alberta and British Columbia, have grown much more rapidly than the average, by more than 120%; while the Atlantic region, Quebec, and the eastern Prairies have grown more slowly, at rates of 40 to 60%. Thus, job creation explains most of the regional variation in urban growth. Interestingly, despite the arguments for the attractions of larger cities, the region that contains Montreal, which was Canada's largest city in 1971, has grown very slowly. Both

demographic factors (including lower levels of immigration) and political uncertainty are part of the explanation.

Virtually all of the job creation over the last 15 years, as noted, has occurred in the services, especially business services, and these activities usually originate in larger cities. Primary and secondary activities, in contrast, have undergone substantial employment downsizing—so that the old economic base model no longer drives urban growth in Canada. Only Fort McMurray, Alberta (also known as Wood Buffalo), continues to grow rapidly as a resource-based boom town on the frontier. Services are also the basis of the widespread growth in Alberta cities; eight of the 25 fastest-growing cities in the country are in Alberta. As noted above, the province is spending oil and gas revenues on the health and education facilities that support small cities.

Figure 11: Employment Growth, 1970-2001

(relative to 1971 = 100)



The impacts of the proliferation of multinational corporations in Canada are difficult to evaluate. Between 1975 (the first year of the time series) and 1999, the proportion of Canadian corporate revenues controlled by foreign firms actually declined from 33.5% to 29.6%, as the economy shifted away from primary activities such as forestry and mining toward services (Statistics Canada, 61-220). Nonetheless, the impact of these firms continues to be significant. They generate most of Canada's exports and also bring in most of the imports. Their knowledge of conditions and prices elsewhere serves to enforce international prices, technology, and standards upon Canada. These firms are also active in the implementation of trade agreements. Within Canada, investments by multinational corporations clearly influence the sectors and locations of growth. They choose the subcontractors and the parts manufacturers.

Perhaps the most worrisome implication of increasing globalization is the reduction of regulatory diversity, both interprovincially and internationally, as the result of the continued lobbying by multinationals to reduce taxes, weaken environmental and labour regulations, and increase subsidies, in order to make Canada more like Alabama or Mexico. As a result, Canada has become more specialized (and, paradoxically, probably more productive) within a narrow set of economic activities, but effectively becomes excluded from other activities—and these choices are made for us by others.

Demography

Although the demographic processes of growth and spatial redistribution are also shaped by economic and political conditions, these processes have made substantial contributions to the changes in the urban system in their own right. The most significant processes include:

- the marked decline in fertility rates (the baby bust) and greater longevity, which have jointly brought about the sharp decline in the rate of natural increase;
- the expansion of international immigration in absolute terms, but especially in comparison to the level of natural increase;
- the relative decline in the importance of domestic migration as a factor in explaining urban growth.

Figure 12: Sources of Population Growth, 1961-2001

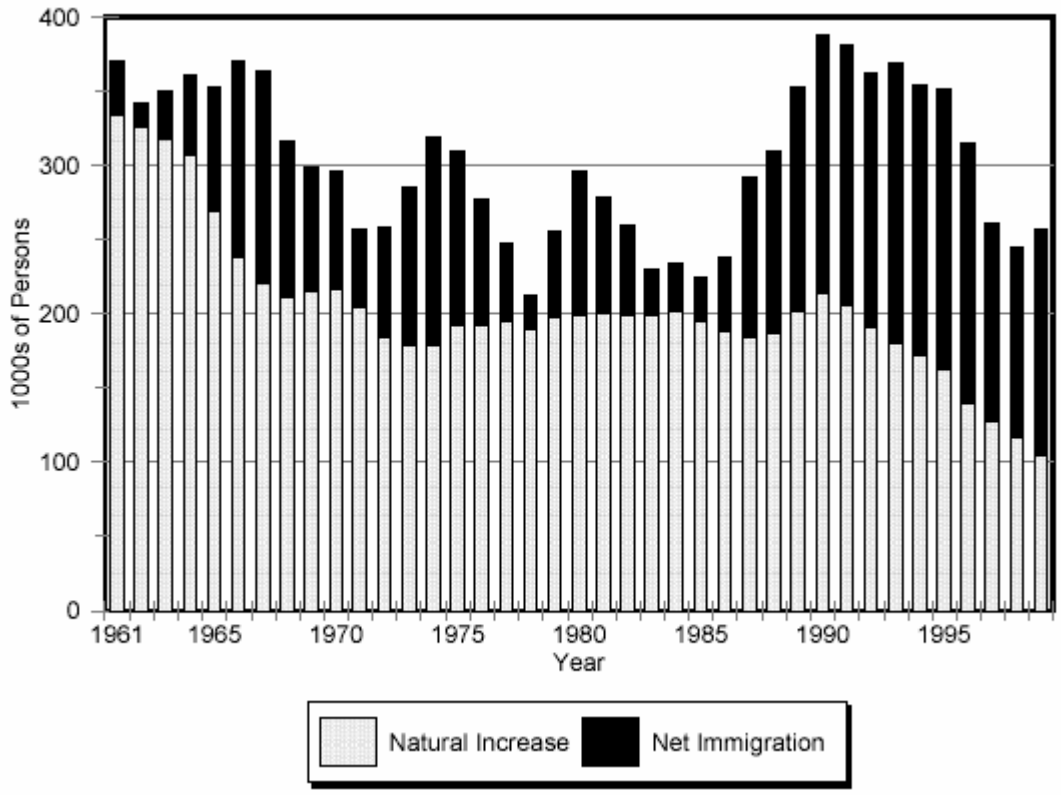


Figure 12 tells most of the story. In 1961, natural increase added more than 300,000 persons per year (equivalent to 1.5% of the population), while net immigration added about 30,000. By 2001, the contribution of immigration surpassed natural increase, which had dropped to little more than 100,000 a year (0.3%). The latter is now only one-third of the rate during the peak growth period, and is well below the replacement rate.

Table 7: The Varieties of Population Growth: CMAs, 1996-2001

Growth Rank	CMA	Population Growth (%)	Natural Increase (%)	Net Domestic Migration (%)	Net Immigration (%)
1.	Calgary	15.8	5.1	6.9	3.7
2.	Oshawa	10.2	3.0	6.5	0.7
3.	Toronto	9.8	4.5	-1.0	6.3
4.	Edmonton	8.7	3.3	3.4	2.0
5.	Vancouver	8.5	3.0	-1.1	6.6
6.	Kitchener	8.2	3.4	2.0	2.7
7.	Abbotsford	8.0	3.6	1.7	2.6
8.	Windsor	7.4	1.9	2.1	3.4
9.	Ottawa-Hull	6.5	0.7	2.6	3.1
10.	Hamilton	6.1	0.9	2.7	2.5
11.	Halifax	4.7	1.1	2.2	1.4
12.	London	3.8	1.8	0.0	2.0
13.	Saskatoon	3.1	2.6	-0.8	1.4
14.	Montreal	3.0	0.9	-0.4	2.5
15.	Sherbrooke	2.8	2.8	-1.2	1.2
16.	Victoria	2.5	-0.1	0.7	1.9
17.	Quebec	1.6	2.9	-2.0	0.7
18.	Kingston	1.6	-0.1	0.2	1.5
19.	St. Catharines	1.2	-0.8	0.8	1.2
20.	Winnipeg	0.6	0.2	-1.2	1.6
21.	Regina	-0.5	1.6	-3.0	1.0
22.	St. John's	-0.7	2.0	-3.2	0.6
23.	Trois Rivières	-1.8	-0.5	-1.5	0.3
24.	Saint John	-2.4	-1.2	-1.8	0.6
25.	Chicoutimi	-3.5	-0.1	-3.5	0.2
26.	Thunder Bay	-3.6	-0.2	-3.9	0.3
27.	Sudbury	-6.0	-1.9	-4.4	0.3
	Average	3.55	1.50	0.11	1.94

Source: Census of Canada, 2001. Domestic migration is given in the Census, net immigration is estimated from provincial retention ratios, and natural increase is the residual value. The latter estimates are thus most prone to error.

The effect on urban growth patterns has been dramatic (see Figure 13 and Table 7). Natural increase is widely dispersed; it occurs everywhere there is population. In 1971 it guaranteed every community an annual growth rate of more than 1%—barring large-scale out-migration.

By 2001 the average rate of natural increase for the 27 CMAs was only 1.5% for five years, and many small communities have begun to lose population through this process. While a few cities in Quebec and Newfoundland are only now completing the demographic transition and still have higher birth rates, natural increase levels will also drop sharply there in the future. The information in Table 7 suggests that only cities that can attract in-migrants—particularly young adults—are able to generate high rates of natural increase (Calgary, Edmonton, Kitchener, Vancouver, Toronto).

The decline in fertility levels has other implications for the urban system. It eventually results in an aging population, and this in turn further reduces the level of domestic migration, since migration is highly concentrated in the age group 15-24. A larger proportion of domestic migrants are now retirees, who are largely unresponsive to economic signals; in fact, they often reverse moves that were made into larger cities a couple of generations earlier, in order to live in less-crowded, less-expensive communities.

Figure 13: Types of Population Growth, CMAs, 1996-2001

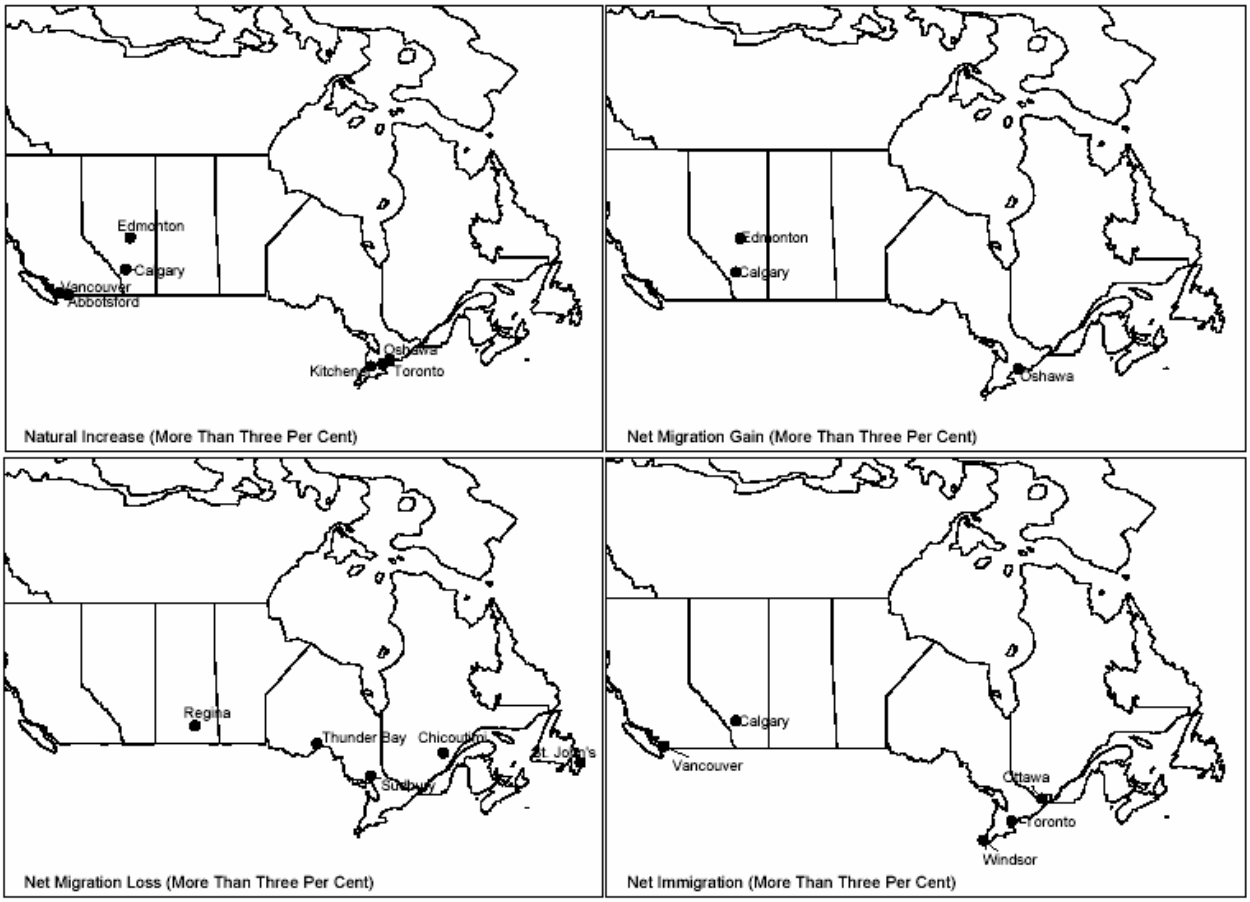


Table 8: Age Structure, 1961-2001

Percent of Total Population					
Age Group	**1961**	**1971**	**1981**	**1991**	**2001**
0-14	34.0	29.6	22.5	20.9	19.1
15-24	14.3	18.6	19.1	14.0	13.4
25-44	26.7	25.1	29.5	33.8	30.3
45-64	17.4	18.6	19.1	19.7	24.3
65+	7.6	8.1	9.7	11.6	13.0
Total Population (in 000s)	18,238	21,568	24,343	27,297	30,007

Source: Statistics Canada. Census of Canada, various years.

Table 8 summarizes the changes in age structure from 1961–2001: a massive decline in the proportion of population under 15, coupled with an equally dramatic increase in the share of the elderly. The proportion of young adults (15-24), and that of the working age population (25-44) have remained relatively stable (so far), but the proportion of older adults (45-64) has increased sharply during the last decade as the baby-boom ages.

Reduced levels of natural increase affect all parts of the urban system, but net immigration is highly selective, as shown in Table 7 and Figure 13. Immigration is highly concentrated in the largest cities, and especially in Toronto and Vancouver; as well as in locations near these cities, notably in southern Ontario. Immigration in the Atlantic region and Quebec, outside the Montreal region, is almost non-existent. While immigration levels used to rise and fall with the strength of the Canadian economy—hence the rate of job creation—recent levels have become more detached from the economy. Moreover, the composition of immigrants has changed over time. There are now more family members, and immigrants originate in countries that are less competitive in terms of economic opportunity. With its long waiting list, Canada can have as many immigrants as it cares to accept, although the competition for skilled immigrants has intensified.

Changes in the sources of immigrants suggest some reasons for the high degree of spatial concentration (see Table 9). During the 1960s, immigrants were overwhelmingly European, with a significant proportion from the United Kingdom. Recent immigrants are less likely to be Europeans and more likely to come from East or South Asia. They prefer to live, at least initially, where there are established networks and communities that share the same language and culture. Eventually, immigrants may disperse more widely throughout the country, but the initial location decisions tend to favour a small number of large, diversified cities.

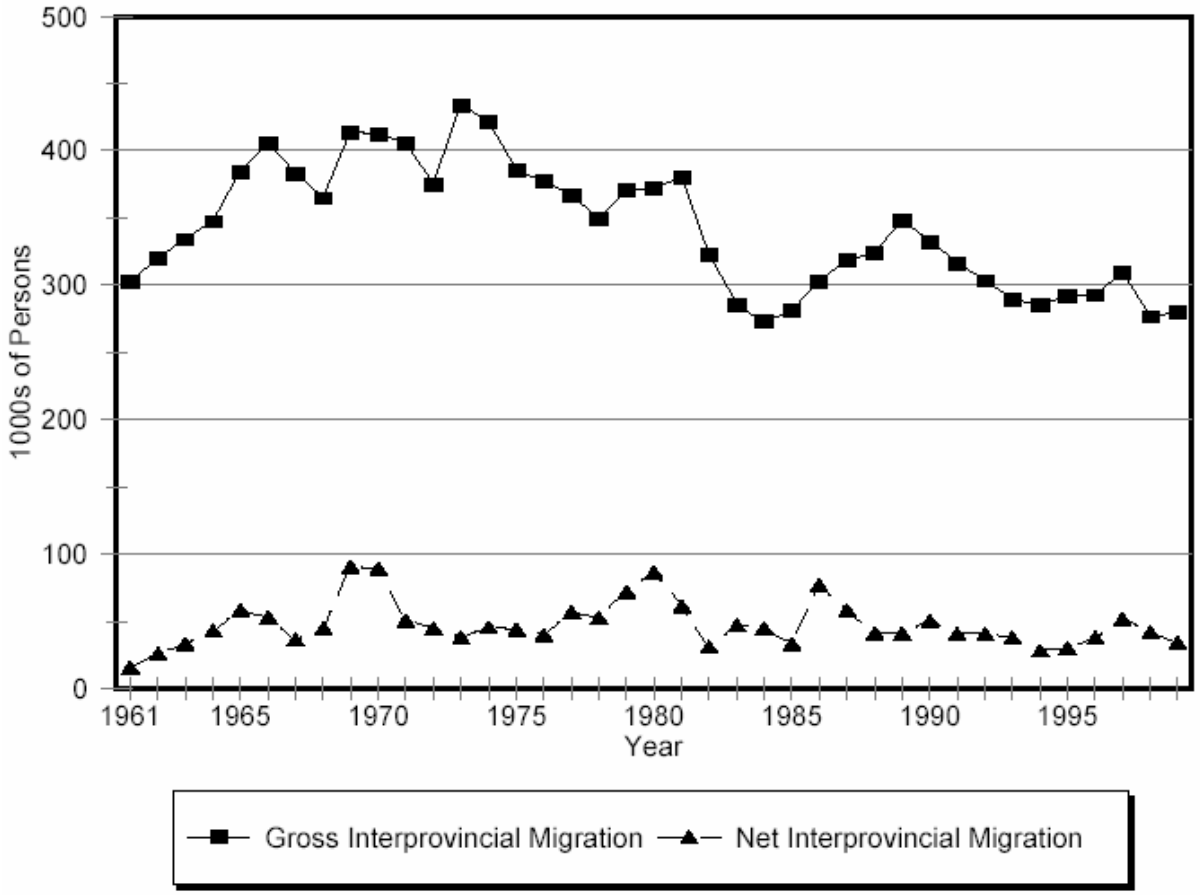
Neither the rate of natural increase nor net immigration responds strongly to local economic growth. Thus, the only demographic mechanism remaining to adjust population to the needs of local labour markets is domestic migration. Canadians do relocate frequently, at an annual rate of more than 15%, but the vast majority of moves take place within the same urban centre, or between the urban centre and the immediate service area. The best measure of longer-distance moves is the level of interprovincial migration, for which a long time series is available (Figure 14).

Table 9: Sources of Immigration, 1961-2001

Origin	1961-1971	1971-1981	1981-1991	1991-2001
United Kingdom	21.4%	13.5	8.8	2.5
Other Europe	47.8	22.7	16.8	17.0
Asia	12.1	33.3	47.2	58.2
South & Central America	8.0	16.5	16.5	10.9
USA	6.3	6.7	4.0	2.8
Africa	3.2	5.8	5.7	7.6
Other	1.2	1.5	1.0	0.8
Number of Immigrants	745,600	936,300	1,041,500	1,830,700

Source: Statistics Canada. Census of Canada, 2001.

Figure 14: Interprovincial Migration, 1961-2001



The level of gross migration depends in the long term on the age structure; as noted earlier; young adults move more often. Interprovincial migration levels peaked during the 1970s as the baby boomers came of age. Economic and political cycles are imposed on this trend and show up in the pattern of net interprovincial migration, which has fluctuated between 30,000

and 90,000 persons a year. Note the impact of the FLQ events in Quebec 1969-70, generating a surge of migrants from Montreal to Toronto. A similar wave occurred after the election of the Parti Quebecois in 1976. The energy boom in the west during the late 1970s (and the subsequent bust in the 1980s) drew job-seekers from Ontario—and then sent them home again. A secondary peak in net migration occurred in 1986. Substantial flows occur within provinces as well; thereby adjusting the population growth of larger and smaller centres to changing economic conditions.

During the 1950s and 1960s people tended to move from rural areas and small towns to the cities; the 1970s witnessed a reverse flow, temporarily, as the population dispersed into smaller places, while more recently, larger cities are again attracting migrants from smaller centres (Table 7 and Figure 13). Some cities are attractions in their own right (Calgary, Edmonton, Ottawa); while others attract large in-flows from nearby larger cities, in the form of overspill suburbanization (Oshawa from Toronto; Abbotsford from Vancouver). Continued rapid economic growth and immigration—and the associated high house prices—also encourage part-time workers or retirees in larger cities to relocate to small town and ex-urban settings, often outside the CMA boundaries.

In sum, as the overall level of natural increase continues to decline, a city's growth will depend more and more on its ability to attract migrants, domestic or international. It must be perceived as a good place to live. The correlations between rates of natural increase, net domestic migration, and net immigration for 139 CMA/CAs were 0.115 and 0.314 respectively, while the net domestic and net international migration flows were correlated at 0.279. All three growth processes were positively correlated with the size of the city in 1996.

Government

The substantial influence of governments on the economy and lifestyles of Canadians, and on growth and change in the CUS is widely recognized (see, for example, Simmons, 1982, 1986), but only partially understood. The economy is shaped by policies, including macroeconomic and trade policies, as well as subsidies and taxes that target various industrial sectors. Immigration policy obviously affects the rate of population growth. Infrastructure investments modify the distance barriers between places and help knit the country together. Massive fiscal transfers and social programs redistribute income from richer to poorer regions. How do all these activities affect the evolution of the Canadian urban system?

Let us begin by recognizing that governments act, among other ways, as gatekeepers, by responding to a variety of external and internal economic and social pressures. As the world changes, or some aspect of Canada changes, governments respond by negotiating a treaty or passing legislation to incorporate that change. For example, Table 10 lists a series of government decisions that have altered the urban system significantly. The most important changes modify the national boundary, making it either less permeable (with the usual result of centralizing growth within the country) or more open (thereby dispersing growth). Notable events for the Canadian urban system were the signing of the Auto Pact in 1965 that encouraged the specialization of Ontario manufacturing and the gradual integration of that region with the American Midwest. The success of the Auto Pact encouraged the Free Trade Agreement of 1989 that opened the door to even greater integration with the United States,

as shown earlier in the growth of exports (Figure 10). The North American Free Trade Agreement (1994) simply expanded the agreement to include Mexico. The Immigration Act (1978) helped increase the flow of immigrants and diversify the sources of immigration. To the extent that family members were preferred, recent immigration destinations have tended to replicate previous immigration concentrations; to the extent that immigrants come from Asia, for example, big cities with established Asian immigrant communities are favoured.

Table 10: Public-Sector Events Affecting the Canadian Urban System, 1965-2001

Date	Event	Impact on CUS
1965	The Auto Pact	Accelerated growth in Ontario; created stronger north-south links with the Midwestern United States.
1967	Equalization payments	Current format initiated. Transferred funds for public services from rich provinces to poor ones.
1968	Medical Care Act	Increased federal funding and provincial expenditures, hence increasing spatial redistribution.
1970	FLQ crisis in Quebec	Frightened anglophones and their firms away from Quebec.
1971	Expanded unemployment benefits	Transferred substantial sums to smaller resource communities, especially in Eastern Canada.
1973	Foreign Investment Review Agency	Monitored acquisitions of Canadian firms; and new investments by foreign firms. Did it discourage American capital from investing in Canada? In 1985 the agency was converted into Investment Canada.
1976	PQ victory in Quebec	Accelerated the flight of anglophones and capital from Quebec.
1978	Immigration Act	Established priorities and targets, expanding the level of immigration.
1980	National Energy Policy	Diverted oil and gas income from Alberta to the East, slowing down growth and investment in the West. Revoked by Tories after 1984.
1989	Free Trade Agreement	Largely eliminated duties and restrictions on trade between Canada and the United States.
1993+	Federal cutbacks	Reduced level of transfers to provinces, in turn reducing redistribution. Reduced unemployment benefits to Atlantic Canada.
1994	NAFTA	Extended Free Trade Agreement to Mexico.

Source: The Canadian Encyclopedia

Other policy initiatives increased the level of spatial redistribution of income from wealthy provinces to poorer ones, and from big cities to smaller (and poorer) places, thereby reducing the variation in income per capita. Equalization payments among provinces took their present form in 1967. Unemployment benefits have a similar redistributive effect, and they were expanded in 1971. Pensions and health care benefits also increase the level of redistribution (Simmons, 1984). On the other hand, programs intended to “eliminate the deficit,” imposed by the Liberal government after 1993, reduced the levels of social transfers and payments to the provinces, creating a series of budget crises for the latter.

Other significant political events have strengthened or weakened the political integration of the country, and thus affected the operation of the urban system. Events and policies in Quebec have weakened the ties between the Francophone urban subsystem centred on Montreal and the rest of Canada. The National Energy Policy and other political actions have reduced support for federal policies of integration in the West. The collapse of constitutional negotiations in the 1980s created tensions between provinces and the federal government. It is now unlikely that the federal government could introduce a major program that implied the further redistribution of resources among the provinces. Instead, Canada is moving towards even greater decentralization, with increased roles for the provinces and international agencies (read the United States), and with the federal government's role in relative decline.

The less visible actions of governments include incremental changes in revenues (taxes) and expenditures that transfer money from wealthier (growing) locations to other poorer places. By improving services in the latter, and reducing the gap in regional incomes, these actions reduce the variance in urban growth rates. The geography of who has political jurisdiction over which tax bases and expenditures is quite important. The federal government can transfer funds interregionally (that is, from one column to another in Table 1). Taxes generated in the high-income provinces of Ontario and Alberta are transferred to the Atlantic region or Quebec by direct transfers or through payments for programs. The provinces may also redistribute income, but only within the province, usually from higher-income metropolitan areas to poorer rural areas and small towns. In other words, the provinces transfer money up and down the columns in Table 1. In this way, the relative importance of government spending at the federal or provincial level affects the spatial pattern of redistribution among cities, hence the variation in income (and urban growth). In summary, a reduced role for the federal government leads to greater income variation among regions; a reduced role for the provinces leads to more variation by city size.

Consider the trends in federal government expenditures over the last 30 years (Figure 15a). For the most part, federal revenues have remained more or less stable over the study period, ranging from 15% to 18% of GDP, increasing in good times and declining during recessions. A wider variation occurs in the level of federal expenditures: this line records the entire trauma of debt and recovery between 1974 and 1997. As government revenues flattened in the aftermath of the first oil crisis, expenditures continued to soar, peaking at 23% of GDP in 1992. The growth occurred first in transfers to business (1974) and then in those to persons (1982). When the expenditures were finally reduced in the early 1990s, the federal government's direct expenditures (the civil service) and transfers to persons and to provinces were affected. By 2001 the transfers to provinces had declined to the 1960 level of 3%, down one-third from the peak of 4.5% in 1992. The federal government's ability to redistribute funds regionally is now about the same as it was in 1970, but has been reduced by 30% since 1992.

At the same time, demands on the provinces were growing rapidly (Figure 15b). Provincial revenues and expenditures doubled from about 10% of GDP in 1960 (equivalent to 60% of the federal government level) to 21% in 2001 (115% of the federal level). Meanwhile, the level of transfers from the federal government rose and then declined, returning to the same level as 1961. Most of the growth went toward the purchase of goods and services, notably health care, although municipalities obtained modestly larger shares as well, at least until the cutbacks in the 1990s. Most of the increase in health care spending was raised within the

Figure 15a: Federal Government Expenditures, 1960-1999

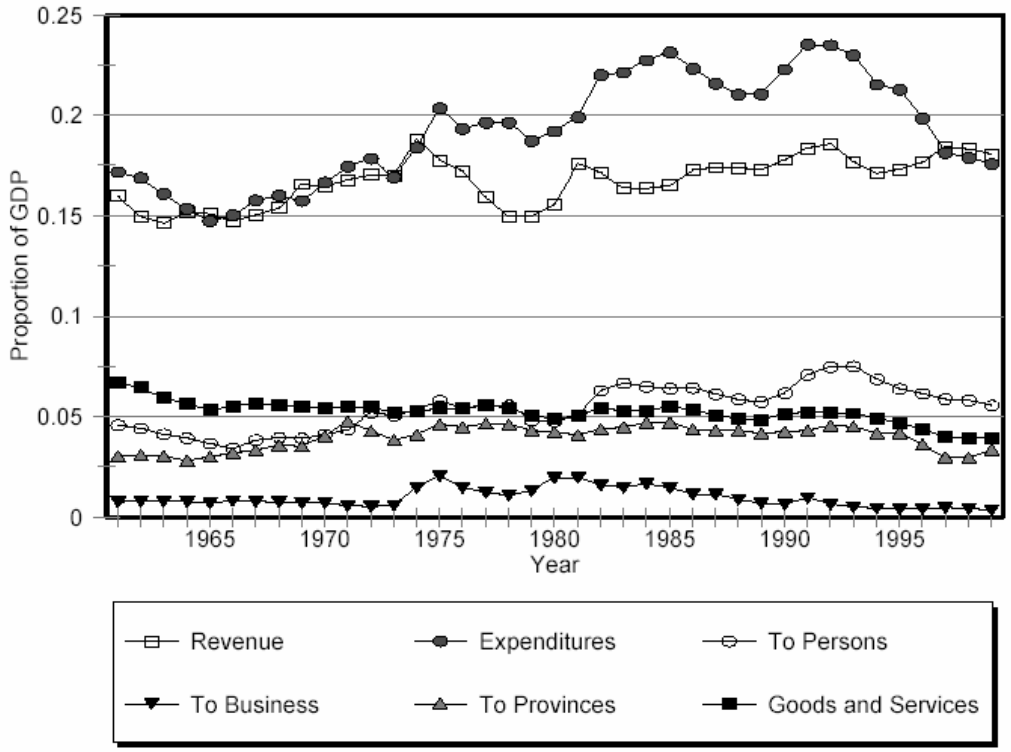
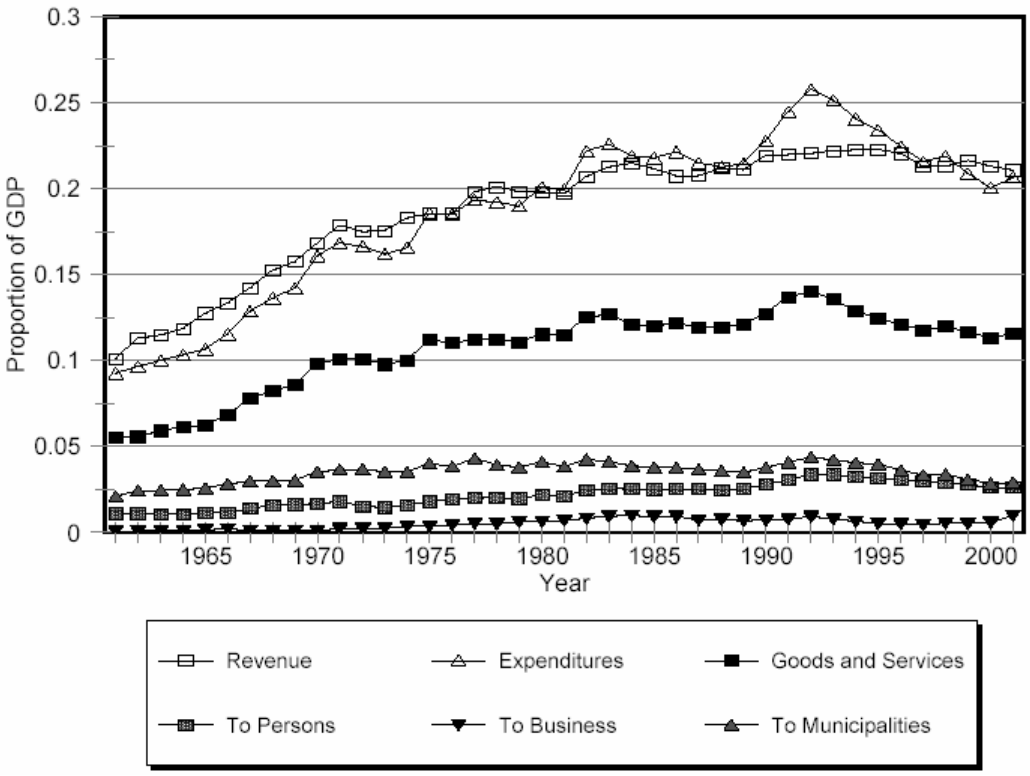


Figure 15b: Provincial Government Expenditures, 1960-2001



provinces, and when the federal government reduced its contributions to the provinces in the 1990s, the latter found themselves squeezed between growing health care costs and shrinking revenues from transfers. There was not much money left for municipalities; their share grew from 2.1% in 1960 to 4.3% of GDP in 1992 but declined to 2.8% by 2001.

In sum, the ability of the provinces to redistribute income from larger to smaller cities has increased over the period as the taxes raised in the larger cities increased, but the pressures for expanded social services has also meant that provinces targeted places according to their health and education needs.

Without any growth in federal government expenditures, the ability to compensate for regional disparities in income and levels of service remains unchanged. At the same time, however, the expenditures by provinces have increased—emphasizing the disparities among provincial tax bases. Figure 16 shows the diversity in revenue sources for provinces and regions. Each bar on the graph displays a different combination of incomes; this, in turn, implies a different pattern of economic growth as local and national economies evolve. Income taxes are perhaps the most similar, ranging from 15 to 20% (Alberta, the Atlantic region) to 30% (Quebec), with the share of revenue derived in this way increasing in all jurisdictions. Indirect taxes are also very similar, except for Alberta, which has no sales tax. In other provinces, the share ranges from 30% (Manitoba, Saskatchewan, the Atlantic provinces) to 40% (Ontario), and again the share has been increasing over time. Corporation taxes typically generate less than 5% of total revenue, except for Alberta and Ontario. Social insurance charges are even smaller.

The major sources of provincial variation are the level of federal transfers and the flow of revenue from resources. Part of the transfers go to all provinces to pay for health and education; but equalization payments are restricted to the poorer provinces as a compensation for their weak revenue base. Alberta, British Columbia (until recently), and Ontario typically do not share in the latter, so transfers contribute only 10 to 15% of their provincial revenue. Manitoba, Saskatchewan, and Quebec receive an additional 10 to 15% of revenue due to equalization; while the Atlantic region obtains 40 to 50% of provincial revenue from the federal government. In every region the share of these transfers has declined over time, as the federal government has cut back; hence the compensating increases in income and sales taxes. Resource revenues vary widely as well; generating only 5 to 10% for Ontario and Quebec (the core), but ranging from 10% in the Atlantic region to 30% in Alberta. In the past, as much as 60% of Alberta's revenue has come from gas and oil royalties—hence the low levels of taxation.

To generalize: Quebec is the high-tax province, despite the equalization payments, but provides a wide range of services. Ontario obtains more corporate taxes. The western provinces have substantial resource revenues, especially Alberta. The Atlantic region lives or dies through federal largess. Whatever the source, these provincial revenues pay for employment in public services (20% of employment) and for infrastructure. The overall decline in the flow of federal funds inevitably increases the variation in growth rates among the regions.

Figure 16: Provincial Revenues, 1960-1999

Figure 17a: Personal Income Per Capita, 1960-2001

(relative to national total)

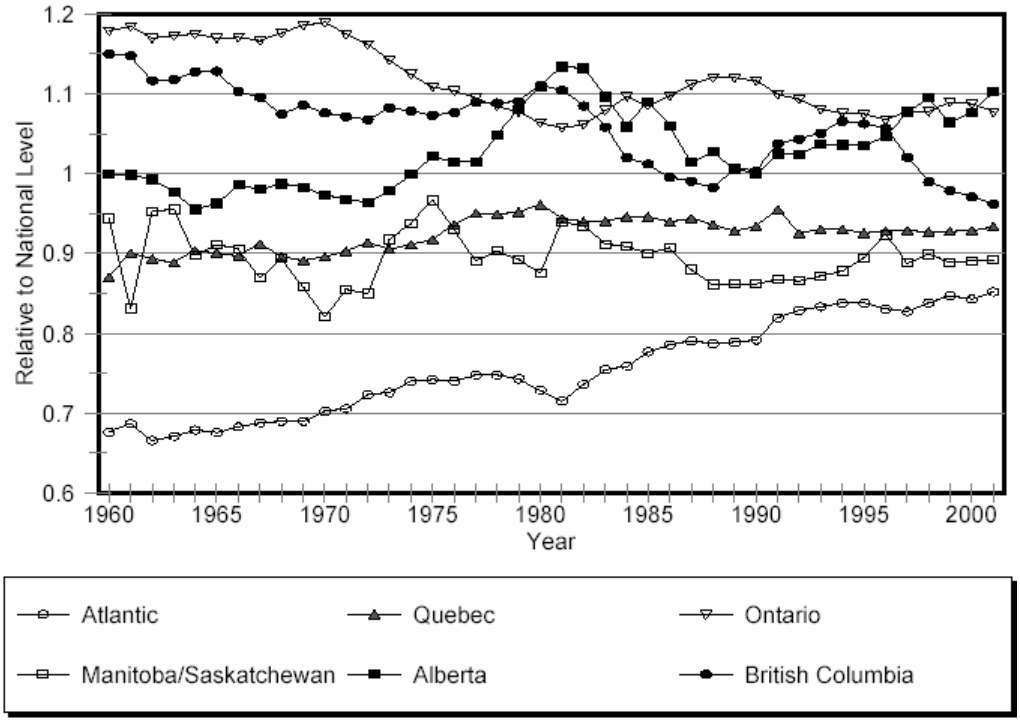
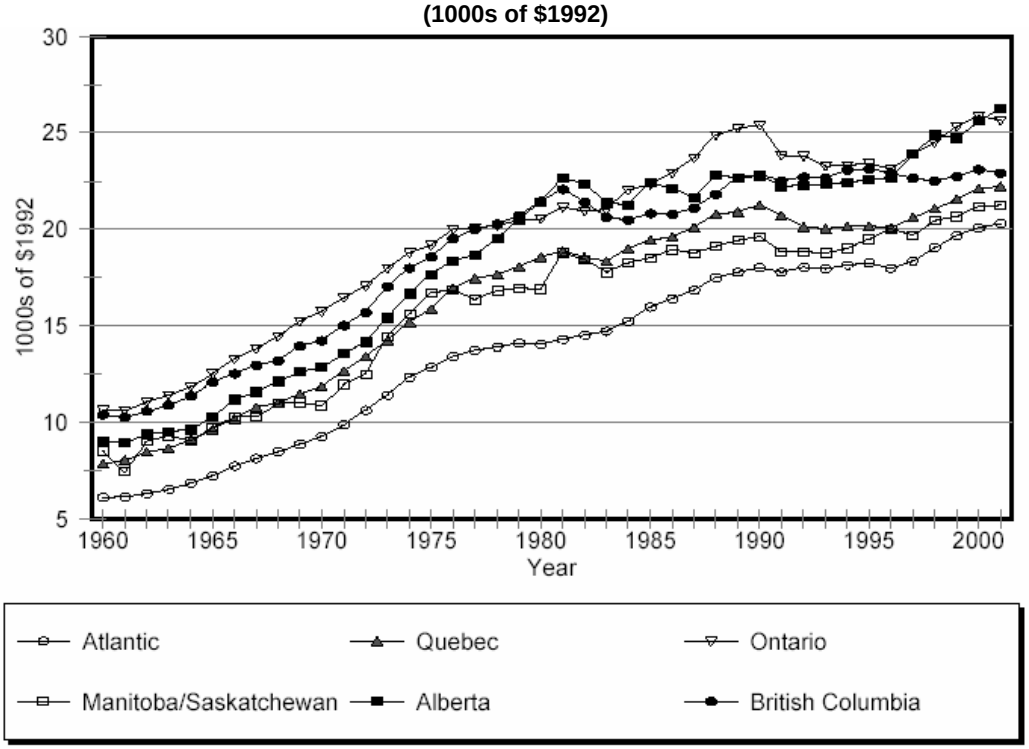


Figure 17b: Personal Income Per Capita, 1960-2001

(1000s of $1992)



The level of interregional transfers—hence the ability to reduce the differences in income levels among the provinces—has not really changed since 1971. A graph of regional income variations over time appears to confirm the lack of change (Figure 17a); but when incomes are scaled relative to the growth in the overall level of income (Figure 17b), substantial convergence among the regions is apparent. Ontario, Alberta, and British Columbia are clearly at the top, with Alberta gaining, and British Columbia losing ground in recent years. Income levels in Quebec and the eastern Prairies remain at just over 90% of the national level, while the Atlantic region continues to lag, despite a substantial advance since 1980.

Economists attempt to track financial flows, as we have done above, but anyone who reads the headlines can track the impact of political events and their effects on urban growth. The chief among these is the continuing controversies and policies concerning Quebec's place within Confederation. The FLQ scare in 1970 and the election of the Parti Québécois in 1976 led to the relocation of at least 100,000 Anglophones from Montreal to Toronto, along with many businesses and considerable capital. Within the decade, Toronto became the largest city and the dominant urban centre in Anglophone Canada, the culmination of a process that began several decades before. Montreal has intensified its links with other cities in Quebec, but lost much of its national role. Subsequent growth in Montreal reflects the relatively slow growth of the region it serves.

Despite—or perhaps because of—these conflicts, subsequent federal governments have intensified economic development programs in Quebec. Every federal policy is examined to see "how it plays in Quebec." Coincidently, for most of the period, Canada's prime ministers have been Quebeckers. This apparent favouritism, coupled with the perception of federal policies such as the National Energy Policy as a direct attack on the West, intensified anti-Ottawa feelings in Western Canada, especially Alberta. Regional political divisions, combined with the relative size and continued growth of Ontario, permits the latter to dominate federal politics and policy.

2. Responses of the Canadian Urban System

In this section we examine the evolution of the CUS within the context of the changes in the environment described in the previous section. The first part tracks the distribution of urban growth over time, by city size and region. The second part examines the leading provinces as a series of case studies intended to illustrate the complex relationships between changes in the provincial economies and the geography of urban development.

2.1 Urban Growth over Time

The most direct measure of the response of the CUS to the complex set of events and processes described above is the population growth of cities. Figure 18 tracks aggregate population growth rates according to city size (Figure 18a) and region (Figure 18b) since 1961. Both graphs reveal the overall trends in urban growth: a gradual decline in growth rates from 1961 to 1981, with an upsurge in 1986, due largely to increased immigration, and a subsequent decline through to the present.

The variations in growth rates by city size are slightly less diverse in magnitude than by region, but are more consistent. Larger cities have the advantage every year except 1976—the brief period of the "counter-urbanization" phenomenon. Over time, the advantages of larger cities appear to have increased. The variation by region is basically east to west: the Atlantic region and Quebec are consistently at the low end, with Ontario above average, but usually trailing either British Columbia or the Prairies (essentially Alberta). In terms of growth, Alberta gained on Ontario during the late 1970s, then dropped back in the 1980s, but has recently recovered its position as the leader.

In Canada, the day-to-day management of urban growth is very much in the hands of the provinces. Provinces define cities and their responsibilities, tax and regulate them, and allocate the bulk of the resources available for basic infrastructure. As cities have grown over the last 30 years, so has the role of provinces, doubling their expenditures relative to GDP. The provinces build roads, utilities, and major public facilities such as hospitals and universities. At the same time, the federal government has retreated from its earlier levels of investment in urban housing, infrastructure, and regional development programs.

Figure 18a: Growth Rates by City Size, 1961-2001

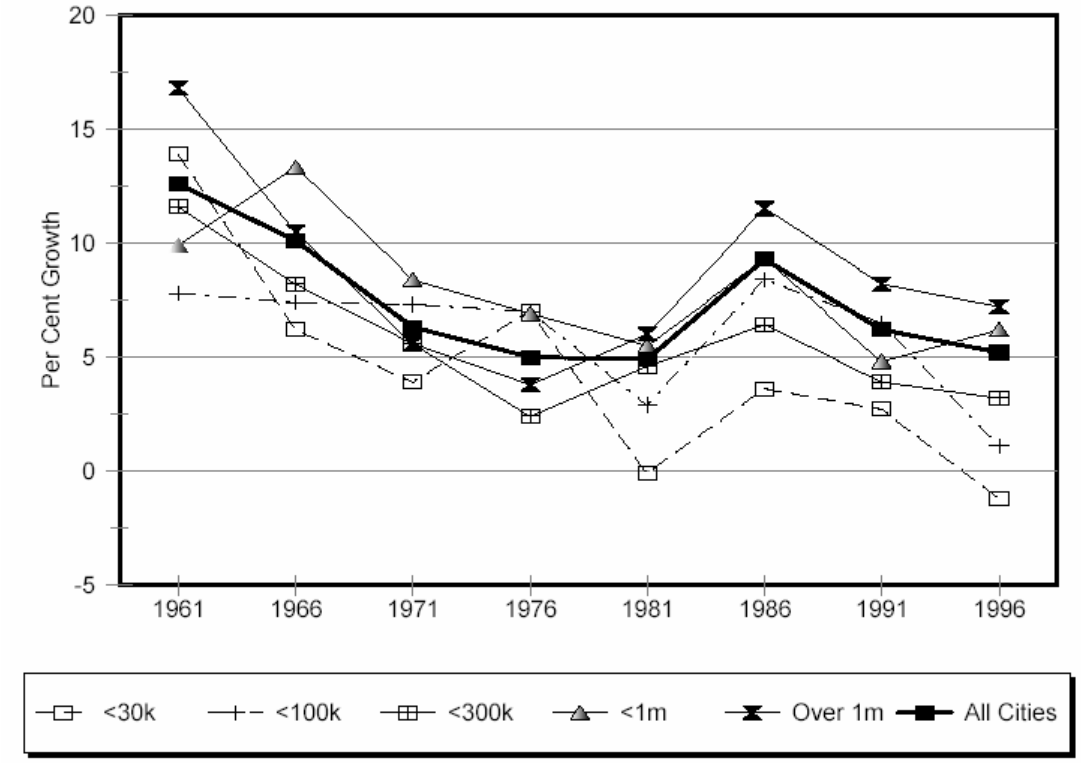
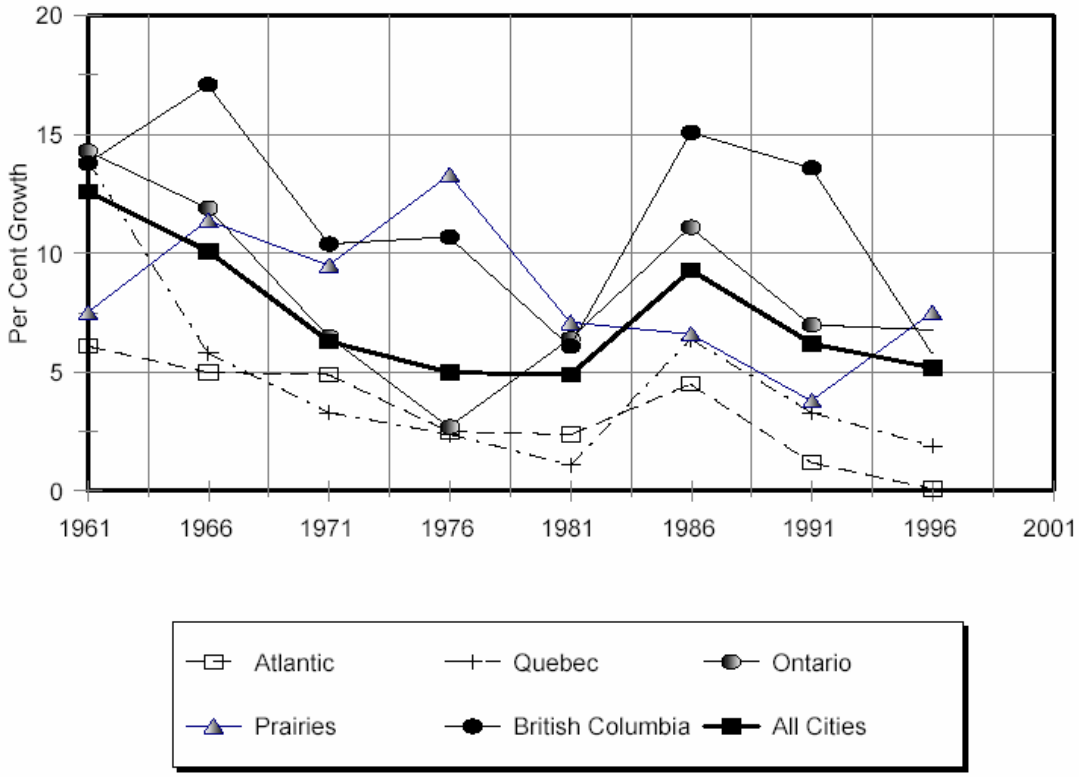


Figure 18b: Growth Rates by Region, 1961-2001



The importance of the provincial political environment for cities raises questions about provincial urban strategies. Do provinces support the growth of the largest centres (thereby encouraging centralization) or the reverse (encouraging dispersion) or do they balance the growth of several large centres (equilibrium)? In the case of smaller places, do they practise a kind of triage, by supporting growing centres and more or less abandoning the others? Or do they try to compensate for the loss of market-based activity in certain locations by expanding public facilities? Table 11 compares the growth rates of a number of Canadian cities with the provinces in which they are located. Are the cities increasing or decreasing their share of the provincial population?

Table 11: Growth Rates of Provincial Centres, 1971-2001

CMA/CA	Prov.	Population Share, 1971 (%)	Population Share, 2001 (%)	Change in Share	Growth Rate of Share (%)
Atlantic					
St. John's*	NF	27.8	33.7	5.9	21.3
Halifax*	NS	32.8	39.6	6.8	20.8
Cape Breton	NS	16.4	12.0	-4.4	-26.7
Moncton	NB	14.0	16.1	2.1	15.1
Saint John	NB	17.9	16.8	-1.1	-6.2
Fredericton*	NB	8.4	11.2	2.8	33.3
Central Canada					
Quebec*	QC	8.4	9.4	1.0	11.9
Montreal	QC	47.4	47.3	-0.1	-0.2
Ottawa	ON	8.7	9.3	0.6	6.9
Toronto*	ON	36.2	41.0	4.8	13.3
Hamilton	ON	6.5	5.8	-0.7	-10.8
Sudbury	ON	2.2	1.4	-0.8	-36.4
Western Canada					
Winnipeg*	MB	57.0	59.9	2.9	5.1
Regina*	SK	16.0	19.7	3.7	23.0
Saskatoon	SK	18.1	23.1	5.0	27.6
Calgary	AB	26.3	32.0	5.7	21.8
Edmonton*	AB	34.2	31.5	-2.7	-7.7
Vancouver	BC	49.5	50.8	1.3	2.6
Victoria*	BC	9.3	8.0	-1.3	-14.0
All cities	**19**	**23.0**	**24.7**	**1.7**	**5.2**
Prov. Capitals	9	25.6	28.2	2.7	11.9
Other Cities	10	20.7	21.5	0.8	-0.8

*Provincial capital.

Source: Statistics Canada, Census of Canada, various years.

Overall, as one would expect, the cities in the list increased their share of the provincial population. Perhaps also predictably, the expansion of activity by the provincial governments gave their capital cities a substantial edge, with an average percentage increase in share of 1.9% compared to a small decline of 0.8% for less fortunate cities—and the size differences for the two groups are not that large. Looking at the provinces in turn, a variety of results are observed. In the Atlantic region, Newfoundland and Nova Scotia have witnessed concentrated growth in St. John's and Halifax, respectively, leaving the other cities far behind, with the Cape Breton (Sydney) urban region as a major loser. In New Brunswick, in contrast, the capital, Fredericton, has gained, as has Moncton as the Francophone urban node in the province, but Saint John has been left behind.

In Quebec, the capital city has improved its position as its provincial role has expanded, but Montreal has fallen behind, due to the loss of population in the Anglophone community and lower levels of immigration. In Ontario, Toronto has outstripped the growth of most other cities, even Ottawa, and Sudbury has declined more rapidly than any other city on the list.

On the Prairies, Winnipeg has grown less than the average for all provincial capitals, but it started with a very high share. The other two Prairie provinces manage twin cities. In Saskatchewan, both cities have grown at about the same rate, but the capital, Regina, has slipped behind Saskatoon. In Alberta, Calgary has moved well ahead of Edmonton. In British Columbia, the provincial government is the major economic activity in Victoria, while Vancouver is moving ahead in all sectors.

Taken together, it is clear that each province faces a different situation, with substantially different results and implications. Most provincial capital cities do well, but Edmonton, Regina, and Victoria have lost ground for different reasons. Large cities usually do well, but Montreal has not. Edmonton has grown rapidly, but Calgary has grown even faster. Although regional variations in urban growth rates are still significant, the largest cities within each region have tended to increase in importance.

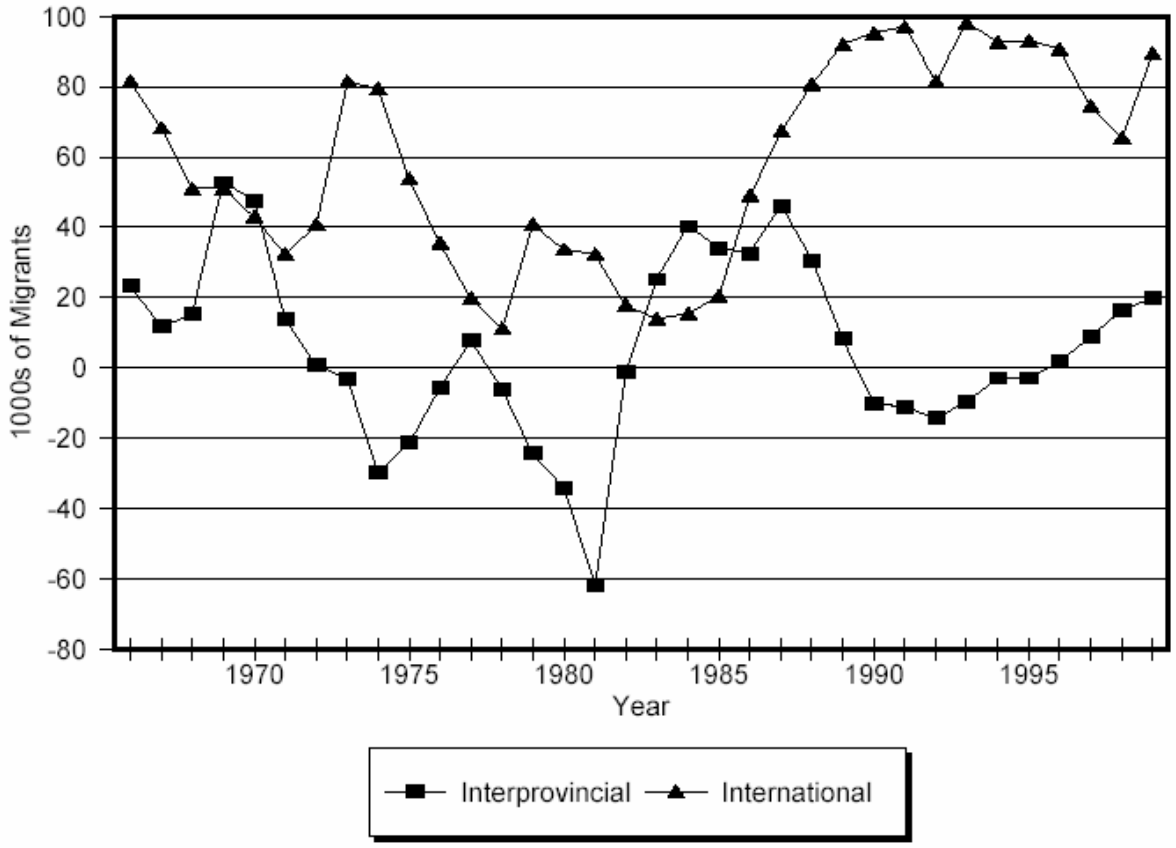
2.2 Provincial Case Studies

For a clearer sense of the process of urban system change, its volatility, and the complex interactions between external and internal forces, we present a series of brief case studies of the relationships among major subsystems within the Canadian urban system. In each case we can track the changes in demographic indicators for the urban subsystem—hence population growth from year to year—and link those changes to economic or political events occurring both inside or outside the country. The case studies are four provinces, each one centred on a major city or cities: Ontario (Toronto), Quebec (Montreal), Alberta (Calgary and Edmonton), and British Columbia (Vancouver). These case studies illustrate how changes in the urban system can originate in any one of the economic, demographic, and public-sector components of the urban system.

We begin with Ontario, the largest region, home of the largest city (Toronto), and the region most closely linked to the United States market (Figure 19). As Ontario has come to dominate the Canadian urban system over the last 30 years, it has also become the demographic reservoir for the rest of the urban system. Ontario provides domestic migrants to other areas

of the country that are growing, typically in the West, and then absorbs migrants from areas in decline, typically those to the East. These movements are accelerated by cyclical swings in the Ontario economy, resulting in the wide variations in the net migration profile from year to year.

Figure 19: Net Flows of Migrants, Ontario, 1965-1999

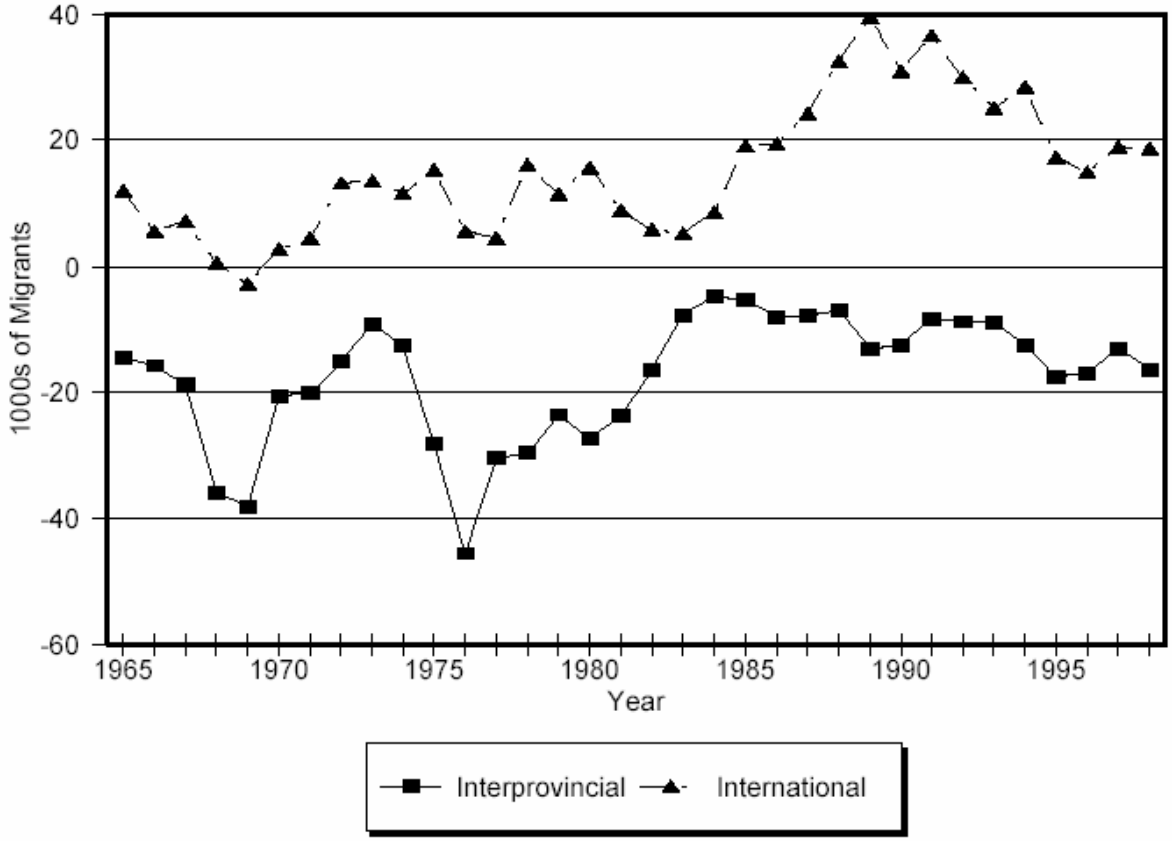


Voters in Ontario, to illustrate one of the relationships, were initially apprehensive about the Free Trade Agreement, and the recession in the early 1990s appeared to support the doubters. However, the growth of exports (especially automobiles) to the United States has stimulated economic and demographic growth in the province (see Figure 10a). Ontario, as a result, has become more and more dependent on the U.S. economy and international immigration, and now appears to be more accepting of, if not comfortable with, the increasing American orientation of the Canadian economy.

While Quebec's economic role as a provider of manufactured goods and services within Canada resembles that of Ontario, the reasons for the declining role of Montreal in the Canadian urban system were political rather than economic (Figure 20). In 1961 Montreal had a population of about 1.7 million, while Toronto had 1.5 million. The two cities provided goods and services to the rest of the country. But Quebec was losing domestic migrants from the early 1960s onward, while Ontario was attracting them; and Ontario was also more attractive to international immigrants. In the 1970s these patterns were accelerated by political events

and violent actions. A surge of relocations to Toronto—called the Highway 401 migrations—resulted, as shown by the domestic migrant profiles for both provinces.

Figure 20: Net Flows of Migrants, Quebec, 1965-1999



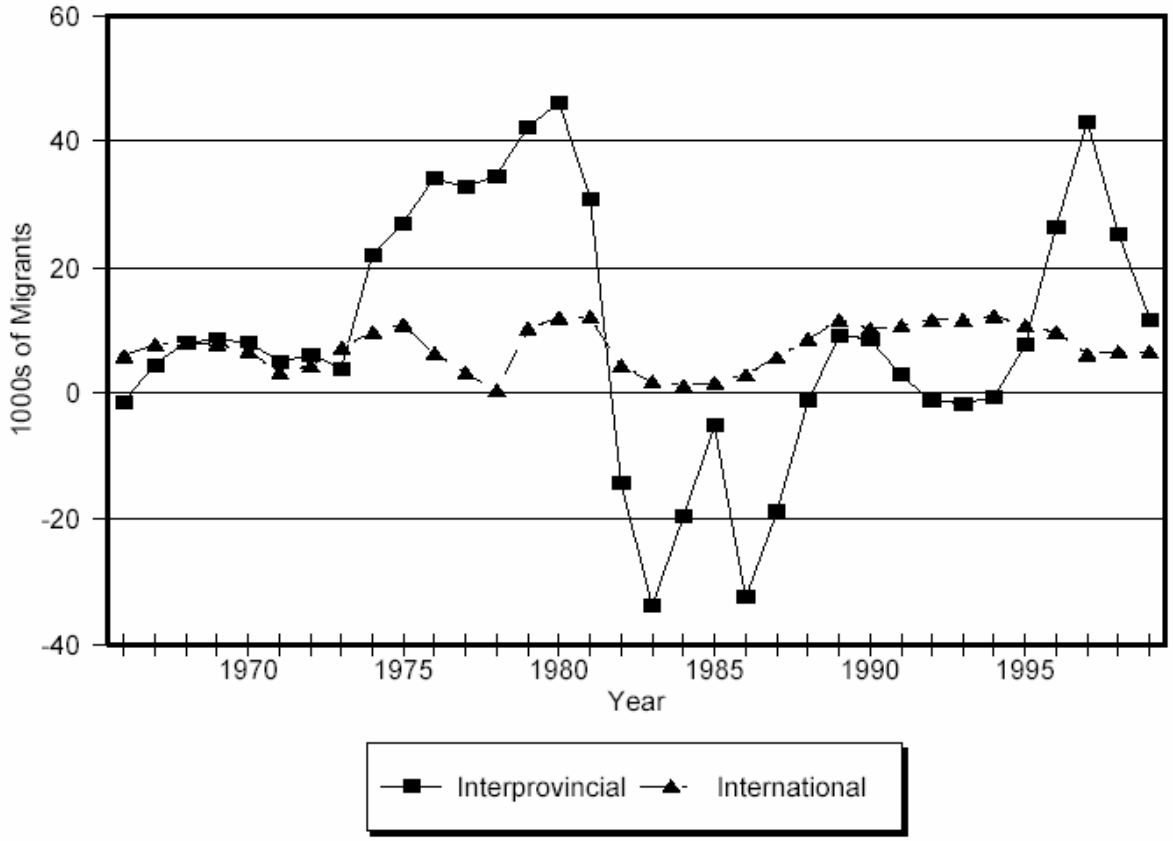
After a few years of recovery, the election of a Francophone activist party in the provincial government in 1976 provoked a second surge of out-migration to Ontario. Legislation requiring the use of French in education and the workplace reinforced this out-migration, and led to declining in-migration and immigration. Most migrants, immigrants, head offices, and American capital went to Montreal's main competitor, Toronto. Montreal intensified its links to Francophone communities in Quebec, but lost those with the other regions of Canada. At the same time, Francophone elites replaced Anglophones within Montreal in positions of economic power. By the year 2001 the Toronto CMA had 4.8 million population, and Montreal about 3.5 million.

The relationship between Ontario (Toronto) and Alberta (Calgary and Edmonton), as shown by migration flows, is a classic example of the core-periphery relationship (see Figure 21). Alberta contains much of Canada's oil and gas deposits. When energy prices are high, producers invest heavily in new production facilities and jobs are created. As well, the province collects energy revenues and builds schools, hospitals, and physical infrastructure. Migrants from all over Canada are attracted to Alberta. But much of the money for energy and energy investments, as well as domestic migrants, come from Ontario, Canada's largest pool of

consumers. The result is an inverse relationship between the growth in the West and the growth of Ontario.

The boom times for Alberta lasted from 1974 (the first oil crisis) until 1981 (see Figure 10). At that time, the Canadian government, in response to pressure from Ontario consumers, decided to freeze the price of oil and gas, and to extract a share of the revenues from the Alberta government. The result was a reversal of migrant flows from Alberta back to Ontario and other eastern provinces. Eventually the federal government reversed the policy, and as oil prices increased in the 1990s, Alberta again began to boom and to attract in-migrants. Since Alberta does not have a large base of recent immigrants, however, the province has attracted fewer new immigrants than one might expect during such boom periods.

Figure 21: Net Flows of Migrants, Alberta, 1965-1999

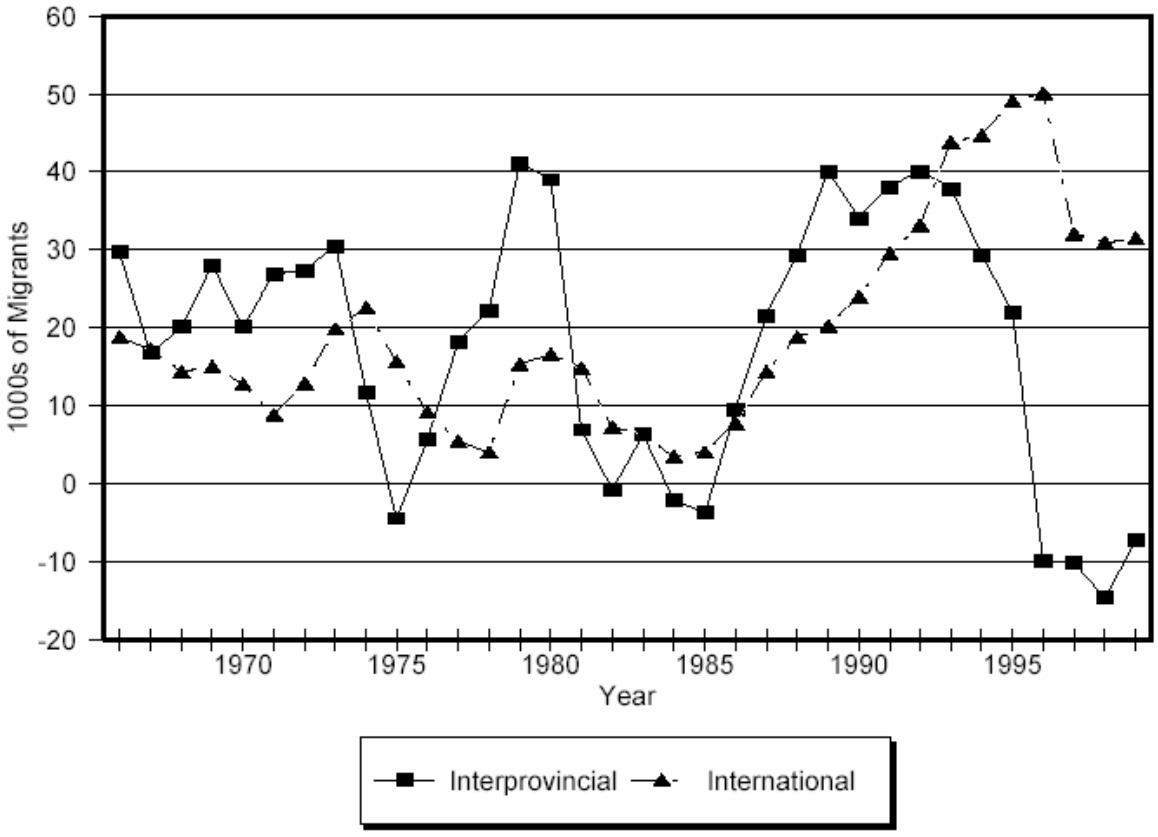


British Columbia, in contrast, has always been home to substantial concentrations of Asian immigrants. During the 1990s, the province received an influx of immigrants from Hong Kong (Figure 22). The transfer of Hong Kong from British to Chinese control in 1997 created considerable uncertainty among Hong Kong residents. Many began to look for alternative places to live, and Canada, especially Vancouver, was considered accessible. By 1995 more than 50,000 immigrants a year were moving into the city; the resulting prosperity attracted large numbers of domestic migrants as well. After the political transition in Hong Kong, the level of immigration declined, along with other parts of the British Columbia economy, and the prov-

ince went into decline. Nonetheless, the surge of growth had cemented Vancouver's position as Canada's third-ranking city, despite the challenges from Calgary and Edmonton.

Canada's cities have always been extraordinarily diverse: a small number of places divided by climate, topography, economic base, time of settlement, city size, and ethnicity. This diversity leads to regional variation in urban growth rates as different growth factors operate in different parts of the country. The last 30 years have altered this diversity in a number of ways. The continued growth of the largest cities has expanded the range of population size, hence the importance of city size in explaining differences among places. The growing importance of services has largely eliminated many of the distinctions previously attributable to regional economic base, as the mix of urban occupations has become more and more alike from one region to another. Higher incomes and closer contact with the United States have also reduced regional differences in lifestyles. In contrast, the surge of recent immigration from new sources, together with the continuing assimilation of earlier immigrants, has led to new forms of social and cultural differentiation among and within cities. In sum, regional differences are slowly giving way to city size variations as the factors that determine urban growth.

Figure 22: Net Flows of Migrants, British Columbia, 1965-1999



Problems emerge as city size plays a greater role in determining urban growth, especially as the overall population growth rate declines. The larger and wealthier cities, with more business and financial services, attract the most investment and the majority of new immigrants. Their economic opportunities, in turn, attract young people and younger lifestyles. Smaller centres, on the other hand, are losing their young people and part of their revenue base and cannot afford the infrastructure to rebuild their cities. Thirty years ago, urban growth in Canada was almost universal, occurring in every part of the country; now, with a few exceptions, it reaches only the largest cities.

3. Summary

The Canadian urban system has changed substantially over the last 30 years, and the processes of change and our understanding of them, have changed as well. The following summary of the observations in this paper lists the changes in the urban system and the contextual or environmental factors. In Section 4, we discuss our understanding of the processes of growth and change and what they imply for the future structure and viability of the CUS.

3.1 The Canadian Urban System

1. The CUS is large, with 139 cities (CMAs and CAs) and 23.8 million population, representing almost 80% of the Canadian population.

2. The urban population is highly concentrated. The eleven largest cities, those with population greater than 300,000, contribute 72% of the total urban population.

3. At the same time, the urban population is widely dispersed, stretching across 8,000 kilometres from Victoria to St. John's. Yet most cities are located within 300 kilometres of the American border, and more than 60% of the population is concentrated in the Windsor-Quebec corridor of Central Canada (the core region).

4. Viewed at a continental scale, however, the CUS appears as a small (less than 10% of the continent's urban population), marginal (along the northern border), appendage to the urban system of the United States.

5. Recent growth rates tend to favour urban centres over rural places; and large urban centres over small ones. Regionally, there is a marked contrast between the lack of growth in the Atlantic and Quebec regions, and in Manitoba and Saskatchewan, and the continued growth in the rest of the country. Almost all cities in Alberta are growing.

6. The largest cities dominate the map of interactions, measured here by air passenger links, especially cities that act as regional capitals and international gateways—Toronto, Montreal, Vancouver, and Calgary. The eastern part of the country is less closely integrated with the rest of the country.

7. The pattern of international linkages suggests that the American border is still significant, reducing the level of movement among cities of similar size and distance apart by a factor of five or more. Although many flows originating from within Canada move through Toronto, they reach a wide variety of American cities.

8. Over the long run (30 years) the CUS has added 10 cities, and grown in population by more than 40%. Growth rates tend to increase with city size, and by region, from the Atlantic to the Pacific.

9. The year-to-year and place-to-place variation in growth rates is highest among the smaller cities, especially among those in the periphery.

10. The wide range in the population of cities within the CUS and the hierarchical structure of interurban relationships tend to maintain the existing population size rankings. The major disturbances in this pattern have been the displacement of Montreal by Toronto as the nation's largest city and leading service centre, and the replacement of Winnipeg by Calgary as the leading service centre of the Prairie region. Montreal has taken a regional role as the leading centre of Quebec and Francophone Canada.

11. These changes in population rank are reflected in the shifts in air passenger flows. Toronto's share of total flows has increased substantially, while Montreal now lags Vancouver (and is barely ahead of Calgary).

12. Airline connections with cities in the United States have grown more than twice as fast as domestic flows, and are becoming more widely diffused as well—on both sides of the border. Even Toronto's share of transborder flows has declined.

13. The diversity of Canadian cities has shifted away from the traditional differences derived from regional economies toward measures linked more closely to differences in city size, growth rate, and social character: the age of the population, the level of immigration, the job opportunities available, and lifestyles.

3.2 The Changing Environment of the CUS

Various factors affect the pattern of growth and change: these are grouped here into economic, demographic, and public-sector factors.

1. The economy has grown three or four times more rapidly than the population, so Canadians are now much more prosperous than before. The importance of consumption activities has increased relative to production activities in shaping the urban growth process.

2. The number of jobs has increased more rapidly than the population, and most new jobs have been added to the service sectors. Jobs in primary activities have declined sharply. This pattern tends to favour cities over small towns and rural regions, especially larger cities, which offer the most sophisticated business and financial services.

3. The lack of growth in jobs in the resources sectors has reduced much of the traditional "boom and bust" characteristic of cities in the periphery. Nevertheless, the energy sector

provides revenues for some provincial governments to build cities by funding public-sector services.

4. Exports have grown rapidly, especially following the Free Trade Agreement in 1989. Ontario has become even more closely integrated with the American Midwest, primarily through the automotive sector, and Western Canada and Quebec sell energy to the United States. In contrast, domestic shipments are losing relative share.

5. Employment growth varies widely by region, increasing from east to west. But when the Prairie region is divided into provinces, Alberta leads Canada, while Manitoba and Saskatchewan have grown least.

6. The most important demographic event has been the rapid decline in the level of fertility, and thus in rates of natural increase. Only a few rapidly growing cities and smaller places with significant native populations have grown through natural increase, while most rural areas and small towns have declined.

7. Immigration has replaced natural increase as the major factor in urban population growth, but it is highly concentrated in a small number of large cities, none of them east of Montreal. New immigrants seek other immigrants for social support and economic opportunity.

8. Domestic migration has declined slightly in absolute terms. It has also become more complex, and less responsive to job creation (Calgary being one exception). Social and environmental amenities have become important attractions. There is little correlation between net domestic migration and immigration within the urban system.

9. Government activities have affected economic and demographic processes, most recently by opening the border to trade and increased immigration. If Canada has an implicit urban policy, the main planks would be the combined impacts of trade liberalization and immigration.

10. Government policies have also reduced pressures for domestic migration by redistributing income to equalize access to services and levels of personal consumption in different parts of the country.

11. Increased expenditures on health care and education have given provincial governments a much greater role in shaping the space-economy and the pattern of urban development, at least relative to the federal government. Individual provinces, however, have responded differently to this challenge.

12. Political events in Quebec have increased the relative importance of Quebec City, but weakened the role of Montreal within the CUS. The preoccupation of the federal government with Quebec over the last two decades, on the other hand, has alienated Western Canada and may have weakened the ties of confederation.

4. Reinterpretation

This section of the paper attempts to draw together the findings of the summary above into a robust description of the growth processes influencing the CUS at the turn of the 21st century. It begins with a projection of current urban growth processes through to 2026, and then discusses the implications of that pattern, both within Canada and within the larger continental system.

4.1 The Future of the CUS

Table 12 shows the basic elements of currently available population projections. It begins with Statistics Canada's medium-level projections for provincial populations for 2026. Unfortunately, the projection is based on the 1996 census, so it favours British Columbia, rather than Alberta. The projections anticipate a national population growth rate of 16.7% over 25 years, with provincial growth rates ranging from –8.1% in Newfoundland to +33.8% in British Columbia.

Part B of the table shows the projected changes in the age distribution for this projection. Each of the age groups below age 45 is projected to decline in share, while all of the growth appears in the two oldest age groups. The proportion of persons over 65 rises from 13.0 to 23.1%.

Part C displays the implications of continued high immigration levels. It begins with the 2001 distribution of immigrants according to decade of entry, for the 1990s, 1980s, etc. We then double the number of immigrants for the earlier periods, to reflect the higher recent rates, assuming that future levels of entry will be maintained at the current level. Although these numbers are largely guesswork, they suggest that the overall proportion of immigrants in the population could rise to 23%, compared to 18% in 2001. Note that the number of immigrants over the next 25 years would be about 4.3 million—about 80% of the entire population growth projected for Canada. The newcomers would likely come from different countries, and be more highly concentrated in large cities than in 2001.

The procedure used to project urban populations combines the provincial projections with the changing city share of provincial populations calculated earlier. The population in 2026 is assumed to equal: (provincial population in 2026) × (city share in 2001) × (city share in

2001/city share in 1976). Thus, the urbanization process—including boundary changes—of the last 25 years is assumed to continue, within the constraints of the provincial projections. A "more-of-the-same" model of this kind, of course, contradicts most of our experience about recent urban growth patterns, but it is still marginally more probable than any alternative, especially since the regularities in Canadian urban growth appear to be increasing over time.

Table 12: The Components of the Population Forecasts (Based on Canada, 2026: Medium Growth Scenario)

A) Location (Population in 1000s)

	BC*	AB	SK	MB	ON	QC	NB	NS	PE	NF	Canada
2001	4,216	3,030	1,025	1,149	11,814	7,391	757	943	139	537	31,002
2026	5,640	3,589	1,010	1,192	14,926	7,476	732	975	150	493	36,191
% Chg.	33.8	18.5	-1.4	3.2	26.3	1.2	-3.3	3.4	7.7	-8.1	16.7

* includes territories

B) Age Structure (Proportion of Population)

	0-14	15-24	25-44	45-64	65+	Canada
2001	19.1%	13.4	30.3	24.3	13.0	100.0
2026	14.9	10.7	26.4	26.6	16.0	100.0
% Chg.	-22.0	-21.9	-12.9	9.5	23.1	0.0

C) Immigration by Decade (1000s)*

	Recent	Recent-1	Recent - 2	Recent -3	Before that	Total	Proportion
2001 (Actual count)	1,831	1,041	936	746	894	5,448	18.2%
2026 (Assumed)	1,831	1,562	1,872	1,492	1,788	8,545	23.1
Ratio	1.0	1.5	2.0	2.0	2.0		

* number of immigrants identified in the census, according to the decade of entry.

Source: Statistics Canada. "Market Research Handbook, 2002." Catalogue 63-224; Census of Canada, 2001.

The results are shown in Tables 13 and 14. Overall, the number of metropolitan areas and cities over 10,000 declines by eight as current cities drop below the population threshold or are incorporated (statistically that is, by Statistics Canada) within larger places, but the urban population increases to 30.2 million or 83.4% of Canada's projected population. Canada's largest city will continue to be Toronto (6.9 million), followed by Montreal (3.5 million) and Vancouver (3.0 million). Ontario contributes 45% of the urban population, followed by Quebec (19%), but British Columbia and the Prairies increase their shares to 17 and 15%, respectively. The shifts in city size ranking are minor, with Guelph and Kingston replacing Chicoutimi and Sudbury in the top 25. The projected rural populations (calculated as residuals) undergo massive decline that partly reflects demography (aging) and in part their continued assimilation into urban areas.

Table 13: The Canadian Urban System, 2026

Number of Cities						
Size/Region	**B.C.**	**Prairies**	**Ontario**	**Quebec**	**Atlantic**	**Canada**
Over 1 m.	1	2	2	1	0	6
300-1,000k.	2	1	7	1	1	12
100-300k.	4	3	6	3	4	19
30-100k.	8	8	15	13	5	49
10-30k.	11	9	12	10	9	51
Total	26	23	41	28	19	137
Urban Population (in 000s)						
Over 1 m.	3,002	2,409	8,351*	3,557	0	17,339
300-1,000k.	732	739	3,447	755	458	6,130
100-300k.	621	613	822	456	560	3,072
30-100k.	520	436	807	656	283	2,701
10-30k.	240	162	195	199	158	953
Total Urban	5,134	4,359	13,621*	5,623	1,458	30,196
Rural	513	1,233	1,305	1,853	892	5,995
Region	5,647	5,791	14,926	7,476	2,350	36,191

Territories cities grouped with BC.

* Ontario includes the population growth that occurred in Gatineau. Thus, the rural declines are over-estimated in Ontario and under-estimated in Quebec.

Source: Projections by the authors.

The declines in rural populations permit urban areas to grow more rapidly than the country as a whole, adding 6.5 million people, for a growth rate of 27%. Toronto will add 2.3 million; Vancouver adds 900,000; Ottawa and Calgary each add 400,000. The growth rates that result are surprisingly positive; since the model tracks the historical record. They resemble the patterns shown in Table 3 for the period 1971-2001. The urban growth rates increase with city size, from 6.9% for the smallest urban places to 33% for the largest metropolitan areas; and they vary irregularly by region, from 4% in Quebec to 50% in British Columbia.

As a cautionary note, the population projections are based purely on recent demographic structures and trends. They do not reflect potential changes in the economy, or the second-round effects of high levels of immigration or possible net out-migration. Still, it is clear that places that do not grow in population will tend to age rapidly, and that cities that grow rapidly will more likely be those that attract immigrants, and these will have high proportions of immigrant population.

Projections by city can be found in Appendix B.

Table 14: Projected Growth within the Canadian Urban System, 2001-2026

Urban Population Growth (1000s) **						
Size/Region	**B.C.**	**Prairies**	**Ontario***	**Quebec***	**Atlantic**	**Canada**
Over 1 m.	1,035	0	2,604	131	0	3,770
300-1,000k.	73	587	452	72	98	1,284
100-300k.	324	89	432	10	17	872
30-100k.	243	117	40	26	50	477
10-30k.	57	19	25	-22	1	80
Total Urban	1,721	813	3,554	217	167	6,483
Rural	-297	-227	-442	-132	-193	-1,301
Total Region	1,424	586	3,112	85	-26	5,182
Growth Rates						
Over 1 m.	52.1	0	45.3	3.8	0	33.8
300-1,000k.	23.5	22.9	20.6	10.6	27.4	21.0
100-300k.	109.6	21.3	39.7	2.2	3.2	31.5
30-100k.	45.1	29.7	5.0	4.3	22.8	18.5
10-30k.	19.8	10.8	10.5	-8.3	0.6	6.9
Total	50.6	22.9	35.3	4.0	12.9	27.3
Rural	-50.0	-65.0	-29.8	-8.5	-18.9	-21.1
Total Region	33.9	11.3	26.3	1.2	1.1	16.7

* Ontario includes the population growth that occurred in Gatineau. Thus, the rural declines are over-estimated in Ontario and under-estimated in Quebec.

** Based on City Size Category in 2001.

Source: Projections by the authors

4.2 The CUS within Canada

Thirty years ago the imprint of the local economy on the urban system was clearly visible in farms and grain elevators, mine heads and tailing dumps, steel mills and auto plants. These features proclaimed the distinctive economies of individual cities and regions. They also generated the jobs and wages that supported local communities and governments. An analyst could plot the flows of products and jobs throughout the urban system as inputs and outputs. The economic linkages were largely hierarchical within the periphery, supporting the economies of a sequence of middle- and higher-order cities, until they reached cities in the core region. Within the core region, the network of linkages was more complex, with manufacturing inputs and outputs connecting all the cities to some extent, proportionate to their size. The residents of each city prospered to the extent that the local economy prospered.

In today's service economy, the economic base of the community may be almost invisible; it employs fewer people, and their jobs and wages are less important to the local economy. The number of jobs within the traditional economic base is declining, not growing. Although

the production and export of resource commodities and manufacturing products continues, the linkages are now more diffused, because the results of production are increasingly financial flows (profits, taxes, and dividends), and these tend to follow institutional relationships rather than product inputs and outputs. Corporations redistribute the income from one mine or plant to other parts of the corporate network, either in Canada or abroad. Governments harvest taxes that flow to Ottawa or to the provincial treasuries for redistribution at a national or provincial scale.

At the same time, more and more people are now footloose within the space economy. They may survive outside the workforce, or find jobs in the consumer services that emerge wherever there is a market. Even the service workers and business services that support the modern resource economy may work in a city far from the mine. Alberta provides the model: the pipelines are invisible, and almost all the jobs are in services, both private or public, that follow the revenue flows from resource sites to corporations and to governments. Whereas local jobs used to generate revenue flows throughout the urban system, nowadays the revenue flows, after being pooled and redistributed, are creating local jobs for teachers or lawyers or fast food workers.

More and more, the future of the urban system will shift towards places where people want to live, instead of where they have to live; that is, towards markets and consumption rather than production sites. The entire CUS operates like a single metropolitan area: all of us depend on the success of the overall urban economy (the downtown?) for our jobs and pensions, but we are free to work and live in any neighbourhood that we choose: the big city or the smaller centre, Anglophone or Francophone, ethnic or not, choosing milder climates, or a place near the family. But just as in the metropolis, the neighbourhood may be shaped by the particular municipality to which it belongs. Some jurisdictions (like Alberta) are rich in resources and low in taxes; others (New Brunswick, for example) have fewer comparative advantages.

The key to local prosperity may well depend on the spatial organization of the corporate and public-sector links that tie the space-economy together. Each city depends on the network of connections generated by the corporations and governments that operate there. The city competes for resources against other locations in the same networks: for the right to produce this or that commodity, product, or service, and to sell it in the markets to which it has access. This is as true for health care as it is for auto parts. How prosperous are the organizations—firms or governments—to which the city is linked? And how competitive is the city relative to the other locations that form part of the organization?

Large multinational corporations determine the locations of investment, production, and markets. Oil and gas are shipped from here, to be sold over there. A particular model of a product or service may be produced or marketed in any one of a dozen countries. The location decisions may depend on the value of the currency, the level of interest rates, or the relative strength of tax rates or labour legislation. At any rate, the value of production is diverted into offshore banks, or to production inputs from around the world. Each corporation represents a different geography of redistribution, just as each level of government generates a different package of income transfers. It seems likely that multinationals will play a larger and larger role in all aspects of the CUS economy in the future, and increasingly these firms will define the nature and geography of the growth processes.

Governments have increasingly intervened to redistribute the value of production at certain locations into jobs in public services at other locations. Taxes permit them to hire nurses and teachers and build hospitals. But which level of government? And what is the spatial extent of their ability to rearrange the inputs and outputs of government activity? If the role of the provinces continues to increase relative to that of the federal government, the result will be greater regional diversity in growth rates, as redistribution becomes increasingly restricted to a single province. While international institutions may become more important in determining the rules for global competition, and even the relationships between public and private sectors within countries, it is unlikely that these global institutions will actually carry out income redistribution in the sense of moving money from rich areas to poor.

Two kinds of cities tend to thrive in this competitive environment. The first are the very largest cities that attract the business, financial, and public services that will continue to generate the largest share of the jobs in the future. Most of them have an additional advantage: the social infrastructure that attracts the immigrant groups that will provide most of the future population growth. The other cities with potential for growth are smaller centres located in amenity areas near the largest cities—in cottage country, or in tranquil countrysides—the kinds of places that attract retirees or footloose service workers. But if the recent experience of Victoria or St. Catharines is relevant, these latter places will not grow very rapidly, even though they may avoid decline. The two kinds of locations—one oriented to production, with success determined by a global competition and one defined by consumption within the Canadian market—symbolize the continuing tension between the internal and external influences on the CUS. The domestic choices operate within the context of increasing external economic pressures.

4.3 Continental and Global Urban Systems

The opening of the CUS boundary to a variety of international events and influences has been a significant part of the environmental changes recorded earlier: more exports—hence more imports, more immigrants, more multinational corporations, and more cross-border flows. Events since September 2001 have finally alerted us to the extent of this international integration, as the United States attempts to impose tighter controls on its borders, and to change Canadian policies on everything from the screening of immigrants to defence and drug enforcement. What can we expect in the future? What further integration is likely within North America? How will this integration affect the CUS?

Unlike the complex plans for European integration, the future integration of North America appears to be restricted to trade flows: there will be no regional transfers and no democratic political institutions. Americans have very few mechanisms for spatial redistribution within their own country, and they would be shocked at the idea of redistributing income among the member countries of NAFTA. Despite the aspirations of Mexico, the United States is unlikely to open the border to immigrants without essential skills. And any form of political integration that would allow other countries to influence American policies is out of the question—now more than ever. Nonetheless, increased economic integration through trade will undoubtedly spill over to affect other dimensions of the CUS, but in a unilateral fashion.

For example, the North American economy will continue the trend toward closer integration, as multinationals link inputs, outputs, markets, subsidiaries, and finance across the border in a variety of ways. The energy sector will lead the way, and as networks pumping oil and gas and electricity generate flows of income into Canada, reciprocal flows of goods and services northward will be required. There will be pressures to increase the sales of American products in every sector, from agriculture to movies to financial services. While the United States may wish to tighten control over its borders, it seems likely that business travellers, especially salespeople, will be largely exempt. As well, there will be parallel pressures on Canadian governments to adopt fiscal measures and regulatory procedures that mirror American practice.

The level of demographic integration will be much more limited. The largest component of immigration to Canada will come from Asia or Latin America; not the United States. The attraction of the United States for Canadians will depend on the relative strength of the dollar (will we still use the $Cdn?), and the degree of institutional convergence (especially health care). Immigrants to Canada, however, will undoubtedly continue to be attracted to the United States.

One of the major unknowns in any population forecast is Canada's ability to retain its immigrants, notably skilled immigrants, especially in the face of aggressive American recruitment. The level of cross-border visits will continue to increase, reflecting increased business flows as well as tourist travel. Travel within Canada will also grow over time, but domestic migration is too closely restricted by the aging population structure to increase. Again, the unknown factor is the willingness of immigrants to move out of the cities in which they initially settle.

The political and institutional dimensions of the CUS will feel the greatest pressures for change, as the effects of economic integration require policy convergence, and cultural integration conditions Canadians to accept American institutions. Watching *Law and Order* makes us all experts on the American legal system, and the Canadian Alliance supports the American lifestyle almost in its entirety—from guns to executions to SUVs. The most likely result is a restriction on the overall size of the public sector (to remain competitive), with a reduction in the level of transfers to individuals and governments. The health care system will survive, and provincial governments will take on more responsibilities from the federal government, which implies a greater diversity of urban growth rates by region.

How does all this alter the geography of the CUS? With respect to the economy, the growing importance of the American market means that access to that market will provide an advantage to certain locations. Border crossings and manufacturing cities close to the border will do better than more isolated cities. Since the most accessible part of the U.S. market is still centred in the Midwest and Eastern states, central Canada will continue to have an advantage in attracting new investment. Toronto and southern Ontario will continue to attract branch-plant offices, because these areas are better-known and more accessible. Quebec's language laws create a continuing disadvantage vis-a-vis the United States, but may be an increasing advantage in attracting European firms. The less-predictable effects are those that derive from some kind of sectoral comparative advantage. Activities that primarily serve Canadians, such as dairy farms or banks, may lose market share; but activities that are espe-

cially attractive to American markets, such as tourism or energy, may flourish. The major unknowns are the manufacturing sectors that depend on U.S. markets in competition with cities in Mexico or China. These sectors, and the manufacturing centres they support in southern Ontario, could suffer as globalization proceeds.

As we have argued, the flow of international migrants has important implications for the growth of large cities, and those flows are expected to continue. Continental relationships are unlikely to affect the decisions of immigrants, either at first or subsequently, unless there are substantial relocations of immigrants to the United States. Most of the high-growth areas in the United States are in the South and Southwest, so proximity to the border is unlikely to be a factor in out-migration. Canada's increasing cultural integration with the United States, however, would ease the transborder movement, at least in certain respects. The multichannel world, with information targeted to all kinds of communities, also facilitates contacts across the border.

A political system with lower levels of redistribution among individuals and locations will inevitably reveal wider geographical variations in resources and levels of services. As individuals and businesses respond to these differences, urban growth rates will also become more uneven, both among and within provinces. In the short run at least, the provinces with access to energy revenues will grow as they attract new workers in a variety of private-sector and public-sector services. Smaller communities will have to deal with massive population decline with relatively little assistance from senior governments. If the economic changes at the global scale do not enlarge the American market or favour Canada, much of the anticipated growth through immigration may decline or disappear. In a world of intense competition for skilled migrants, the people may not come, or they may move on quickly. Without immigrants, the large cities will grow less quickly, and the urban system as a whole will not be much different from the way it is today.

In sum, knowledge of the recent history of the CUS does not really prepare us to project the future. As systems become more open, they become less predictable. Canada's future now depends on the ability to export goods and services, and to attract immigrants to fill our cities. Neither project is automatically successful, since we compete against a number of other countries around the world that are trying to do the same things. As Kurt Vonnegut wrote, "History is simply a list of surprises."

1. Urban growth is volatile; and thus urban systems can evolve rapidly.

2. Growth-rate variations among cities are greater for urban systems that are more open to external influences such as trade and immigration.

3. Globalization increases the likelihood of change within urban systems. In fact, the wave of globalization beginning in the 1970s may have stimulated much of the "counter-urbanization" effect, by favouring peripheral locations over core regions—at least for a brief period.

4. In Canada, growth rate differentials are greater among regions (urban subsystems) than among city sizes in certain periods; while the reverse is true in other periods. These contrasts are the more interesting kinds of change in urban systems.

5. The simplistic contrast between core and periphery has been replaced by a much more complex pattern of multiple cores and peripheries. There are growing centres in declining regions (Halifax); declining centres within the original core region of southern Ontario and southern Quebec (Sarnia, Cornwall, Belleville, Trois Rivières); and emerging cores in the central Alberta corridor (Calgary to Edmonton) and British Columbia's Lower Mainland.

6. The dominant contrast in urban Canada differentiates the regions around the largest metropolitan centres and the smaller, more distant places.

7. The places that grow are larger, and connected with the global economy—including trade and immigration—either directly or indirectly.

8. The few smaller places that are growing are largely recreation and retirement centres for the expanding metropolitan regions.

9. Despite these contrasts in growth rates within the CUS, growth rates overall have become less volatile, as the services have replaced the productive sectors in job creation, the demographic processes have stabilized and more of the population now lives in the large cities that have always grown more regularly. These factors will dampen the regional (provincial) variation in growth rates, and the growth differences among city size groups.

10. Much of the emphasis in the paper has been placed on the growing gap between big cities and the rest—because this is a new phenomenon that we are just beginning to recognize and understand. But the variations by size of city are nowhere near as great as the regional differences, nor are they likely to be in the future. The city size effect is amplified, however, within a context of regional growth: as is the case for Vancouver, Calgary/Edmonton, and Toronto. City size doesn't do much for cities like Winnipeg or Montreal that are situated within non-growth regions—even though these cities will do better than their smaller neighbours. A large city within a successful region is really a recipe for growth in the future.

Appendix A: Creating the File of Urban Populations

Maintaining a time series of urban definitions—hence populations—turns out to be quite complex, although the overall results are quite resistant to definitional problems. Statistics Canada goes to great lengths to make the CMA/CA definitions for each census internally consistent, but largely ignores the variations that emerge from one census to the next. A time series of population for a particular city may contain sudden bumps or declines from one year to the next.

Part of the problem is external to Statistics Canada in that the use of Census Subdivisions (municipalities) as the spatial units for constructing CMA/CAs introduces changes due to annexation or municipal reorganization. But most of the problem lies in Statistics Canada's apparent lack of interest in historical sequences for urban phenomena, and its consequent neglect of sequences of definitions over time. The expansion of Census Agglomeration definitions in 1976 and 1981, for example, significantly altered the concept of "urban" in Canada, but Statistics Canada offered no discussion of the procedure, the rationale, or the implications. Definitional changes in later years sometimes reversed the definitions for particular cities that were introduced earlier.

Faced with this chaos, the researcher has three alternatives. First, the data as defined year by year can be accepted as they are, greatly increasing the apparent variance in growth rates over periods longer than five years. For example, some Census Agglomerations appear or disappear from year to year, depending on the definitions. This is the easy way out, but it becomes unacceptable once one looks closely at the data. Second, one could apply the most recent (2001) spatial definitions for each preceding census period, to produce a spatially consistent time series. In theory this is possible—with considerable effort—since GIS programs now make it possible to select all the appropriate census subdivisions (CSDs) or enumeration areas (EAs) within the present day urban boundaries. Despite the overestimation of urbanization in early periods, this is probably the best approach, but lacking a complete file of CSD data for previous years, a compromise was devised. Each urban area was examined in turn, comparing the sequence of definitions as revealed by the relationship between the population as defined in 1971 (for example) with the population defined five years later. In many cases, it is possible to choose the most appropriate definition for a given

year and smooth the sequence. In general, the 1981 definitions were the most consistent with current practice, much more generous than the 1976 values, which in turn were more generously applied than the 1971 definitions. The modifications were not applied consistently to all cities.

The starting point was the urban populations for 1971, as defined by the 1976 census. From that point, figures were adjusted only where they seemed out of line. For example, three cities in Ontario were over-bounded in 2001: Lindsay, Simcoe, and Chatham. The 1996 figures were substituted, and the population growth indicated by the 2001 definition was added to them. In the case of 1971 and 1976, the reverse process was used: given the 1976 figures for the 1981 boundaries, it was possible to subtract the indicated growth for the 1971-1976 period to obtain the 1971 population for the 1981 areal definition.

A particular difficulty emerged for cities that were defined as Census Agglomerations (CAs) in various censuses, but excluded in others. For the most part these places were included in the list, by extending the defined areas into other time periods. All CAs that later merged with neighbouring cities were merged from the beginning. There were seven of these in all (St. Jerome Quebec; Fort Erie, Ontario; St. Thomas, Ontario; Strathroy, Ontario; Trenton, Ontario; Sydney Mines, Nova Scotia; Wallaceburg, Ontario). Three places (Chibougamau, Quebec; Selkirk, Manitoba; and Weyburn, Saskatchewan) both entered and exited the system, as their populations rose and then declined. They were ignored in most of this paper.

Finally, as a check on the procedures, a growth index was generated that incorporates the effect of all the definitional changes between 1971 and 2001. The growth index is equal to the ratio of populations for each census year, as given for two different census definitions: thus the growth index for Toronto equals (P76b/P76a) × (P81b/P81a) × ...etc., where “a” represents the spatial definition in the first (census) year and “b” indicates the spatial definition in the following census. This index indicates the maximum effect of the boundary changes over time; but for two-thirds of the cities it amounts to less than 5%. The removal of the boundary change effect from urban growth tends to reduce the estimate of the demographic growth, lowering the apparent urban growth rates, but treating all the cities in similar fashion. Toronto has a boundary change index of 1.07, Montreal, 1.03, and Vancouver 1.00. The index is largest for some of the smaller places that became urban at a later date, such as Parksville, British Columbia.

Although these problems of definition are annoying, and possibly produce erroneous results for particular places, the overall results are quite valid for evaluating change in the Canadian urban system. The boundary errors balance out, producing temporally consistent estimates of growth for the urban system as a whole.

Appendix B: Urban Populations: Past, Present and Projected

The following table lists the population data that are the focus of discussion in this paper. The populations for 1996 and 2001 are based on the 2001 Census of Canada, while the estimated population for 1971 applies the Growth Index described in Appendix A. The population projections for 2026 are based on Statistics Canada's provincial projections, plus an extrapolation of each city's provincial share. The procedure is described in Section 4.1 of the paper.

CMA/CA	Prov.	Pop. in 1996	POP. in 2001	Growth index	Estimated pop. in 1971	Growth rate, 1971-2001	Estimated pop. in 2002
St. John's	NF	174.1	172.9	1.10048	145.0	0.1921	198.0
Carbonear	NF	11.4	10.7	1.00000	10.6	0.0094	10.6
Grand Falls	NF	20.4	19.0	1.00000	14.3	0.3287	25.0
Gander	NF	12.0	11.3	1.20895	9.6	0.1832	11.9
Corner Brook	NF	27.9	25.7	1.18193	31.1	-0.1732	23.2
Labrador City	NF	10.5	9.6	1.00000	11.0	-0.1273	6.1
Charlottetown	PE	57.2	58.4	1.07811	44.2	0.3212	74.0
Summerside	PE	16.0	16.0	1.07797	15.1	0.0602	16.4
Halifax	NS	343.0	359.2	1.03123	258.4	0.3900	457.7
Kentville	NS	25.1	25.2	1.00478	18.5	0.3630	32.3
Truro	NS	44.1	44.3	0.97045	34.0	0.3042	51.6
New Glasgow	NS	38.1	36.7	1.00000	38.6	-0.0492	34.1
Amherst	NS	9.7	9.5	1.00000	10.0	-0.0500	8.6
Cape Breton	NS	117.8	109.3	1.03445	129.5	-0.1561	91.2
Moncton	NB	113.5	117.7	1.00845	89.0	0.3218	134.0
Saint John	NB	125.7	122.7	1.06820	114.0	0.0765	116.3

Fredericton	NB	79.0	81.3	0.99861	53.3	0.5246	111.2
Oromocto	NB	9.2	8.8	1.00000	11.4	-0.2281	7.0
Newcastle/Miramichi	NB	19.2	18.5	1.29268	23.5	-0.2137	13.4
Bathurst	NB	25.4	23.9	1.23755	23.5	0.0164	22.1
Campbellton	NB	16.9	16.3	1.00000	19.6	-0.1684	13.5
Edmundston	NB	22.6	22.2	1.00919	21.7	0.0232	21.7
Matane	QC	17.1	16.2	1.35492	16.0	0.0133	13.6
Rimouski	QC	48.1	47.7	1.16978	38.4	0.2432	50.9
Rivière-du-Loup	QC	22.4	22.3	1.00434	18.6	0.2002	23.7
Baie-Comeau	QC	31.8	28.9	1.21466	30.7	-0.0596	23.0
Chicoutimi	QC	160.5	154.9	1.01867	149.2	0.0380	141.0
Alma	QC	30.4	30.1	1.15209	28.8	0.0451	27.3
Dolbeau	QC	15.2	14.9	1.00000	12.6	0.1825	14.2
Sept-Ile	QC	28.0	27.0	1.11788	27.2	-0.0061	19.0
Montmagny	QC	11.9	11.7	1.00000	12.4	-0.0565	9.9
Chibougamau	QC	8.7	7.9	1.00000	9.7	-0.1856	5.3
Quebec	QC	671.9	682.8	1.01337	508.1	0.3438	755.1
Saint-Georges	QC	26.6	28.1	1.22376	16.6	0.6884	38.0
Asbestos	QC	10.9	11.3	1.00000	15.8	-0.2848	19.6
Sherbrooke	QC	149.6	153.8	1.09495	113.5	0.3545	7.9
Thetford Mines	QC	27.8	26.3	1.09120	32.5	-0.1912	173.8
Magog	QC	21.3	22.5	1.00000	16.7	0.3473	26.7
Cowansville	QC	12.1	12.0	0.99934	11.9	0.0091	10.8
Victoriaville	QC	40.4	41.2	0.98339	33.1	0.2432	44.1
Trois-Rivières	QC	140.0	137.5	1.12377	118.3	0.1620	141.2
Shawinigan	QC	59.9	57.3	0.98986	66.4	-0.1373	46.7
La Tuque	QC	13.2	12.4	1.06084	15.0	-0.1710	9.4
Drummondville	QC	65.1	68.5	1.01830	51.9	0.3190	78.0
Granby	QC	58.9	60.3	1.04013	40.9	0.4752	75.0
Saint-Hyacinthe	QC	50.0	49.5	0.98207	43.9	0.1276	49.3
Sorel	QC	43.0	41.0	0.95905	41.8	-0.0195	35.3
Joliette	QC	34.4	35.8	0.98831	29.1	0.2321	38.3
Saint-Jean de Richelieu	QC	76.5	79.6	1.03030	51.1	0.5576	97.4
Montreal	QC	3326.4	3426.4	1.03446	2859.8	0.1981	3557.3
Salaberry-de-Valleyfield	QC	39.6	39.0	1.06966	38.3	0.0184	35.2
Lachute	QC	11.6	11.6	1.00870	15.6	-0.2581	7.9
Val-d'Or	QC	33.8	32.4	1.21838	23.3	0.3923	35.8
Amos	QC	22.4	21.7	1.05920	14.8	0.4660	21.2
Rouyn-Noranda	QC	39.1	36.3	1.23456	38.3	-0.0515	31.8
Cornwall	ON	59.0	57.6	1.08507	58.6	-0.0170	54.7

Hawkesbury	ON	11.6	11.6	1.00000	11.0	0.0545	11.3
Ottawa-Hull	ON	998.7	1063.7	1.08438	672.2	0.5824	1425.9
Smiths Falls	ON	12.8	12.9	1.00000	14.2	-0.0915	11.8
Brockville	ON	45.2	44.7	1.13533	38.8	0.1512	47.9
Pembroke	ON	24.6	23.6	1.29078	26.3	-0.1038	22.1
Petawawa	ON	15.3	14.4	1.00000	14.3	0.0070	13.7
Kingston	ON	144.5	146.8	1.00767	110.1	0.3329	177.6
Belleville	ON	87.9	87.4	0.94029	76.2	0.1475	90.4
Cobourg	ON	16.2	17.2	1.16349	13.1	0.3082	21.1
Port Hope	ON	15.4	15.6	1.35458	12.1	0.2940	17.4
Peterborough	ON	100.3	102.4	1.00100	82.4	0.2430	118.0
Lindsay	ON	21.9	23.2	1.00000	15.5	0.4968	32.1
Oshawa	ON	268.8	296.3	1.00000	171.5	0.7277	446.3
Toronto	ON	4263.8	4682.9	1.07035	2785.2	0.6814	6925.1
Hamilton	ON	624.4	662.4	1.00000	503.1	0.3166	785.3
St.Catharines-Niagara	ON	372.4	377.0	1.04292	322.2	0.1702	396.2
Kitchener	ON	382.9	414.3	1.00000	238.6	0.7364	597.5
Brantford	ON	84.8	86.4	0.84631	68.0	0.2714	100.9
Woodstock	ON	32.3	33.1	1.00623	26.4	0.2555	38.5
Tillsonburg	ON	13.2	14.1	1.00000	8.1	0.7407	20.0
Simcoe	ON	15.4	15.7	1.00000	13.0	0.2077	16.4
Guelph	ON	106.0	117.3	1.01087	67.6	0.7345	172.9
Stratford	ON	29.0	29.7	1.00514	24.6	0.2060	32.4
London	ON	416.5	432.5	1.06578	339.0	0.2757	521.3
Chatham	ON	67.1	66.1	1.09874	57.7	0.1460	66.9
Leamington	ON	43.8	46.8	1.12426	33.5	0.3969	57.7
Windsor	ON	286.8	307.9	1.04809	260.7	0.1812	346.1
Sarnia	ON	90.7	88.3	1.04855	82.2	0.0741	86.7
Owen Sound	ON	31.6	31.6	1.04290	26.9	0.1744	33.8
Collingwood	ON	15.6	16.0	1.06667	10.5	0.5306	20.5
Barrie	ON	118.7	148.5	1.08226	47.1	2.1543	354.2
Orillia	ON	38.1	40.3	1.00880	30.7	0.3141	49.5
Midland	ON	33.7	33.3	0.80569	24.3	0.3686	39.6
North Bay	ON	64.8	63.7	1.10443	56.8	0.1221	64.5
Sudbury	ON	165.6	155.6	1.07445	169.4	-0.0817	136.0
Elliot Lake	ON	13.6	12.0	1.00192	9.1	0.3162	15.5
Haileybury	ON	13.7	12.9	1.20086	15.6	-0.1737	10.4
Kirkland Lake	ON	9.9	8.6	1.00000	15.2	-0.4342	5.2
Timmins	ON	47.5	43.7	1.00000	43.0	0.0163	40.5
Sault Ste. Marie	ON	83.6	79.8	1.02927	83.7	-0.0464	71.5

Kapuskasing	ON	10.0	9.2	1.00000	12.8	-0.2813	6.3
Thunder Bay	ON	126.6	122.0	1.01618	116.6	0.0467	116.3
Kenora	ON	16.4	15.8	1.00000	16.7	-0.0539	14.7
Winnipeg	MB	667.1	671.3	1.02490	563.5	0.1913	738.5
Selkirk	MB	9.9	9.8	1.00000	9.3	0.0538	9.4
Portage La Prairie	MB	20.4	20.6	1.59091	20.7	-0.0040	20.6
Brandon	MB	40.6	41.0	1.02776	33.6	0.2200	45.5
Flin Flon	MB	6.9	6.3	0.90681	10.2	-0.3797	4.1
Thompson	MB	14.4	13.3	1.00000	19.0	-0.3000	9.9
Regina	SK	193.7	192.8	1.05417	148.3	0.2999	226.3
Yorkton	SK	17.7	17.6	1.22153	16.4	0.0752	17.5
Moose Jaw	SK	34.8	33.5	1.00000	34.2	-0.0205	31.3
Swift Current	SK	16.4	16.5	1.10479	17.0	-0.0302	16.7
Saskatoon	SK	219.1	225.9	1.14040	167.4	0.3494	281.6
North Battleford	SK	18.0	17.5	0.99379	15.0	0.1662	18.6
Prince Albert	SK	41.7	41.5	0.99217	34.9	0.1883	47.7
Estevan	SK	12.7	12.1	1.20967	11.1	0.0873	13.3
Weyburn	SK	9.7	9.5	1.00000	8.8	0.0795	9.8
Medicine Hat	AB	56.6	61.7	1.00000	34.3	0.7988	68.5
Brooks	AB	10.1	11.6	1.01587	4.1	1.8547	15.7
Lethbridge	AB	63.1	67.4	1.02002	42.0	0.6038	70.9
Calgary	AB	821.6	951.4	1.05987	427.4	1.2258	1354.6
Red Deer	AB	60.1	67.7	1.00932	28.0	1.4215	105.1
Camrose	AB	13.7	14.9	1.00000	8.8	0.6932	16.4
Edmonton	AB	862.6	937.8	1.12128	556.2	0.6862	1054.8
Lloydminster	AB	18.9	21.0	1.00137	8.7	1.4105	31.9
Grand Centre/Cold Lake	AB	27.1	27.9	2.73380	16.7	0.6730	29.9
Grande Prairie	AB	31.4	37.0	1.00965	13.3	1.7762	57.4
Wood Buffalo	AB	36.1	42.6	1.06423	7.3	4.8013	82.5
Wetaskiwin	AB	11.0	11.2	1.00943	6.4	0.7612	13.6
Cranbrook	BC	24.2	24.3	1.37663	16.5	0.4710	28.4
Trail	BC	13.5	12.9	1.00000	14.2	-0.0916	9.4
Penticton	BC	41.3	41.6	0.79752	14.4	1.8819	90.9
Kelowna	BC	136.5	147.7	1.09935	58.6	1.5207	271.7
Vernon	BC	49.7	51.5	0.89711	28.3	0.8167	72.3
Kamloops	BC	85.4	86.5	1.11920	52.4	0.6514	102.4
Chilliwack	BC	66.3	69.8	1.07475	35.8	0.9503	107.9
Abbotsford	BC	136.5	147.4	1.00000	41.5	2.5518	346.9
Vancouver	BC	1831.7	1987.0	1.00006	1082.5	0.8356	3021.5
Squamish	BC	14.2	14.4	1.01429	6.2	1.3274	21.7

Victoria	BC	304.3	311.9	1.03305	202.3	0.5420	385.1
Duncan	BC	38.5	38.8	1.32107	22.2	0.7482	49.9
Nanaimo	BC	82.7	85.7	0.96612	41.0	1.0921	139.3
Parksville	BC	22.6	24.3	2.03280	6.9	2.5181	55.3
Port Alberni	BC	26.9	25.4	1.00000	26.5	-0.0415	21.9
Courtenay	BC	46.3	47.1	0.84335	22.5	1.0917	79.9
Campbell River	BC	33.8	33.9	0.96459	19.2	0.7660	48.3
Powell River	BC	18.4	18.3	0.92462	18.1	0.0098	16.5
Williams Lake	BC	25.0	25.1	0.64767	18.4	0.3646	26.4
Quesnel	BC	25.1	24.4	0.99209	21.1	0.1547	23.7
Prince Rupert	BC	17.4	15.3	1.09306	17.2	-0.1084	12.9
Kitimat	BC	11.1	10.3	1.00000	11.8	-0.1271	7.9
Terrace	BC	20.9	20.0	1.17333	16.7	0.2004	20.3
Prince George	BC	87.7	85.0	1.16622	57.6	0.4754	92.3
Dawson Creek	BC	18.0	17.4	1.62162	19.3	-0.0983	15.9
Fort St. John	BC	15.0	16.0	1.01124	8.4	0.9063	25.4
Whitehorse	YK	21.8	21.4	1.12291	12.6	0.7016	26.5
Yellowknife	NW	17.3	16.5	1.00000	6.1	1.7049	30.6

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