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Urban Growth and Decline in Canada, 1971-2001

Explanations and Implications

Jim Simmons and Larry S. Bourne

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Abstract

This paper further explores some of the issues raised in an earlier research paper by the same authors ("The Canadian Urban System, 1971-2001: Responses to a Changing World," Centre for Urban and Community Studies, 2003) concerning urban growth. The research draws on the findings of the 2001 Census of Canada and comparable data for 1971 to investigate trends over the past three decades. After describing the location and amount of urban growth, the paper examines the correlations between growth and other urban characteristics and between growth and changes in those characteristics. In particular, the authors consider the question of whether cities are becoming more alike or more specialized in some ways. The paper concludes with a discussion of the implications of continued variability in the rates of urban growth and decline.

Acknowledgements

These explorations have been ably assisted by Jeff Cantos, who worked with the databases, and Shizue Kamikihara, who worked on the maps. The research was supported by a grant from the Social Sciences and Humanities Research Council at the University of Toronto and by the Centre for the Study of Commercial Activity at Ryerson University.

Table of Contents

List of Figures

List of Tables

Executive Summary

How have cities in Canada changed over the last 30 years, and what do these changes imply for Canadians?

Most of the country's population growth took place in large cities, especially the three largest metropolitan areas – Toronto, Montreal, and Vancouver – which alone contributed 47% of the urban growth. Together with the eight other places that have over 300,000 population, these cities accounted for 73% of urban growth. Meanwhile, 64 out of 140 urban areas (45%) lost population between 1996 and 2001. Among cities with less than 250,000 population, more than half declined.

The growth rate of individual Canadian cities between 1971 and 2001 depended in part on city size (large cities became larger), regional location (western cities have higher growth rates than eastern ones), and previous population growth rate (rapidly growing cities tended to keep growing).

These factors, however, accounted for less than half of the differences in growth rates over the 30-year period. Much of the remaining variation is due to other economic and social changes. For example, some cities grew because they were close to very large cities, or they became resort or retirement communities. Many Francophone cities declined because of the rapid drop in their birth rates, and their relative inability to attract immigrants.

Can future growth be predicted? An analysis of the patterns of urban growth shows that:

- the high-growth places tend to be the service centres with the best access to the redistribution of regional income, while places in decline tend to be those less accessible places that specialize in mining and manufacturing;
- the cities that grow will be those that are able to attract domestic migrants and/or immigrants;
- smaller but accessible cities with high levels of amenities may attract recreational and retirement facilities and residents;

- cities have become more alike – that is, their characteristics have converged; many of the striking variations among Canadian regions and the 140 cities that were evident in 1971 are no longer significant;
- at the same time, the largest cities have become more distinctive as their economies evolve, and as immigration becomes increasingly concentrated in these locations.

The unpredictability of urban growth affects people's lives. Slow growth may reduce the level of household income and increase the likelihood of unemployment, and it may reduce the value of housing or small businesses. Although it is often argued that people can move to a place with greater opportunity, the reality is that relocation costs are high and they increase with an individual's age. At some point, a household becomes "locked in" to a job, a house, and a set of social connections. As people get older, the probability of relocation declines rapidly. A bad location choice at the age of 20 or 25 may seal one's fate by age 35 or 40.

To some extent, governments have shielded Canadians from the worst of this uncertainty with an extended system of unemployment benefits, pensions, and other forms of transfer payments, that serve to stabilize income and ensure more-or-less similar service levels locally. However, population forecasts suggest that the country as a whole will grow more slowly in the future and the effect of urban decline will be more widely felt. This poses a serious challenge for government programs that provide infrastructure or income redistribution.

Preface

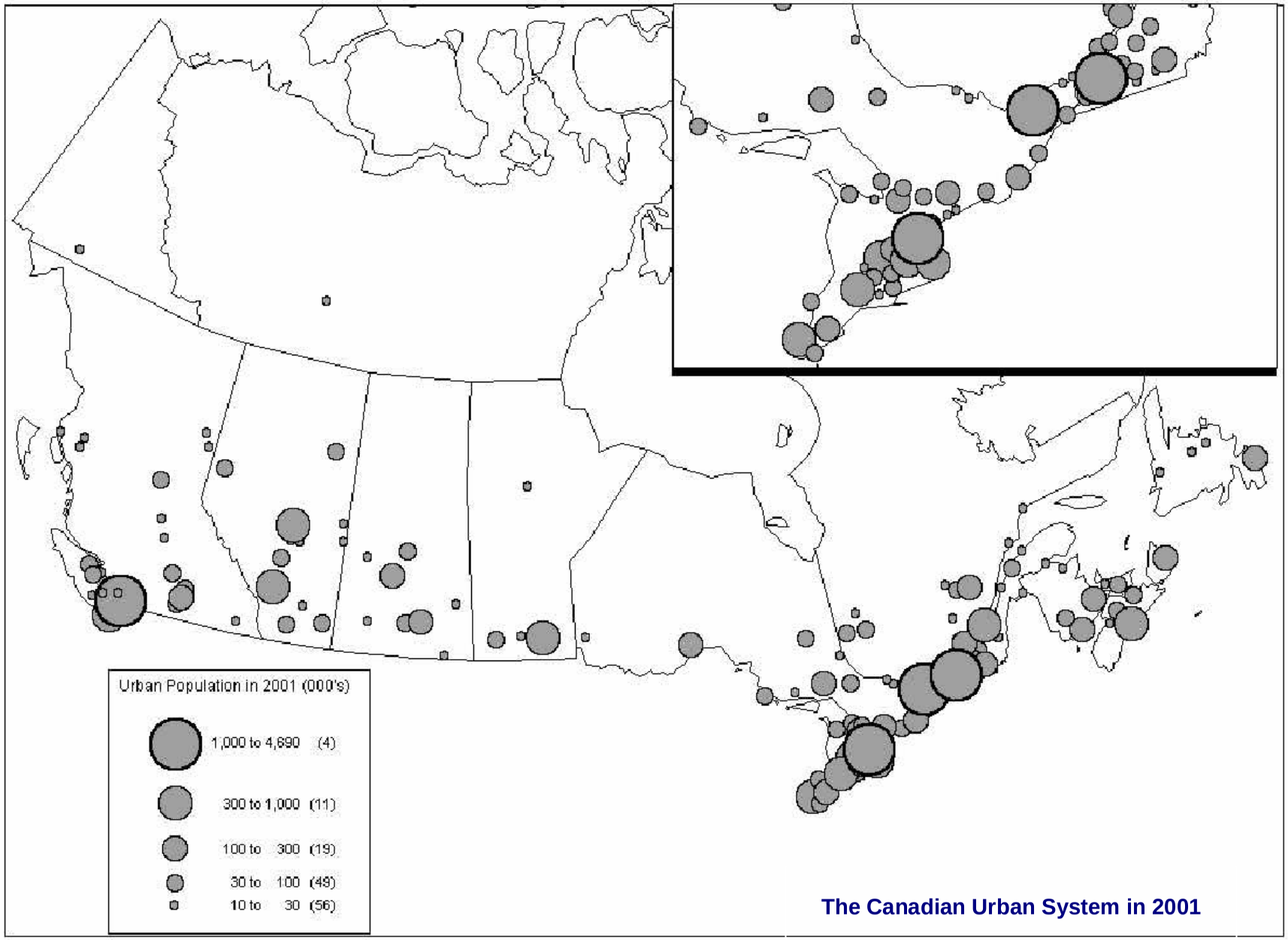
This paper further explores some of the issues raised in an earlier paper (Simmons and Bourne, 2003) concerning urban growth. The question of why some cities grow and others do not remains one of the great mysteries in urban research. Despite the need for accurate forecasts for planning purposes, urban researchers have been unable to develop reliable models of growth processes, or even to explain growth processes in retrospect. For instance, this paper suggests that less than half the variance in growth rates among cities in Canada between 1971 and 2001 could have been predicted from the information available in 1971—even if the growth model itself had been specified ahead of time, which of course, would have been impossible. Much of the variation in growth rates reflects processes and events that took place after the projection was made, or the effects of larger processes on local areas.

What we do in this study is to describe the location and amount of urban growth, and examine the correlations between growth and other urban characteristics and between growth and changes in those characteristics. We can also ask whether cities are becoming more alike or more specialized in some ways. Over this 30-year period have we seen a divergence or convergence of urban characteristics? Finally, we examine the implications of continued variability in the rates of urban growth and decline.

We will compare the rich body of information available for Canadian cities from the *Census of Canada, 2001* to an extraordinary compilation of data for 1971 that was published in *Canadian Urban Trends* by Michael Ray and his colleagues (1976). Without the latter data, this study would have been far more difficult and much more limited in scope.

Jim Simmons and Larry Bourne

Victoria and Toronto, 2004



The Canadian Urban System in 2001

1. Introduction

Over the last century, Canadians, especially those persons living in large cities,[1] have become accustomed to urban growth on a more or less continuous basis. Each census documents a larger population, more jobs, and higher incomes. New subdivisions are filled with new houses; new malls and industrial zones attract new stores and businesses. The Census of 2001, however, suggests that growth is no longer inevitable (see Simmons and Bourne, 2003). Instead, urban population decline has become widespread across the country. Altogether, 64 out of 140 urban areas (45%) lost population between 1996 and 2001. And among those cities with less than 250,000 population, more than half declined.

If Canada's overall rate of population growth continues to slow down, while the pattern of concentration in large cities continues, this urban population decline may present serious policy problems. Most Canadians live in cities, and their immediate living environment—including jobs and income, housing, lifestyle choices, and available services—matters more to them than the overall growth of the GDP or the level of immigration for Canada as a whole.

This paper explores the ways in which that local experience—the growth of the city—is related to the type and location of city, and to regional or national growth events. It also discusses the implications of urban growth or decline for lifestyle and living conditions within a city. The analysis begins with Canada's 140 urban areas as described in the Census of 2001, and evaluates their growth rates since 1971. We then look at the characteristics of these cities as they were in 1971, in order to see what kinds of cities (in terms of location, size, or economic or social characteristics) were most likely to grow. As well, we can compare the characteristics of cities in 1971 with their characteristics in 2001 to see what other changes accompany population growth: more jobs, higher incomes, more immigrants and domestic in-migrants, etc. Finally, we examine the outcome of this growth in the year 2001. Are the characteristics of cities converging or diverging? What are the present characteristics of high-growth or low-growth cities, and what can reasonably be concluded about the future of cities that are currently losing population?

1. We use the generic term "cities" to refer to functional urban regions—census metropolitan areas and census agglomerations—not municipalities.

To the degree that the rate of urban growth is linked to variations in social or economic conditions that benefit or handicap Canadians, social problems may result. While a person may choose to live in a large city or a certain region of the country in order to participate in the economy or lifestyle of that place, it is much more difficult to choose a city that is going to grow in the future. Within each census period, different kinds of cities grow, as a different mix of growth factors comes into play. To a considerable extent, the growth rate of an urban environment is not something that one can choose. In this sense, urban life is a kind of lottery, in which the fortunate residents of growing cities enjoy better jobs, faster promotions, and rising housing markets that cushion their retirement, while others watch the value of their homes and businesses stagnate or decline.

1.1 Urban Growth, 1971-2001

Simmons and Bourne (2003) describe the main features of urban growth in Canada since 1971. During this period the number of urban places (those with populations over 10,000) 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 these cities. At the same time, patterns of growth and change have evolved substantially from one census period to the next. In some decades the largest cities grow; in other times smaller places do better. For the most part, however, urban growth rates are neutral with respect to city population, but vary widely by region; first, Ontario, then perhaps Alberta, or British Columbia.

Table 1 summarizes the urban growth patterns since 1971, based on the estimated values 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 table provides two versions of the totals, at first excluding the 12 cities that grew sufficiently to be classified as members of the urban system during the period, and then adding them all together. The urban system 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 in the country during these three decades.

Most of the population growth took place in large cities, especially the three largest metropolitan areas—Toronto, Montreal, and Vancouver—that alone contributed 47% of the urban growth. Together with cities having populations over 300,000, these cities accounted for 73% of urban growth. The amount of growth, and the rate of growth, is lowest for the smaller urban areas (those with populations of less than 30,000). The two largest urban size groups grew at a rate of close to 50%; while the other size groups were closer to 30%. Meanwhile, non-urban areas grew at a rate of only 25%. 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 1 and 2). 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 base in 1971 and the high rate of subsequent growth, has generated 45% of Canada's total urban growth since 1971. Only 15% of all urban growth occurred east of the Ontario border.

Table 1: Population Growth within the Canadian Urban System, 1971-2001

Urban Population Growth, 1971-2001 (1000s)							
Size/Region	**BC**	**Prairies**	**Ontario**	**Quebec**	**Atlantic**	**Canada**	
(in 1971)							
Over 1m.	904.5	—	1,897.7	566.6	—	3,368.9	
300-1,000k.	—	1,013.4	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	1228.0	
Total Region	1,763.0	1,532.0	3,707.0	1,209.0	227.0	8,439.2	
Growth Rates, 1971-2001 (%)							
Size/Region	**BC**	**Prairies**	**Ontario**	**Quebec**	**Atlantic**	**Canada**	**CV**
(in 1971)							
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	
CV***	1.04	1.45	1.71	1.75	2.75	1.67	

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

**Rural includes all areas not defined as CMAs (Census Metropolitan Areas) or CAs (Census Agglomerations).

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

Source: Statistics Canada, *Census of Canada*. Various years.

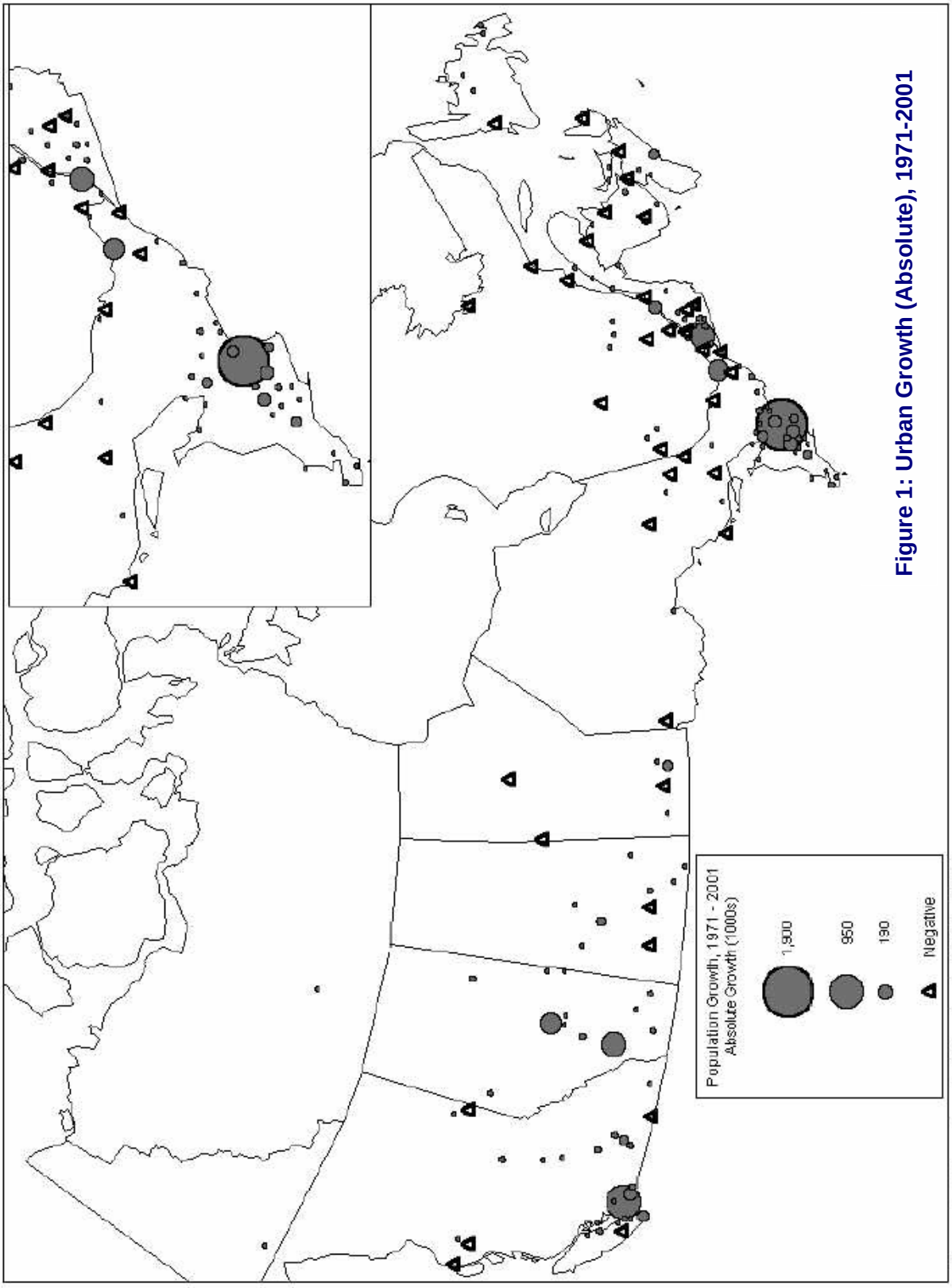


Figure 1: Urban Growth (Absolute), 1971-2001

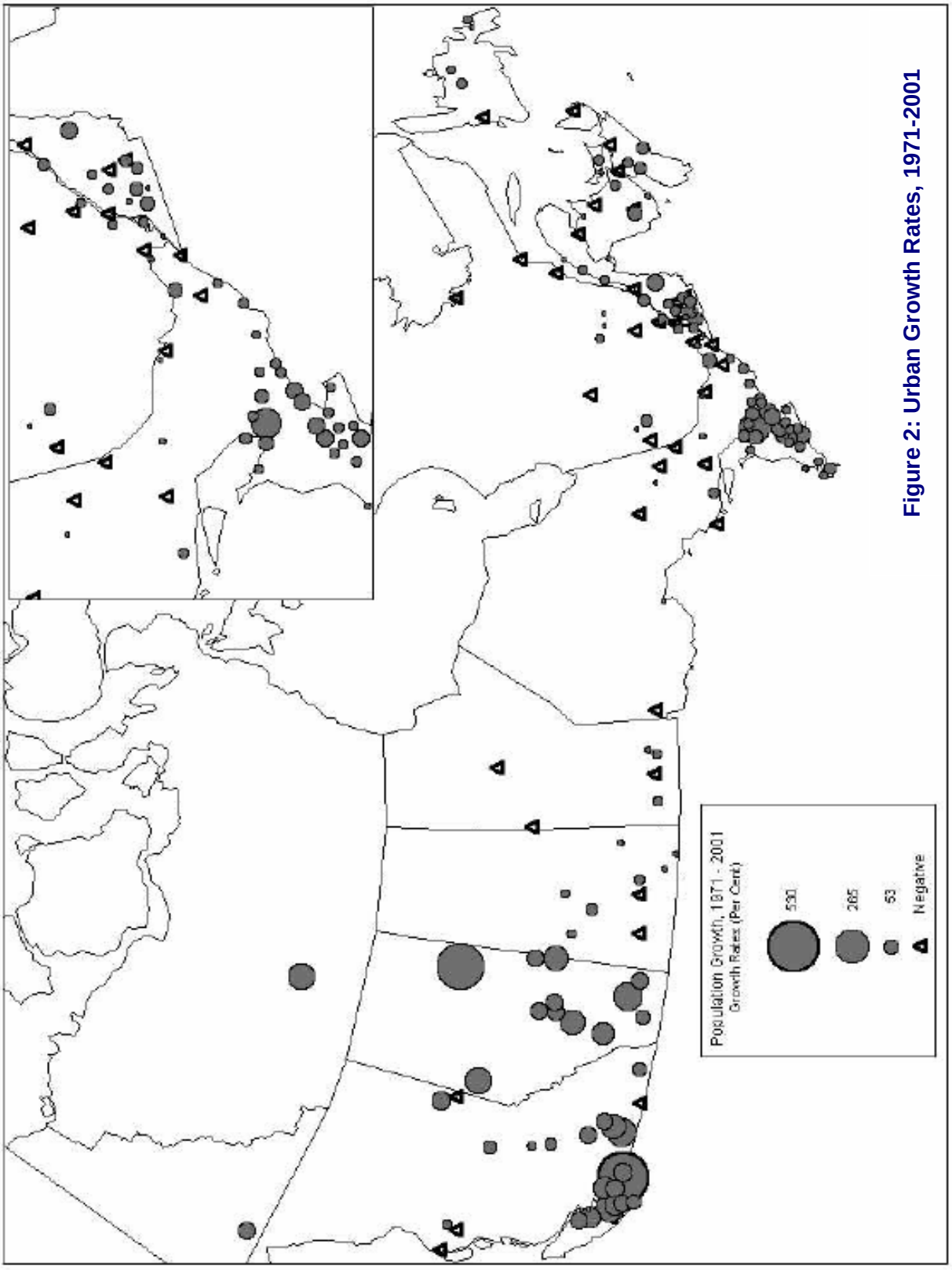


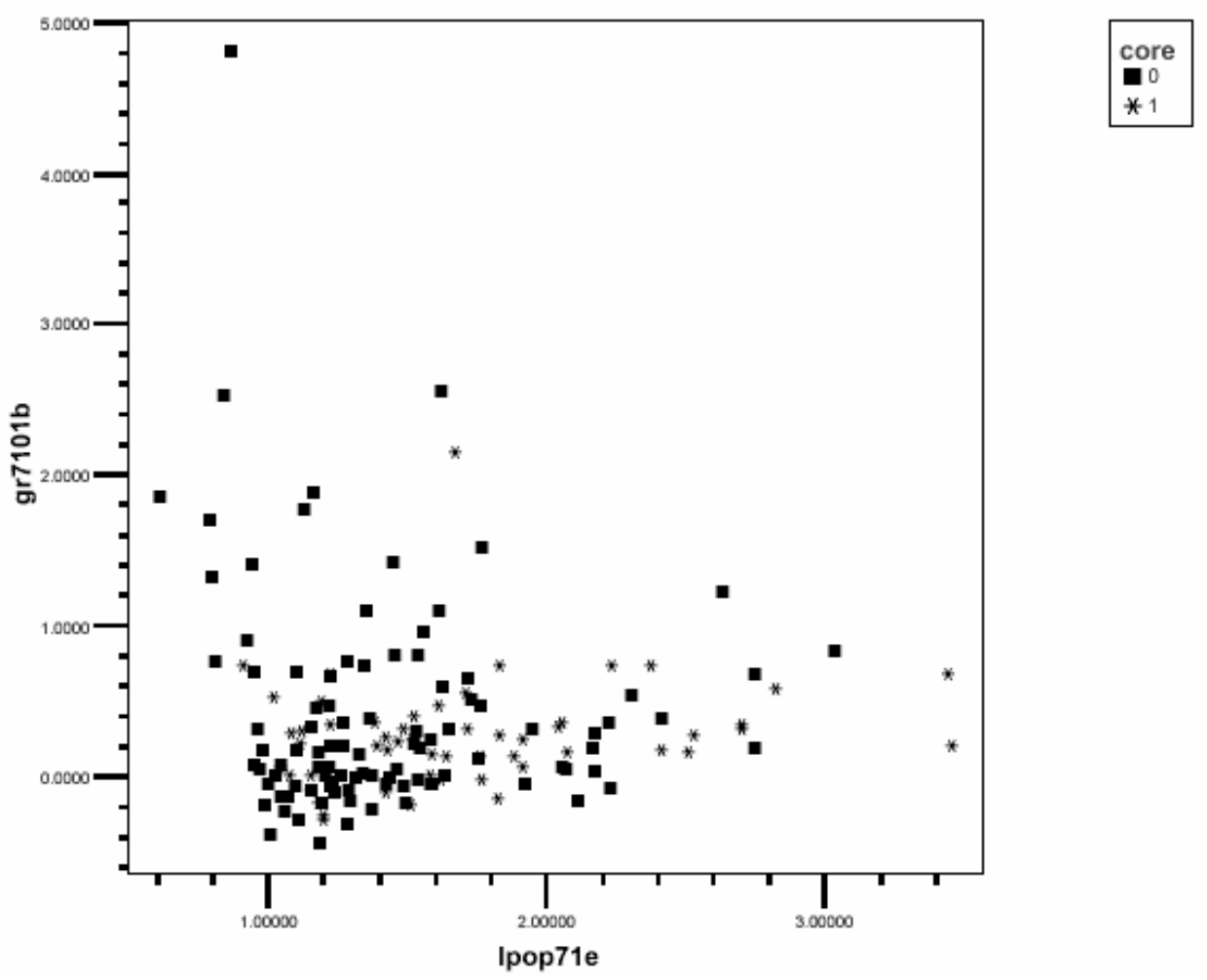
Figure 2: Urban Growth Rates, 1971-2001

The coefficient of variation in growth rates indicates the variability of growth by city size and region. The larger cities grew in more predictable fashion, approximating the overall national growth rate. Smaller cities tend to be more specialized in one or two economic activities and their growth rates therefore tend to be more erratic. During this period the coefficient declines as we move from east to west, suggesting that the national pattern is dominated by the regional differences in growth rates. For example, the Prairies and British Columbia show higher standard deviations in urban growth rates than the rest of the country.

While the cities in decline include representatives from all regions, as well as cities as large as 150,000 population, a common feature of these cities is a peripheral location. Many cities in decline are resource-based towns along the northern frontier; others are located away from the main centres of population within their region. With the exception of Alberta, urban growth is most rapid in and around the locations with the most dense concentration of urban centres.

As Figure 3 indicates, there is a wide variation in the urban growth rates for individual cities. The average increase is 40.5%, but the standard deviation is 64.5%. This variability drives the search for causal factors and the interest in exploring the implications. Figure 3 plots the growth

Figure 3: City Size and Growth Rate, 1971-2001



rate against the log of population size in 1971, demonstrating a number of urban system relationships in which the size and growth of particular cities is constrained by the overall properties of the urban system. Note the roughly log-normal distribution of city population size, with many more smaller places than large ones. The growth rates of the largest cities 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; but in Canada, during the last two decades, larger cities appear to have had an advantage. The graph also differentiates between cities in the core region (= 1) and the periphery (= 0). It is apparent that urban growth rates are far more variable in the latter. Core cities depend on their access to the national market for growth; cities of the periphery depend on the local resource base and commodity prices.

Finally, Figure 4 tracks the actual demographic processes for Vancouver, Calgary, Winnipeg, and Quebec City. Each is a major regional centre within Canada, but these cities have grown in different ways and for different reasons.

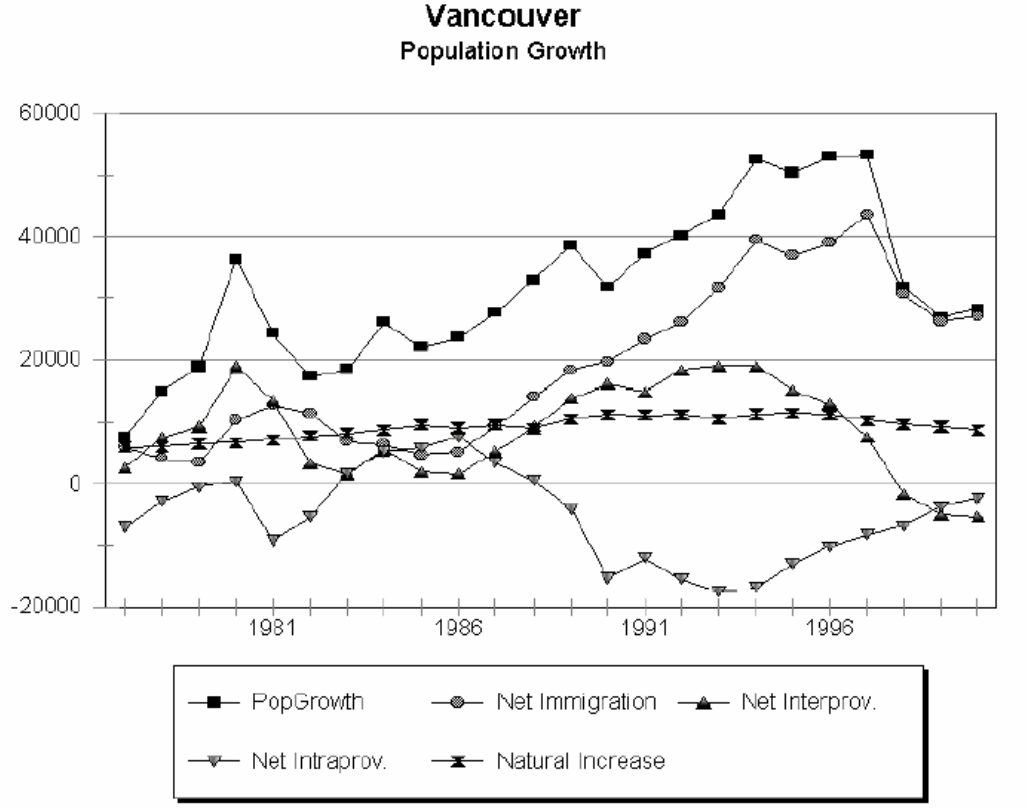
The first point to make is the variability—hence uncertainly—of growth. Urban growth occurs in spurts and surges, and there is no guarantee that a city will recover from a period of decline. Calgary epitomizes the “boom-and-bust” cycles of regional centres with economies based on natural resources. When oil prices are high, growth is explosive, and workers flock in from all over the country (net interprovincial flows). When prices decline, the workers return home.

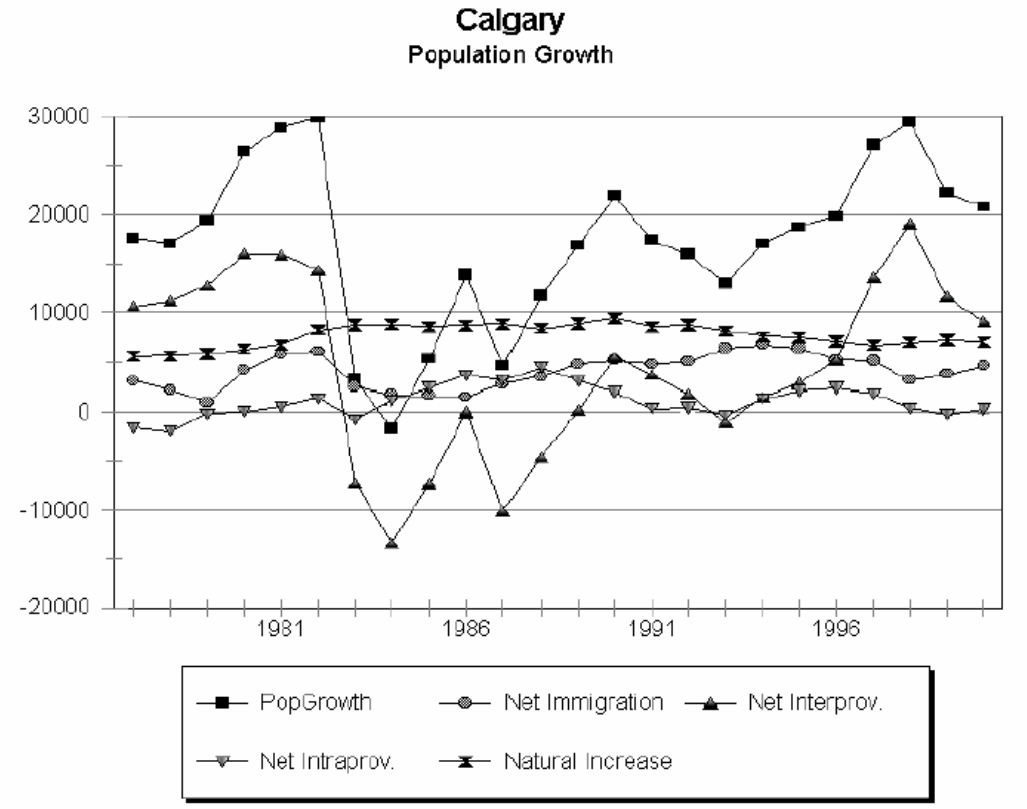
The second point is that cities depend on different demographic processes. Calgary depends on interprovincial migrants, but Vancouver’s growth was driven by immigrants from Hong Kong, before Hong Kong was turned over to China in 1997. In fact, the surge of immigration encouraged a net outflow of intraprovincial migrants to neighbouring cities. Both cities are responding to events occurring outside the country: Vancouver is affected on the supply side, and Calgary responds to the demand side. Quebec City, in contrast, is the Francophone political capital, and receives very little immigration or flows from other provinces. Political events within the province determine its growth, which occurs largely through natural increase (declining) and intraprovincial flows (depending on the ideology of the political party in power). Winnipeg is a slow-growth city, generating massive outflows to other provinces in response to growth in Calgary or Toronto, but surviving through natural increase and modest levels of immigration. Each city tells a different story.

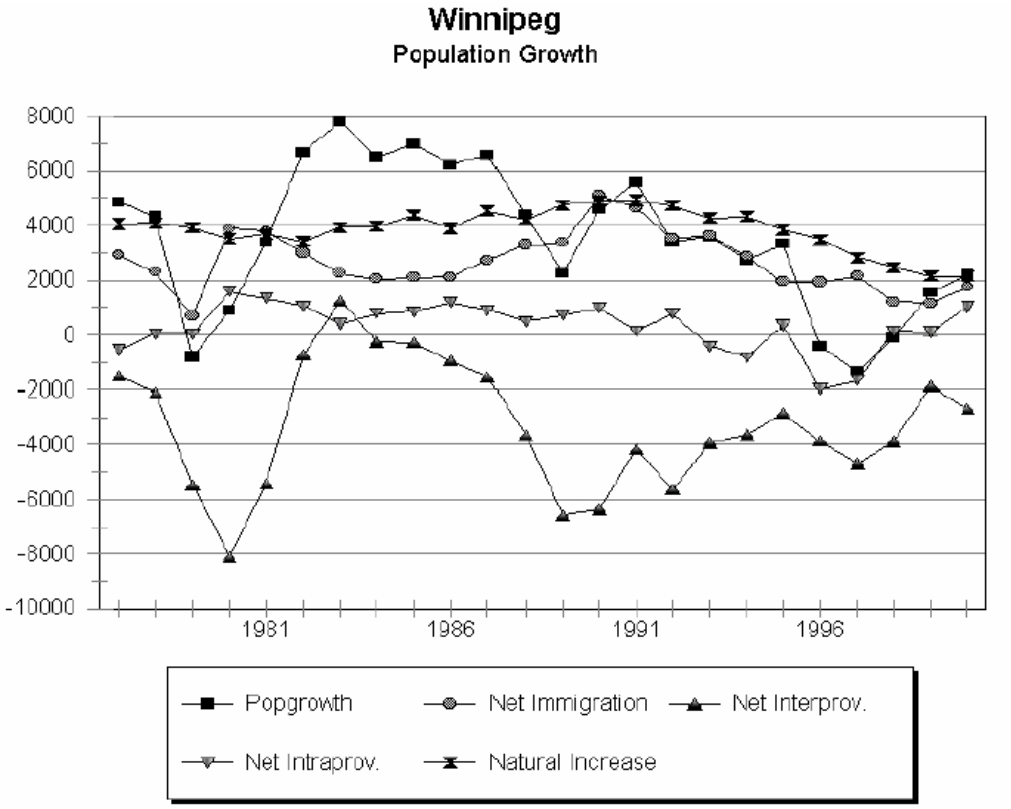
1.2 The Data Base

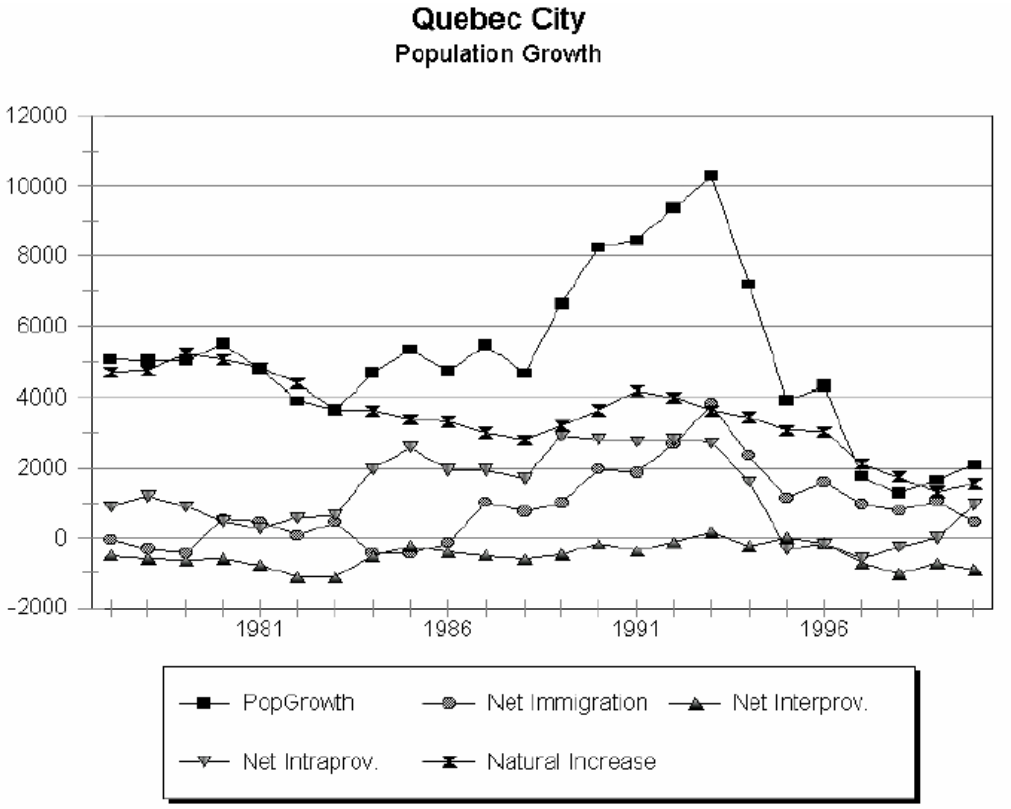
It is not easy to measure urban growth over 30 years, and it is even more difficult to obtain comparable measures of urban characteristics (see the Appendices). The study began with the 140 urban areas defined in 2001 by Statistics Canada. Numerous measures of urban characteristics are available for these places. By tracking the population of these places back in time, it was possible to estimate the population in 1971 for roughly equivalent geographical boundaries. As well, five other cities that have been identified as urban centres by Statistics Canada in earlier censuses were added to the list. This population data base, including estimates for each intermediate census year back to 1971, was the basis for Table 1 and Figures 1 to 3.

Figure 4: Growth Tracks for Selected Cities






Winnipeg
Population Growth
8000
6000
4000
2000
0
-2000
-4000
-6000
-8000
-10000
1981
1986
1991
1996
Popgrowth
Net Immigration
Net Interprov.
Net Intraprov.
Natural Increase


Quebec City
Population Growth
12000
10000
8000
6000
4000
2000
0
-2000
1981
1986
1991
1996
PopGrowth
Net Immigration
Net Interprov.
Net Intraprov.
Natural Increase

It is possible to estimate urban populations for earlier years, because Statistics Canada provides population counts for each urban area at both the census year, and for the previous census year (five years earlier) for the same geographical boundaries. Thus the population in 1971 can be calculated in the following way:

$$\text{Population in 1971} = (P71b/P71a) \times (P76b/P76a) \times \ldots..$$

where

P71a = the city's population in 1971 using the 1971 definition,

P71b = the city's population in 1976, using the 1976 definition, and so forth.

The product of these ratios for the six census periods—the Growth Index—is used to estimate the urban population in 1971, as the basis for growth analyses and discussions.

These explicit comparisons across census years are not available for other census measures, such as age structure or housing characteristics, that are tied to the geographical boundaries defined in each census year. The actual boundaries of the metropolitan area often change from one census to the next, incorporating additional rural areas as the settlement expands spatially, or including annexations to the central municipalities, or changes to Statistics Canada's definitions of urban areas overall.

Clearly, urban definitions based on evolving spatial boundaries will produce different measures of urban characteristics from those based on boundaries that are constant over time. The solution we applied was to maintain the corrected estimates of population and population growth, but to work with a variety of ratio measures to compare urban characteristics that are less sensitive to boundary problems. Thus average family income, for instance, is compiled for whatever spatial unit was employed by Statistics Canada to measure the urban area in a given year.

Table 2: The Data Base: Cities

The 1971 Study (Canadian Urban Trends)	The Census in 2001
137 Urban Places	140 CMAs and CAs
116 places continue	116
5 merged into larger places*	0
4 dropped below the population threshold**	0
4 were incorrectly identified initially***	0
5 were incorrectly dropped by Statistics Canada****	0
3 are not comparable due to massive annexation*****	3
0 Newly defined urban places	21

* Lincoln, St-Jerome, Sydney Mines, Trenton, Wallaceburg

** Flin Flon, Kapuskasing, Kirkland Lake, Oromocto

*** Arnprior, Gaspe, New Hamburg, Ste-Scholastique

**** Asbestos, Montmagny, Newcastle-Miramichi, Smiths Falls, Trail

***** Chatham (Chatham-Kent), Lindsay (Kawartha), Simcoe (Norfolk)

The continuing places include 12 cities for which the Growth Index (the product of all boundary adjustments since 1971) is equal to 1.2 or higher, indicating substantial boundary changes.

Nonetheless, the comparison breaks down for cases in which substantial changes are made to urban boundaries. Fortunately, a substantial data base for 1971 was assembled by Ray and his associates for Canadian Urban Trends (1976)—hereafter CUT—that used more extensive definitions of urban areas than those used by Statistics Canada; most were roughly comparable to the boundaries as defined in 2001 (see Table 2). CUT defined 137 urban places in 1971, of which 116 can be compared to the 2001 urban units. Five others have been merged with nearby places, four dropped below the population threshold of 10,000, three underwent massive annexations, four were wrongly identified as urban places in 1971, and five appear to have been redefined as "non-urban places" by Statistics Canada at some point. As well, 21 new urban centres have been added by 2001, all of which were below the population threshold in 1971.

Depending on the type of analysis, the variables used, and the temporal focus, this study can draw on different sets of cities. For instance, an analysis of urban growth since 1971 is based on 128 cities (omitting the five places that were later merged, and the four places that were wrongly identified as cities). An evaluation of the effects of growth on the characteristics of cities in the 2001 Census uses 137 CMA/CAs (omitting the three places where major annexations took place). The evaluation of the variables associated with change, however, is restricted to the 116 continuing cities—those that appear in both the 1971 and 2001 data sets. The cities used in the various analyses are listed in Appendix A, and the variables are described in Appendix B.

2. What Kinds of Cities Grow?

In the 1970s, a group of researchers at the Centre for Urban and Community Studies at the University of Toronto attempted to forecast the future urban development in Central Canada (Bourne et al., 1974). They found out that the data, models, and technologies available at that time were not particularly effective for projecting urban populations. For the most part, they were unable to make any predictions beyond "more of the same."

After the 2001 Census, however, it is possible to look back and evaluate the relationships between the actual growth pattern and certain urban characteristics that were known in 1971. What proportion of growth can be predicted based on the *a priori* conditions—now that we know the answers? And how much is absolutely uncertain, in that growth results from events that occurred after 1971? This section begins with a description of the Canadian Urban System (CUS) in 1971, followed by an evaluation of 1971 variables that are correlated with the urban growth rate over the next 30 years.

2.1 The Canadian Urban System in 1971

Table 3 and Figure 5 portray the CUS as it was in 1971. The urban system included 139 cities with more than 10,000 population; the total population of these cities was 16,534,000, or about 72% of the Canada's population at that time. The largest Census Metropolitan Area was Montreal (2,859,000), followed by Toronto (2,785,000). Even then, the concentration in the largest cities was apparent, with the 11 cities that had populations over 300,000 accounting for 64% of the urban total. Ontario and Quebec represented more than two-thirds of the urban population.

City sizes and regional groupings in 1971 provide insights into the subsequent pattern of urban growth. We now know that the 11 largest cities grew at a rate of about 50% over 30 years, while smaller places grew at a rate of only 30% (see Table 1). The regional differences were even stronger, varying from 17% in the Atlantic region to 79% in British Columbia. In fact, an analysis of variance in urban growth rates indicates that 42% of the city-to-city variation could be explained by combinations of city size and regional groupings—something to be borne in mind in the exploration of correlations and regressions that follows. Many growth "predictors" are simply surrogate indicators of differences in city size and region.

Table 3: The Canadian Urban System, 1971

Number of Cities						
Size/Region	**BC**	**Prairies**	**Ontario**	**Quebec**	**Atlantic**	**Canada**
Over 1 m.	1	0	1	1	0	3
300-1,000k.	0	3	4	1	0	8
100-300k.	1	2	6	3	4	16
30-100k.	6	5	14	12	6	43
10-30k.	16	10	17	15	11	69
Total	24	20	42	32	21	139
Urban Population (in 1000s)						
Over 1 m.	1,083	0	2,785	2,860	0	6,728
300-1,000k.	0	1,547	1,837	508	359	3,892
100-300k.	202	316	1,067	381	647	2,613
30-100k.	287	179	826	507	290	2,090
10-30k.	299	167	293	274	179	1,212
Total Urban	1,871	2,209	6,807	4,531	1,116	16,534
Rural	367	1,333	1,457	1,703	1,066	6,459
Region	2,238	3,542	8,264	6,234	2,182	22,993

Territories cities grouped with B.C.

Source: Simmons and Bourne, 2003, Appendix B.

2.2 Predictors of Urban Growth

Aside from population, almost all measures of urban characteristics are derived directly from volume one of *Canadian Urban Trends*, as listed in Appendix B. This study was a landmark in Canadian urban geography, providing a wealth of detail on both inter-city and intra-city variations, as well as perceptive comments and fascinating maps. The authors began by redefining urban areas with more extensive boundaries than those used by Statistics Canada at the time, definitions that are much more comparable to those used today. As well, they selected a variety of useful indicators, that are also generally comparable to the measures available in the 2001 Census of Canada: demographic variables such as age, family structure, migration, and ethnicity; economic variables such as employment, income, and industrial sector; and indicators of consumption such as housing characteristics, and TV and automobile ownership.

The challenge in analysing the 1971 data is to identify variables that would have been good predictors of future growth or decline—if we had known then what we now know. This analysis has been carried out in two stages: we begin with a series of correlations between the 1971 urban characteristics and the 1971-2001 growth rates, based on the 128 cities described in *Canadian Urban Trends*. We then use the most promising variables in a series of regression models.

There is always a risk that such correlations and regression relationships may be biased by a few small cities that have enjoyed extremely high rates of growth over the study period. For

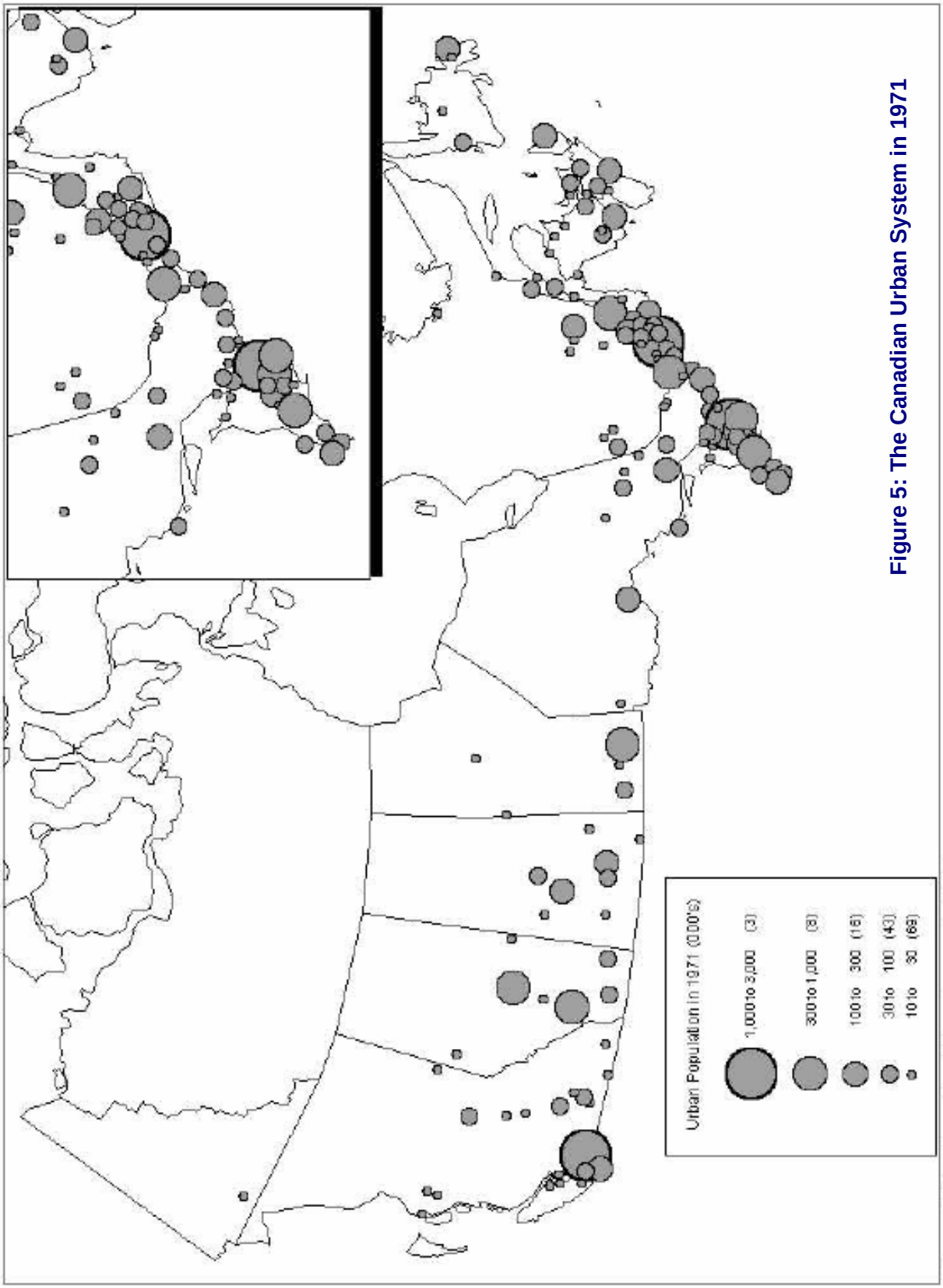


Figure 5: The Canadian Urban System in 1971

example, eight of the study cities more than doubled their population during the interval. Barrie alone grew at a rate of 215%. A complementary analysis assigns the cities into five growth categories—roughly quintiles—and looks at the aggregate characteristics in each category. The danger here is the domination of some categories by the largest urban places. As noted in Figure 3, big cities are concentrated in the growth categories that are slightly above average. To obtain a relatively "pure" evaluation of the "growth" effect, as opposed to the "city size" effect, we examined the nine largest cities separately.

The correlations with growth rates for the study period are shown in Table 4, with the values for city size, previous growth rate, and a regional measure included, so that we can begin to sort out direct and indirect effects on urban growth. The correlations give a sense of geographical variation: the regional indicator varies from east (1) to west (5) and the log of population has the familiar spatial distribution shown in the frontispiece. Other variables are grouped into clusters: size and location, demography, ethnicity, economy, and housing/ consumption. As we have seen, both city size and regional location are correlated with urban growth. The simple coding of regions produced a correlation with urban growth of 0.352, and a dummy variable that identified cities in Alberta and British Columbia was an even more effective growth predictor. Locations in the core region, or close to the border, or even those associated with large cities were not as good predictors, since the Quebec portion of Central Canada did not attract much growth.

Table 4: Correlations: Population Growth and Urban Characteristics, 1971

128 Cities*				
1971 Measures	**Growth Rate 1971-2001**	**Log Population, 1971**	**Growth Rate, 1961-1971**	**Region, East to West[a]**
Log Population, 1971	0.220	1.000	0.032	-0.010
Growth Rate, 1961-1971	0.250	0.032	1.000	0.240
Region	0.352	-0.010	0.240	1.000
Core[b]	0.002	0.193	-0.176	-0.197
Francophone[c]	-0.255	-0.093	-0.210	-0.748
Central[d]	0.157	0.311	-0.067	-0.046
Border[e]	0.021	0.200	-0.215	-0.097
West[f]	0.466	-0.037	0.300	0.720
Age 0-14 (%)	-0.212	-0.275	0.389	-0.088
Age 15-44 (%)	-0.072	0.023	0.480	-0.162
Age 45-64 (%)	0.135	0.205	-0.563	0.110
over 65 (%)	0.259	0.068	-0.358	0.150
Family Size	-0.364	-0.262	-0.010	-0.501
Natural Increase, 1971 (%)	-0.143	-0.097	0.302	0.021
In-Migration, 1966-1971 (%)	0.347	-0.250	0.672	0.548
Out-Migration, 1966-1971 (%)	0.065	-0.560	0.247	0.421
Immigration, 1961-1971 (%)	0.216	0.387	0.387	0.459
Born Abroad (%)	0.367	0.335	0.221	0.710

Table 4: Correlations: Population Growth and Urban Characteristics, 1971

128 Cities*				
1971 Measures	**Growth Rate 1971-2001**	**Log Population, 1971**	**Growth Rate, 1961-1971**	**Region, East to West[a]**
Mother Tongue English (%)	0.231	0.058	0.156	0.370
Mother Tongue French (%)	-0.251	-0.101	-0.183	-0.473
Mother Tongue Other (%)	0.216	0.240	0.207	0.695
Ethnic Diversity Index	0.170	0.148	0.224	0.706
University Education (%)	0.275	0.539	0.486	0.374
Employment Growth, 1961-1971 (%)	0.382	-0.002	0.783	0.290
LF Construction (%)	0.447	0.092	0.331	0.274
LF Mining or Manufacturing (%)	-0.318	-0.112	0.121	-0.107
LF Infrastructure (%)	0.228	0.082	0.206	0.254
LF Commercial Services (%)	0.453	0.127	-0.003	0.269
LF Public Services (%)	0.032	-0.028	-0.249	-0.136
Average Family Income	0.139	0.359	0.486	0.374
Value of Housing	0.448	0.527	0.513	0.335
Average Rent	0.029	0.168	0.281	0.155
Apartments (%)	-0.201	0.256	-0.107	-0.406
Rented (%)	-0.179	0.090	0.035	-0.331
Persons/Room	0.009	-0.042	0.142	0.050
Rooms/Dwelling	-0.036	-0.033	-0.064	0.009
With Colour TV (%)	0.033	0.100	-0.035	-0.067
With Two Cars (%)	0.067	0.136	0.123	0.163

* The 137 cities described in Canadian Urban Trends, minus five mergers and four misclassifications. Note that nine of these cities are not included in the 2001 Census.

[a] Each region is assigned a value ranging from 1 for Atlantic to 5 for British Columbia.

[b] Cities in Southern Ontario and Quebec.

[c] Cities predominately French-speaking

[d] Cities within 100 kms. of metropolitan area > 500,000

[e] Cities within 200 kms. of U.S. border

[f] Cities in Alberta or British Columbia

Source: *Canadian Urban Trends*.

The cluster of demographic measures tracks the recent growth history of cities as defined in 1971, but because Canada was then in the middle of the transition between the baby boom and the baby bust, the correlations and implications are complex. In general, a recent history of population or economic growth at that time was a good indicator of future growth. However, the nature of that population growth affects the relationship between past and future growth. Places

in the Atlantic region and Quebec that had relied on natural increase—hence a surplus of young people—would lose ground in the future. Places that had been able to create jobs and attract in-migrants and/or immigrants in 1971 would continue to do so over the next three decades.

The correlation that links future growth to the proportion of the elderly in 1971 is peculiar, but that measure is simply another indicator of the low birth rate. Family size turns out to be a significant regional indicator, decreasing as we move westward. The level of previous immigration is also a regional variable and a good indicator of potential growth. Note that in 1971, past immigration was mostly from the United Kingdom or Northern Europe. A high immigration rate and a high proportion of population with a university education are both associated with big cities.

A number of economic indicators appear to be useful predictors of future population growth. Previous job creation is an effective measure of previous growth rates, and the 1971 proportion of construction workers—an indicator of infrastructure investment—is even more effective. Specialization in commercial services, including retail, finance, and a variety of services is the single best growth predictor ($r = 0.453$) in the entire list. This variable is associated with city size, as in the example of regional service centres, and also with regional variation. Central Canada has manufacturing centres; the West has central places that provide services. Many of the former have lost ground, while the latter have grown, especially in Alberta and British Columbia.

Despite the links to both city size and regional patterns, average family income is only modestly associated with future population growth. In contrast, the average value of housing is a strong growth indicator ($r = 0.448$), and the only housing measure that contributes significantly to the explanation of differences in growth rates. It is, of course, also an outcome of previous growth.

In sum, the value of most growth predictors depends on their indirect relationships to city size, regional location (the west), and previous population growth rate. A regression model for urban growth between 1971 and 2001 using these three variables explains 26.8% of the total variation. The beta values for the three variables were 0.233, 0.442, and 0.111 respectively. A more complex model that adds the other regional variable (the east), as well as in-migration rate, immigration, employment growth, construction, commercial services, and house value—the most promising predictors—generate only 44.7% of the explanation. The best intermediate model combination substituted in-migration rate for population growth rate and increased the explanation to 32.4%.

2.3 Comparing Cities by Growth Categories

The behaviour of individual cities can vary widely, either with respect to the growth rate or to the other indicators that we wish to associate with growth. An alternative approach groups cities according to growth rates and looks at the *a priori* characteristics of each group. Table 5 includes five growth categories—and the nine largest cities—and shows how the 1971 characteristics vary among them. Note that variations in growth rates are seldom systematic—unlike the *ex posteriori* characteristics we will examine in a later section. The growth-size categories represent different regions, and in 1971 there were significant interregional differences in almost every aspect of urban life and living conditions. The 14 cities in the high growth group—composed of a number of peripheral places in western Canada—often contradict patterns established by the other growth groups.

Table 5: Anticipating Growth: Urban Characteristics, by Growth Categories, 1971

	128 Cities*					
Measure	**Group 1**	**Group 2**	**Group 3**	**Group 4**	**Group 5**	**Large Cities****
No. of Cities	36	27	22	20	14	9
Avg. Population	32,300	64,800	60,400	60,600	58,100	1,106,400
Growth Rate, 1971-2001 (%)	-10.9	11.5	26.5	44.0	97.6	51.3
Age 0-14 (%)	31.2	29.6	28.8	28.4	29.2	27.5
Age 15-44 (%)	44.8	43.6	44.0	44.6	44.5	45.9
Age 45-64 (%)	17.5	18.7	18.7	18.2	18.3	19.0
Age 65+ (%)	6.4	8.1	8.6	8.6	8.5	7.5
Family Size	3.88	3.75	3.66	3.60	3.54	3.53
Natural Increase (Annual) (%)	1.13	0.93	1.02	0.95	0.98	0.90
Net Migration, 1966-1971 (%)	-0.8	0.0	0.9	1.4	3.3	2.7
Immigration, 1966-1971 (%)	2.1	2.4	2.9	3.3	4.9	5.7
Born Abroad (%)	8.9	13.6	11.8	13.2	22.5	24.1
Mother Tongue English (%)	59.0	60.2	77.2	72.3	83.5	55.4
Mother Tongue French (%)	33.3	29.3	15.2	20.0	1.8	28.0
Mother Tongue Other (%)	7.7	10.5	7.6	7.8	14.7	16.6
Ethnic Diversity Index	0.464	0.488	0.389	0.444	0.597	0.600
University Education (%)	4.12	4.23	5.03	5.83	4.64	6.05
LF Construction (%)	6.5%	6.2	6.2	6.8	7.4	6.5
LF Mining & Mfg. (%)	33.6%	30.1	22.2	16.8	30.8	24.2
LF Infrastructure (%)	8.4%	8.2	9.1	8.6	6.4	9.3
LF Commercial Serv. (%)	25.1%	27.1	30.5	29.4	27.9	30.1
LF Public Sector (%)	22.5%	23.2	26.2	32.8	22.6	22.4
Med. Family Income***	$44,900	46,200	47,900	45,600	47,300	51,200
Income/Capita ($2000)	$11,550	12,340	13,075	12,750	13,360	14,525
Avg. Value Dwelling***	$74,100	85,400	86,300	98,500	98,000	115,400
Owned (%)	61.2	63.2	61.3	55.2	67.6	49.7
Apartments (%)	28.3	27.6	29.2	34.3	21.3	39.5
Avg. Rental ($2000)	$445	500	500	475	410	600
Rooms/ Dwelling	5.4	5.5	5.4	5.3	5.6	5.5
Persons/ Room	0.72	0.66	0.65	0.59	0.40	0.62
With Colour TV (%)	17.3	18.5	18.1	18.7	13.9	22.0
With Two Cars (%)	17.2	23.9	16.6	23.2	17.9	26.3

* The 137 cities described in *Canadian Urban Trends*, minus five mergers and four misclassifications. Cities are grouped by their 1971-2001 growth rates into categories of roughly equal size. Note that nine of these cities were not included in the 2001 Census.

** The nine largest cities with population over 500,000 in 2001.

*** Values in $2000 (comparable with the 2001 Census).

The cities in each growth group were defined as quintiles for the cities in the 2001 Census; they vary in number in this table, due to the addition of a number of declining cities that were present in 1971, but not in 2001; and the exclusion of several rapidly growing cities that were too small in 1971, but were included in 2001. Average city size is about the same for all growth groups except the first, which tend to be smaller, and, of course, for the big cities. Aggregate growth rates ranged from minus 10% to almost 100%. Can we find regular variations in urban characteristics that indicate the possibility of future growth (or decline)?

The demographic characteristics largely reflect the amount and nature of past growth, thus suggesting future directions of change. The variables measuring age group distribution are inconclusive, but family size and natural increase rates suggest that high birth rates characterize slow-growth locations. In contrast, high-growth locations attract domestic and international migrants. The big cities and the high-growth places have a history of immigration, and substantial proportions of people with mother tongues categorized under “Other.” It may not have been apparent in 1971, but slow-growth communities had the highest proportions of those whose mother tongue was French (Quebec). The level of ethnic diversity (higher in the West) and higher levels of education (particularly in Ontario) were also growth indicators.

In Canada, and especially in 1971, the economic base varies by region, so the links between particular economic sectors and growth rates are inconsistent or simply reflect regional variations. Smaller cities with a strong mining or manufacturing base display a “boom-and-bust” history, occupying both growth extremes. Cities with high levels of service activity—either private or public—are found in the more moderate growth categories. In contrast, and surprisingly, there is relatively little difference in income levels among the growth categories. The value of housing in 1971, however, partly reflects recent and potential growth patterns. Curiously, cities that would later decline have more persons per room, probably due to higher birth rates and larger families.

Most of the *a priori* predictors of growth indirectly identify regional location, or suggest the characteristics of past growth. Economic base is an especially ambiguous predictor. The ability to attract in-migrants or immigrants suggests a potential for future growth. At the same time, much of the variation in urban growth rates remains unexplained by conditions in 1971.

3. The Processes of Urban Growth

The *a priori* conditions identified above that support future urban growth explain less than half the variance in urban growth rates. Some of the remaining uncertainty derives from problems of definition and measurement, but much of the rest is due to economic and social changes that took place over the 30 years after 1971. Some were primarily local in origin, fostering the growth of one city over its neighbours; others were regional or national, creating new categories of cities to attract growth. Examples of the first include Fort McMurray (the Oil Sands) or Barrie (the overflow from Toronto). Examples of the latter include the relative decline of Francophone cities with the drop in their birth rates, or the expansion of resort and retirement centres throughout the country.

In order to incorporate such processes into the growth model, it is necessary to associate population growth with the changes in certain urban characteristics. *Canadian Urban Trends* provides a cross-section of information for 128 cities in 1971. By examining the same cities in 2001 using the same measures, we can evaluate the geography of change for each variable. Unfortunately, not all 128 cities can be studied in 2001. Four cities dropped below the population threshold of 10,000 for designation as a Census Agglomeration and thus drop out of our study group; five others were withdrawn by Statistics Canada for reasons that are unclear; and three are not comparable because of massive annexations (see Table 2).

The following analysis is thus based on 116 cities for which data were available for both 1971 and 2001. Most of the variables are ratios, such as the percentage of population age 0 to 14, and the measure for comparison is the 2001 value divided by the 1971 value. Dollar values such as average family income are adjusted to 2001 equivalents. Bear in mind, however, that many variable definitions have changed over 30 years, so that the measures are not always exactly comparable, although they do indicate the relative patterns of change among the cities.

3.1 Patterns of Change, 1971-2001

The directions of change in the variables are displayed in Table 6, as they vary among the growth categories. Each entry shows the ratio of values for the proportions measured in the 1971 and 2001 Censuses, and how these ratios vary among the different growth categories.

Table 6: The Magnitude of Change by Growth Category, 1971-2001

Ratio of 2001 value to the 1971 value, unless indicated, for 116 cities*						
Measure	**Group 1**	**Group 2**	**Group 3**	**Group 4**	**Group 5**	**Large Cities****
No. of Cities	27	26	21	19	14	9
Avg. Population, 1971	38,300	65,100	62,600	69,300	58,100	1,106,400
Avg. Population, 2001	34,600	72,700	79,700	99,900	114,800	1,670,400
Growth Rate, 1971-2001 (%)	-10.3	8.3	26.1	45.5	117.2	56.2
Age 0-14 (%)	0.600	0.602	0.641	0.635	0.681	0.666
Age 15-44 (%)	0.907	0.938	0.965	0.968	0.994	0.993
Age 45-64 (%)	1.788	1.468	1.369	1.457	1.279	1.291
Age 65+ (%)	3.074	2.247	1.770	1.998	1.541	1.628
Household Size	0.652	0.660	0.684	0.723	1.233	0.759
Born Abroad (%)	0.560	0.684	0.743	0.756	0.704	1.091
Mother Tongue English (%)	0.835	0.816	0.882	0.874	1.014	0.805
Mother Tongue French (%)	0.822	0.942	0.983	0.966	1.056	0.850
Mother Tongue Other (%)	1.105	1.110	1.225	1.252	0.860	1.444
Pop'n Growth (5-year) (%)	*denominator too close to zero*					
In-Migration (5-year) (%)	0.542	0.700	0.724	0.752	0.827	0.617
Out-Migration (5-year) (%)	0.758	0.778	0.761	0.745	0.762	0.748
Net Migration (5-year) (%)	*denominator too close to zero*					
Natural Increase(5-year) (%)	-0.098	-0.117	0.325	0.245	1.256	0.503
Immigration (5-year) (%)	0.320	0.444	0.493	0.572	0.501	0.969
Employment Growth (%)	26.7	65.2	79.9	133.2	225.6	102.0
Participation Rate (%)	1.070	1.115	1.093	1.127	1.094	1.111
Employment Rate (%)	0.988	1.014	0.991	1.006	1.010	1.019
Employment Ratio (%)	1.059	1.131	1.083	1.135	1.122	1.131
Income/Hhld. ($2000)***	1.058	1.149	1.158	1.177	1.264	1.241
LF manufacturing (%)	0.761	0.711	0.682	0.736	0.712	0.649
LF Infrastructure (%)	0.770	0.844	0.752	0.781	0.752	0.691
LF Commercial Serv. (%)	1.602	1.623	1.570	1.515	1.566	1.741
LF Public Sector (%)	1.294	1.001	0.992	0.960	0.920	0.956
Avg. Value Dwelling***	1.205	1.279	1.303	1.370	1.600	1.416
Owned (%)	1.159	1.138	1.085	1.144	1.085	1.196
Apartments (%)	0.182	0.191	0.206	0.160	0.114	0.095
Rooms/ Dwelling	1.166	1.149	1.163	1.248	1.205	1.130
Persons/ Room	0.592	0.590	0.624	0.561	0.600	0.682
Built before 1946 (%)	0.520	0.433	0.392	0.338	0.265	0.366

* The 116 cities described in *Canadian Urban Trends* that are included in the 2001 Census.

** The 9 largest cities with population over 500,000 in 2001.

*** Values in $2000 (comparable with the 2001 Census).

Thus the proportion of children declined throughout the urban system, while the proportion of the elderly increased; these changes are most marked in the slow-growth cities. For the most part, it is difficult to compare the absolute numbers—of seniors, say—because of the many urban boundary changes that have taken place. Note that the growth categories are the same as those used in other analyses, but the number of cities in each category changes because fewer cities are included. Finally, although Table 4 was based on aggregate rates of urban characteristics for growth categories, in Table 6 the mean values of characteristics for cities in each category are used.

The demographic measures suggest that the most dramatic change in slow-growth communities is the increase in the proportion of seniors, which is now three times higher than it was in 1971. The lack of population growth also tends to stabilize the ethnic mix. The proportions using the various mother tongues remains more or less unchanged, and the proportion of the population born outside the country declines as those who immigrated in the early part of the century die. The most obvious effect of immigration over the study period has been to differentiate the big cities from the smaller centres—no matter what their growth rate.

A comparison of the sources of the five-year population growth rates confirms the importance of city size. The growth ratios compare the 1996-2001 period with the 1966-1971 period, although the growth rates for population and net migration cannot be compared. All the growth processes have declined in magnitude over time, but immigration into big cities has held up very well, and natural increase has declined less rapidly in big cities than in most smaller centres. Rates of natural increase were originally lower in the larger cities, and the subsequent influx of immigrants increased fertility.

The fundamental urban growth relationship is economic. Despite the problems in defining urban areas over a period as long as 30 years, the simple correlation between population growth and employment growth is 0.795. This suggests that more than 60% of the variance in urban growth rates can be explained by this relationship. As well, there are marked differences in the employment growth rates across the urban growth categories. The analytical problem is that similar levels of explanation could be achieved by measuring the growth in dwelling units, or the number of cars. We cannot be sure to what degree population growth follows job creation, and how much job creation follows population growth. Instead, we can compare ratio measures of economic activity. As the rate of population growth increases, income growth is more rapid, and both participation and employment rates tend to improve slightly (the employment ratio combines the effect of both of these). This suggests that economic growth leads rather than lags population growth.

The economic sectors have changed in a variety of ways. The big cities showed the greatest decline in the share of manufacturing and infrastructure jobs, but the highest increase in the share of commercial service jobs. Slow-growth cities increased their share of both commercial and public service jobs more rapidly than high-growth cities, but as suggested in Table 4, the slow-growth cities had lower proportions of these service jobs in 1971.

“Value of dwelling” is the housing variable most strongly associated with population growth. The increase in value ranges from 20% to 60% depending on the growth category. The share of new houses is larger in growing cities, as one might expect, so that the proportion of older housing

declines. Newer houses tend to be more expensive and to have more rooms, and are more likely to be condominiums rather than rental apartments.

Table 6 indicates several important points. First, employment growth appears to be linked with population growth in a direct, causal way. Growing cities not only manage to provide jobs for their residents; they also show an increase in the ratio of jobs to population (the employment ratio). Second, while the processes of population growth of big cities are driven primarily by immigration, the growth of smaller cities depends on increased domestic in-migration—hence the level of net migration. In both instances, natural increase follows the migrants. Third, urban growth brings economic advantage: growth brings higher incomes, as much as 20% on average; and increases the average value of dwellings (a disadvantage to newcomers, but an advantage to those who are able to buy (or intend to sell).

3.2 The Change Correlations

Table 7 indicates certain spatial correlations. Each change ratio is compared in turn to the population growth rate, to city size and region (numbered from one to five, east to west), and to the *a priori* spatial distribution of the ratio as measured in 1971. In the latter case, a positive correlation suggests that the concentration is increasing (for example, the rich are getting richer), while a negative correlation suggests a spatial dispersion of the characteristic (for example income filters down to poorer places). Of course, the values less than plus or minus 0.1 are largely random results and can be ignored.

Changes in age structure ratios are correlated with the growth rate, and also with city size; but the strongest correlations—with the *a priori* conditions—are negative. Thus, places with high proportions of young people display the most rapid decline in the proportion of young people over the 30-year period, and places that had more adults lost the greatest share. Change in household size, in turn, is closely related to the changing proportion of children. The proportion of the population born outside the country has increased most rapidly in cities that grow, especially in big cities. The share of the population speaking various languages shows the greatest diversity of change. The proportion with English as a mother tongue increases to the west as the initial pioneer immigrants from continental Europe die off, and the proportion of Anglophones increases in those cities that do not receive new immigrants. The proportion of those who list their mother tongue as “Other,” in contrast, is increasing in the east, and dispersing throughout the country.

Population growth rates and net migration rates cannot be compared for the two five-year periods, 1966-1971 and 1996-2001, because the base values are too close to zero. However, changes in both in-migration and out-migration rates show negative correlations with the initial values for both measures, suggesting that the current pattern is to some degree the inverse of what happened before. Natural increase has increased in the west, and immigration has increased more rapidly in the biggest cities.

Table 7: Correlations with Change Measures, 1971-2001

116 Cities,* Based on the Change Ratios Described in Table 6				
	Growth Rate 1971-2001	**Log Population, 1971**	**Region, East to West****	**Measure in 1971**
Growth Rate, 1971-2001	—	0.155	0.368	—
Log10 Population 1971	0.155	—	-0.020	—
Age 0-14 (%)	0.329	0.203	0.422	-0.472
Age 15-44 (%)	0.357	0.274	0.132	-0.474
Age 45-64 (%)	-0.278	-0.273	-0.126	-0.829
Age 65+ (%)	-0.334	-0.253	0.056	-0.683
Household Size	0.221	0.036	0.204	-0.695
Born Abroad (%)	0.217	0.413	-0.128	-0.100
Mother Tongue English (%)	0.191	-0.028	0.461	0.840
Mother Tongue French (%)	0.202	-0.075	-0.114	0.109
Mother Tongue Other (%)	-0.049	0.091	-0.344	-0.402
Pop'n Growth (5-year) (%)	*denominator too close to zero*			
In-Migration (5-year) (%)	0.280	-0.062	-0.045	-0.365
Out-Migration (5-year) (%)	-0.029	-0.024	0.041	-0.459
Net Migration (5-year) (%)	*denominator too close to zero*			
Natural Increase (5-year) (%)	0.313	0.068	0.261	-0.176
Immigration (5-year) (%)	0.149	0.317	-0.112	-0.131
Employment Growth (%)	0.795	-0.027	0.249	—
Participation Rate (%)	0.168	-0.023	-0.262	-0.421
Employment Rate (%)	0.150	0.191	0.036	-0.390
Employment Ratio (%)	0.189	0.033	-0.175	-0.458
Income/Capita ($2000)***	0.563	0.171	0.127	0.015
LF Manufacturing (%)	-0.022	-0.255	-0.090	-0.412
LF Infrastructure (%)	0.087	-0.160	0.030	-0.132
LF Commercial Service (%)	-0.098	0.316	-0.201	-0.745
LF Public Sector (%)	-0.337	-0.117	0.091	-0.573
Avg. Value Dwelling***	0.500	0.092	0.457	0.111
Owned (%)	-0.168	0.068	-0.225	-0.799
Apartments (%)	-0.191	-0.149	-0.314	0.052
Rooms/ Dwelling	0.134	-0.149	0.154	-0.597
Persons/ Room	0.024	0.235	-0.062	-0.845
Built before 1946 (%)	-0.338	-0.109	0.107	-0.093

* The 116 cities described in *Canadian Urban Trends* that are included in the 2001 Census.

** Each region is assigned a value ranging from 1 for Atlantic to 5 for British Columbia.

*** Values in $2000 (comparable with the 2001 Census).

As suggested above, the growth of employment is closely correlated with population growth, and is stronger in the west, although not correlated with city size. Changes in the employment ratio (jobs/adult population) summarize the demographic/economic relationship: the ratio has improved with urban growth, but more importantly, in those places that began with low values. Three decades of income redistribution across the country through the market and in response to public policy initiatives, as well as the overall shift toward the service economy and the increased participation of women in the workforce, have greatly improved access to employment.

Despite these changes in employment, the spatial distribution of income per capita has changed little, except to favour cities that are growing. Manufacturing employment, on balance, has dispersed from the largest industrial cities towards smaller service centres, while commercial services have shifted in the opposite direction. Also significant is the shift of public-sector activities towards slow-growth places—or the fact these jobs have remained in these places, while other jobs have relocated. Either way, these cities have become more dependent on governments.

The increase in the value of housing is linked to population growth, and is higher in the west, but shows little association with the pattern that existed in 1971. Better access to mortgages and the expansion of condominium ownership have increased the level of home ownership in places where it was lower before—notably in Quebec. The amount of housing—measured as either rooms per dwelling, or persons per room, or household size—has shifted, in relative terms, towards places that were less favoured before. In part this reflects the significant reduction of the birth rate, and in part, the overall reduction in economic differences across the country.

It is difficult to summarize the variety of changes described in this table. For the most part, the relationships with the growth rate or city size are weak. Growth rates influence economic conditions such as incomes and the value of housing; a larger population attracts immigrants and services. The east-west trends, summarized by the correlations with the regional indicator, tend to be more important. But the most important finding is the degree of restructuring of social conditions across the country. Demographics, the ethno-cultural mix, growth processes, the character of the economic base and employment, and many housing variables display a geography of change that is the inverse of the pattern in 1971. Canadian cities have become more and more alike. This supports the convergence hypothesis.

3.3 Testing Convergence / Divergence

The data in Table 7 suggest that the changes in Canadian cities over 30 years have reduced the differences among places, at least with respect to most of the social and economic measures used in this analysis. This finding is perhaps not surprising, given Canadian policies designed to overcome regional variations in income, public services, and health care, as well as the overall shift away from primary and manufacturing jobs towards the service economy. At the same time, this result contradicts the assertions in a number of recent papers (cf. Bourne, 2003; Bourne and Simmons, 2003) that suggest that a significant development in the Canadian urban system has been the growing differential between the large cities and the rest of the urban system (this is the reason that the largest cities have been segregated in all of the analyses of urban growth rates above).

Table 8: Testing the Convergence of Urban Characteristics, 1971-2001

116 Cities							
Measure	1971			2001			CV Ratio
	Mean	SD	CV	Mean	SD	CV	
Age 0-14 (%)	29.92	3.31	0.111	18.68	2.29	0.133	1.105
Age 15-44 (%)	44.64	3.49	0.078	42.36	3.38	0.080	1.019
Age 45-64 (%)	17.73	3.12	0.176	24.98	2.63	0.105	0.597
Age 65+ (%)	7.75	3.21	0.414	13.98	3.63	0.260	0.627
Household Size	3.64	0.508	0.139	2.51	0.145	0.058	0.414
Born Abroad (%)	11.77	9.64	0.819	8.13	7.53	0.927	1.132
Mother Tongue English (%)	61.86	35.50	0.574	61.33	36.88	0.601	1.048
Mother Tongue French (%)	29.54	39.73	1.345	28.77	39.77	1.382	1.028
Mother Tongue Other (%)	8.61	8.15	0.947	7.33	7.22	0.985	1.040
Pop'n Growth (5-year) (%)	9.29	10.45	1.252	0.57	5.78	10.09*	8.059*
In-Migration (5-year) (%)	20.55	8.32	0.405	13.29	5.70	0.429	1.059
Out-Migration (5-year) (%)	19.84	7.21	0.363	14.34	4.85	0.339	0.933
Net Migration (5-year) (%)	0.71	5.06	7.155	-1.05	4.26	-4.07*	0.568*
Natural Increase (5-year) (%)	10.27	5.84	0.569	0.75	2.34	3.103*	5.453*
Immigration (5-year) (%)	2.70	2.17	0.803	0.87	1.06	1.062	1.516
Participation Rate (%)	57.47	5.05	0.088	63.38	5.71	0.090	1.024
Employment Rate (%)	90.82	2.58	0.028	91.17	3.35	0.367	1.292
Employment Ratio (%)	52.29	5.71	0.109	57.86	6.31	0.109	0.999
Income/Capita ($2000)**	12,026	1,779	0.148	20,769	2,472	0.119	0.804
LF Manufacturing (%)	22.49	13.39	0.595	14.64	8.40	0.574	0.965
LF Infrastructure (%)	15.51	5.13	0.331	11.06	2.10	0.190	0.574
LF Commercial Service (%)	28.43	4.84	0.170	44.51	5.24	0.118	0.693
LF Public Sector (%)	25.47	9.29	0.365	24.96	5.99	0.240	0.658
Avg. Value Dwelling**	83,200	18,900	0.228	111,200	36,400	0.327	1.436
Owned (%)	59.58	9.58	0.161	66.49	6.71	0.101	0.627
Apartments (%)	28.84	10.50	0.364	4.97	4.08	0.821	2.255
Rooms/ Dwelling	5.39	0.32	0.059	6.33	0.47	0.074	0.635
Persons/ Room	0.672	0.079	0.117	0.398	0.029	0.072	0.616
Built before 1946 (%)	36.55	14.93	0.409	14.48	7.49	0.517	1.265

The 116 cities described in *Canadian Urban Trends* that are included in the 2001 Census.

SD = Standard Deviation; CV = Coefficient of Variation.

* Coefficients of variation and ratios are suspect because of low values of means.

** Values in $2000 (comparable with the 2001 Census).

The twin processes of convergence and divergence are not necessarily contradictory, however—since the former refers to all of the 130 or so cities within Canada, and the latter refers to the nine largest places only—but it raises questions about the magnitude and direction of differences, the kinds of processes involved, and the specific measures to be used. The set of variables defined for the 116 cities that were used to study the characteristics of change between 1971 and 2001 are clearly relevant to these questions.

The study of convergence requires a systematic comparison of the variance in each measure at different points. Table 8 indicates the mean, standard deviation (SD), and coefficient of variation (CV) of each measure for both years. The final column shows the ratio of the 2001 coefficient to the 1971 value. If this ratio is greater than one, it implies divergence with respect to the measure; if the value is less than one, it suggests convergence. Alternatively, the standard deviations for the two years can be compared directly: divergence is suggested if the value for 2001 is greater than the value for 1971.

The results are complex, but they do confirm the overall trend to convergence in characteristics of the 116 continuing urban places. If we rely on the ratio of coefficients of variation, only 13 of 26 variables show convergence, but if we compare the standard deviations, 19 of 29 variables converge, and 24 of 29 have one or the other indicator supporting convergence. Only five measures show divergence with respect to both indicators. At the same time, the population size range for these 116 cities almost doubled during this period.

According to the variables, the demographic measures of age structure and household size are converging, as are the aggregate measures of economic activity, income levels, and housing consumption. Even the standard deviations of the various growth processes are declining, although the rates themselves have declined sharply. At the same time, language variables and measures of immigration and natural increase rates show some divergence, while the labour market measures show little change. Average values of housing, on the other hand, are becoming more diverse. As we will see, the variables that show the greatest divergence are also those that distinguish the large cities from smaller ones.

In the case of large cities, the focus is the comparison of two means: one for the full set of 116 cities, and one for the nine largest places. Are big cities diverging from the rest? Table 9 shows the two sets of means and also the ratio of the subset mean to the overall mean for each year. The last column compares the two sets of results by subtraction to see whether the distance between the two means has increased (positive, indicating divergence) or decreased (negative, indicating convergence). The comparison is complicated by situations in which the big cities initially have values less than the norm, but by 2001 have values that are higher (for example, values for natural increase), or vice versa. In these cases, the change in differential indicates the extent to which the final big city value is farther or closer from the norm (thus 2.196 units above the norm, instead of 0.058 units below the norm represents a difference of 2.138). Overall, the increasing differentiation of the big cities is clearly confirmed, with 21 out of 29 measures showing divergence.

Table 9: Testing the Divergence of Big Cities, 1971-2001

116 Cities							
Measure	1971			2001			Change in Differential
	All* Cities	Big** Cities	Ratio	All* Cities	Big** Cities	Ratio	
Age 0-14 (%)	29.92	28.11	0.940	18.68	18.69	1.001	-0.059
Age 15-44 (%)	44.64	45.76	1.025	42.36	45.41	1.071	0.046
Age 45-64 (%)	17.73	18.63	1.051	24.98	23.92	0.957	-0.008
Age 65+ (%)	7.75	7.49	0.967	13.98	11.99	0.858	0.109
Household Size	3.64	3.41	0.935	2.51	2.58	1.026	-0.039
Born Abroad (%)	11.77	20.28	1.723	8.13	21.89	2.694	0.971
Mother Tongue English (%)	61.86	60.82	0.983	61.33	53.77	0.877	0.106
Mother Tongue French (%)	29.54	23.86	0.807	28.77	22.79	0.792	0.015
Mother Tongue Other (%)	8.61	15.32	1.780	7.33	19.83	2.706	0.926
Pop'n Growth (5-year) (%)	9.29	12.94	1.394	0.57	6.74	11.764	10.370
In-Migration (5-year) (%)	20.55	14.85	0.723	13.29	9.27	0.697	0.026
Out-Migration (5-year) (%)	19.84	11.50	0.580	14.34	8.17	0.570	0.010
Net Migration (5-year) (%)	0.71	3.35	4.745	-1.05	1.10	-1.049	negative
Natural Increase (5-year) (%)	10.27	9.68	0.942	0.75	2.41	3.196	2.138
Immigration (5-year) (%)	2.70	5.28	1.955	0.87	3.24	3.708	1.753
Participation Rate	57.47	61.07	1.063	63.38	67.66	1.068	0.005
Employment Rate	90.82	92.22	1.015	91.17	93.91	1.030	0.015
Employment Ratio (%)	52.29	56.34	1.077	57.86	63.57	1.099	0.022
Income/Capita ($2000)***	12,026	14,201	1.181	20,769	24,436	1.177	-0.004
LF Manufacturing (%)	22.49	19.84	0.882	14.64	12.11	0.827	0.055
LF Infrastructure (%)	15.51	16.10	1.038	11.06	11.08	1.002	-0.036
LF Commercial Service (%)	28.43	29.58	1.041	44.51	51.14	1.149	0.108
LF Public Sector (%)	25.47	26.04	1.022	24.96	23.89	0.957	0.021
Avg. Value Dwelling***	83,200	110,400	1.328	111,200	160,100	1.440	0.112
Owned (%)	59.58	52.94	0.889	66.49	62.46	0.939	-0.050
Apartments (%)	28.84	36.49	1.265	4.97	3.45	0.694	0.041
Rooms/ Dwelling	5.39	5.41	1.003	6.33	6.11	0.965	0.032
Persons/ Room	0.672	0.622	0.926	0.398	0.422	1.060	-0.014
Built before 1946 (%)	36.55	30.36	0.830	14.48	11.61	0.802	0.028

* The 116 cities described in *Canadian Urban Trends* that are included in the 2001 Census.

** The nine largest cities with population over 500,000 in 2001.

*** Values in $2000 (comparable with the 2001 Census).

The largest changes occur in measures of mother tongue and immigration, and surprisingly, in rates of natural increase—which are now much higher in larger cities than in smaller centres. Relative differences in housing values have increased, but relative incomes have not. Big cities have increased their share of private services, and lost their share of public services, but in both cases these cities have become further differentiated from smaller places. The results support most generalizations about Canada's largest cities: not only are they larger, they are growing more rapidly than other places, often in rather different ways and for different reasons. They grow both by immigration and natural increase, while they lose population through net domestic migration. The mix of industry is more oriented to services in the private sector.

3.4 Interpretations

This overview of the processes of change in Canadian cities does not allow us to predict exactly which cities will grow, and which ones will slide into decline. It does confirm, however, some of the overall patterns of change in Canadian cities that set the stage for urban growth in the future, as discussed in Simmons and Bourne (2003).

First, the Canadian economy has increasingly become a service economy, in which almost all new jobs are created in the service sectors. Service jobs tend to follow income growth instead of changes in primary and secondary employment. Income growth accrues to broad regions, rather than specific locations, as it is redistributed by the federal government and the provinces. The growth points will be the service centres that have the best access to the redistributed regional income. The places in decline will be those less accessible places that specialize in mining and manufacturing.

Second, as Canada's rate of natural increase in population rapidly approaches zero, the cities that grow will be those that attract domestic migrants and/or immigrants. And in the future, the level of domestic migration is likely to decline further as the population ages. Access to immigration is becoming more and more important for the continued growth of large cities, and this is likely to be linked to the presence of established immigrant communities. Places without an immigrant base must compete for domestic migrants or go into decline. In this sense, most cities in the Atlantic provinces and Quebec are poorly positioned for growth.

Third, the proportion of the population over 65 has more than doubled since 1971, and now makes up about 12% of the total. In the future it will surpass 15% and possibly approach 20% of the national population. As this proportion increases, smaller but accessible cities with high levels of amenities may benefit by attracting recreational and retirement facilities and residents.

Finally, the effect of the many economic and social changes over the last 30 years has been to reduce many of the important differences among cities, as suggested by the high levels of negative correlation between patterns of change and the patterns in 1971. Most of the striking variations among Canadian regions have been removed: Quebec is no longer distinguished by high fertility, the mining and manufacturing cities in Central Canada have shifted towards services, income levels have become more uniform, and so has the level of housing consumption. Only one ratio shows a marked intensification over time: the proportion of population whose mother tongue is English has increased in many Anglophone communities—a measure of the massive levels of European immigration around the turn of the century. For the most part, the 116 cities

in our study have become more alike. Thus, differences in urban growth rates are likely to be much less problematic today than they would have been in the more strongly differentiated urban system of 1971.

Of course these relationships are heavily influenced by the inclusion of so many smaller cities that are weighted more strongly than their actual population merits. These are the places that varied considerably from region to region in 1971, and that have benefited from the trends we have identified. At the same time, the very largest cities have moved apart from the rest. By attracting most of the immigrants, they have grown more rapidly and maintained higher levels of natural increase. The economy of the larger places has also shifted towards private services (wholesale, retail, finance, other services) more rapidly than other cities, and relies less on the public sector.

4. The Implications of Population Decline

One of the premises driving this research is that the population growth of a city affects the life chances of its citizens directly in a variety of ways. This section of the paper evaluates this proposition using two approaches.

First, the correlations between the urban growth rate and a variety of urban characteristics in 2001 are examined, in a fashion similar to earlier analyses. Which characteristics of cities are most sensitive to growth, and how much of the variation in these characteristics is directly attributable to the rate of growth? Correlations may be distorted in some instances if the distributions of the variables are not normal—for instance, when there are a small number of cities with very high growth rates. To overcome this problem, the second analysis again divided the 137 cities in 2001 into five growth categories plus a big-city group, so that the characteristics of the cities in each category can be compared.

4.1 The Effects of Population Growth

The analysis of the growth effects necessarily focuses on measures of lifestyle and consumption that can be interpreted as results; rather than causal measures such as city size or location that were emphasized above. Income levels, income inequalities, demographic structure, and housing measures are used here. The correlation matrix uses 125 cities, omitting the 3 that underwent major annexations, as well as 12 that were too small to be included in 1971. Given their small population base in 1971, some of the latter generated very high rates of growth that could bias the results.

The resulting correlations are shown in Table 10. The first column shows the actual correlation with the growth rate, and the second and third columns the spatial distribution of the measure with respect to city size and region, respectively. Although city size is a rather weak predictor of urban growth, after more than 30 years of population growth, the growing cities are substantially larger on average. Therefore, correlations between growth rate and other variables that are less than 0.338 should be treated with caution; they may simply measure the indirect effects of city size. The third column shows the correlations for the regional location indicator. The urban growth rate is more strongly correlated with the regional measure than with city size.

Table 10: Correlations: Population Growth and Urban Characteristics, 2001

	125 Cities*		
2001 Measures	**Growth Rate, 1971-2001**	**Log population, 1971**	**Region, East to West****
Log Population, 1971	0.338	1.000	0.041
Region	0.391	0.041	1.000
Age 0-14 (%)	0.193	-0.056	0.389
Age 15-44 (%)	0.234	0.304	0.480
Age 45-64 (%)	-0.351	-0.197	0.110
over 65 (%)	-0.085	-0.103	-0.358
Household Size	0.259	0.118	0.165
Natural Increase, 1996-2001 (%)	-0.143	0.237	0.450
Net Migration, 1996-2001 (%)	0.347	0.363	0.647
Net Immigration, 1996-2001 (%)	0.402	0.705	0.402
Born Abroad (%)	0.426	0.335	0.534
Mother Tongue English (%)	0.221	0.058	0.443
Mother Tongue French (%)	-0.262	-0.101	-0.509
Mother Tongue Other (%)	0.341	0.240	0.564
Employment Rate (%)	0.232	0.303	0.189
Participation Rate (%)	0.338	0.220	0.344
Average Income/Capita	0.346	0.506	0.359
LF Primary (%)	-0.013	-0.366	0.158
LF Manufacturing (%)	-0.151	-0.099	-0.186
LF Infrastructure (%)	0.160	-0.008	0.328
LF Commercial Services (%)	0.412	0.592	0.099
LF Public Services (%)	-0.200	-0.047	-0.096
Median Value of House	0.613	0.552	0.541
Single Family (%)	-0.029	-0.323	0.284
Row Housing (%)	0.327	0.295	0.284
Apt. (%)	-0.216	-0.094	-0.445
Owned (%)	0.138	-0.150	0.296
Persons/Room	-0.005	0.185	-0.199
Rooms/Dwelling	0.244	-0.052	0.335
Built pre-1946 (%)	-0.431	-0.104	-0.340
Built 1946-1980 (%)	-0.472	-0.238	0.073
Built after 1980 (%)	0.820	0.320	0.216

* Omits the three CAs with massive annexations, and 12 cities with less than 10,000 population in 1971.

** Each region is assigned a value ranging from 1 for Atlantic to 5 for British Columbia.

Source: Census of Canada, 2001

The current demographic composition is the most obvious result of protracted urban growth. High growth rates are based on in-migration, either domestic or international—which is largely composed of young adults—and thus results in high levels of natural increase in the years that follow. The youthful age structure reduces the proportion of older adults and the elderly. Note that the sources of demographic growth refer only to the period 1996-2001, rather than the whole study period. The other effect of a high growth rate is the change in the ethnic mix of the population. A significant source of population growth is immigration (per cent born abroad, net external migration) and the result is a higher proportion of residents with a mother tongue other than English or French. During this period, Francophone cities suffered slower growth rates than Anglophone cities because of the lack of immigration and the remarkable decline of natural increase rates.

On the economic side, growing cities enjoyed higher incomes per capita, based on higher rates of employment and higher labour force participation rates (which were also related to city size). Growing cities provide more economic opportunities, and therefore attract migrants—both domestic and international. Population growth also modifies the kinds of jobs available: reducing the proportion of jobs in the primary and secondary sectors and in the public service, but stimulating the creation of new jobs in the commercial services. The correlation with service employment suggests that growing cities provide a wider variety of consumption opportunities as well: shops, restaurants, recreation opportunities, and the like.

Perhaps the most visible aspect of consumption, and the most variable characteristics among cities, is housing. High growth rates affect the composition of housing types, favouring row houses over single detached or apartment housing; and modestly increase the level of home ownership. The latter is significant in the light of the strong correlation between growth rate and the value of housing. In high-growth areas, housing costs more, but the return on investment can be very strong. At the same time, there are strong links between housing characteristics and the region of growth. Perhaps the most important point to make here is the obvious link between the growth rate and the age of housing. Growing cities have a higher proportion of new houses, but they also have more new shopping centres, new schools, new roads, and new sewer lines. Their residents benefit from enormous investments in modern facilities of all kinds, even if there may be a time lag in the provision of the facilities.

4.2 Comparing Urban Growth Categories

The table of correlations between the rate of growth and the benchmark variables tends to be distorted by the presence of very high growth rates in some of the smaller urban centres—even after the omission of those places that had less than 10,000 population in 1971. For this reason, and in order to get a better sense of the magnitude of impact of growth on urban characteristics, the cities described in the 2001 Census were divided into five roughly equal groups, based on their rates of growth since 1971 (Table 11), with an additional category for the 9 largest cities. This permits us to calculate aggregate values for each group over a variety of characteristics.

Table 11: The Impact of Urban Growth: Urban Characteristics by Growth Categories, 2001

	137 Cities*					
2001 Measure	**Group 1**	**Group 2**	**Group 3**	**Group 4**	**Group 5**	**Large Cities****
No. of Cities	27	28	24	23	26	9
Avg. Population	34,700	68,600	71,000	85,900	76,900	1,685,600
Growth Rate, 1971-2001 (%)	-9.4	11.5	26.6	44.5	108.6	51.0
Age 0-14 (%)	18.1	18.3	18.7	18.4	20.6	18.8
Age 15-44 (%)	40.6	41.7	43.4	44.2	44.0	45.5
Age 45-64 (%)	26.4	25.1	24.2	24.3	22.6	23.8
Age 65+ (%)	15.0	14.9	13.8	13.1	12.8	12.0
Avg. Household Size	2.47	2.49	2.51	2.47	2.65	2.62
Growth Rate, 1996-2001 (%)	-5.42	-0.28	1.71	2.76	8.88	6.97
Net Immigration (%)	0.33	1.00	0.96	1.22	1.56	4.10
Net Migration (%)	-4.54	-1.07	-0.73	0.37	4.21	0.24
Natural Increase (%)	-1.21	-0.21	1.48	1.18	3.11	2.63
Born Abroad (%)	4.8	10.2	9.0	9.1	15.7	27.8
Mother Tongue English (%)	59.3	60.1	74.8	69.8	83.3	48.9
Mother Tongue French (%)	32.7	28.6	15.5	20.5	1.7	22.4
Mother Tongue Other (%)	5.4	8.9	7.5	7.5	13.1	24.0
Avg. Income per Capita	$19,500	21,500	21,300	21,700	22,900	24,900
Income Distribution (Gini)	0.2865	0.2860	0.2852	0.2823	0.2675	0.2954
Participation Rate (%)	58.5%	61.7	64.7	65.8	67.7	67.2
Employment Rate (%)	88.9	91.9	92.1	92.5	93.1	93.7
Primary Labour Force (%)	5.9	3.0	2.4	3.7	4.9	1.4
Manufacturing (%)	13.1	17.3	13.1	10.5	15.5	13.3
Infrastructure (%)	11.1	10.9	10.6	10.5	11.8	10.7
Commercial Services (%)	41.5	44.0	47.0	45.9	45.8	52.0
Public Sector (%)	25.7	22.6	25.0	27.7	20.3	20.9
Single Detached Housing (%)	65.2	63.6	60.6	56.8	62.6	45.4
Owned Units (%)	67.6	67.7	65.6	63.9	70.6	60.4
Rooms per Household	6.25	6.35	6.49	6.33	6.63	6.04
Average Value	$103,000	139,400	139,600	170,300	209,500	241,900
Built before 1946 (%)	17.9%	18.5	15.8	12.2	8.2	12.2
1946-1980 (%)	60.3	55.7	54.0	53.6	48.8	54.3
After 1980 (%)	21.9	25.7	30.2	34.3	43.8	33.6

* Omits the three CAs with massive annexations.

** The nine largest CMAs (Toronto, Montreal, Vancouver, Ottawa, Calgary, Edmonton, Hamilton, Winnipeg, and Quebec City).

On average, the slow-growth group lost 9.4% of population, while the high-growth group gained more than 108%, doubling in size. Clearly the variety of growth outcomes is substantial, and thus the impacts of growth should be substantial as well. Most of the urban characteristics display a consistent sequence of variation across the columns that confirms the correlations identified above. High-growth cities have more young people and young adults, with fewer older adults and seniors. With more children in high-growth cities, households are larger, on average.

All three demographic growth processes show a similar pattern of variation, suggesting a strong correlation among the various growth processes themselves. The ethnicity effect is much weaker once the large cities are removed. Only the two extreme-growth categories show much variation. Note that the high-growth category does not include a single Francophone city; this category is dominated by cities from Alberta and British Columbia, plus a handful of small Ontario cities close to Toronto.

The variation in economic measures is also reduced when the big cities are omitted. The effect of growth on income is consistently positive, but relatively modest compared to the effect of city size. The results for the measure of income distribution are more complex. The lower the value of the Gini coefficient, the less variation in income levels within the city. Rapid growth reduces the disparities in income, but larger cities display greater variation. Differences in the rate of labour force participation and employment are greater than income differentials. The major differences in the kinds of jobs available reflect the contrast between commercial and public-service opportunities. Rapidly growing cities create jobs in commercial services; but in slow-growth cities, the commercial sectors shrink, so that the share of the public sector becomes higher.

The only measure of housing that varies consistently with growth rate is value of dwelling unit, but that variation is significant. Housing in the high-growth cities is roughly twice as expensive as that in slow-growth places. Of course, the housing is also newer and of higher quality, which also implies that the rest of the urban infrastructure is more up-to-date. Note that housing costs also correlate positively with city size. In fact, a regression analysis suggests that urban size and urban growth rate contribute equally to housing value. Each order of magnitude increase in urban population size increases average house value by about $40,000; and a population growth of 100% contributes the same amount.

4.3 Interpretations

To some degree, Canadians can choose the kind of city in which they wish to live. They can opt for small towns or big cities, they can spend their lives in the Maritimes or in B.C., they can live in an Anglophone, Francophone, or ethnically diverse environment. It is much more difficult, however, to identify a place that is likely to grow or to avoid one that is going to decline. As our explorations suggest, it is hard to predict future urban growth based on what is known at any one time. The growth of a Canadian city may have an *ex post* kind of logic, as in the case of Calgary and the oil and gas revenue, or Vancouver and the transition of government in Hong Kong, but it is seldom evident *a priori*.

This unpredictable element of the growth process has a substantial effect on people's lives. It may reduce the level of household income and increase the probability of unemployment, or it may influence the variety of goods and services available. To some extent governments have

intervened to shield Canadians from the worst of this uncertainty. Unemployment benefits, pensions, and other forms of transfer payments help to stabilize income and service levels locally. Governments provide health and education services to all locations, whether or not they grow, aided by transfers from the richer provinces to the poor and from the larger cities to the small.

One of the unexpected findings in this paper was the variety of ways in which the variations in urban attributes among the regions, and between those cities that are growing and those that are declining have been reduced over the study period. Canadian cities are now more alike than they have ever been, including income measures.

The problems attributable to differentials in growth rates that remain relate mainly to social capital in the widest sense. On the one hand, Canadians tend to be homeowners. Of the 12 million households in Canada—including 2.7 million single-person households—about two-thirds own their own homes, with a median value in 2001 of $110,000. As well, as the service economy expands, there are now more than 600,000 private businesses, most of them family-owned. The potential future value of both home and business depends directly on the rate of growth of the urban area in which they are located. After living in Toronto or Calgary for 30 years, a household can sell out and retire on the West Coast. After 30 years in Brandon or Regina, the household is no better off than it was at the beginning . This is even more true for businesses. Growth means larger markets, larger profits, and more capital available for expansion. Decline means intense competition to stay in business.

The same argument can be made about human capital. The worker with a strong back or a university degree has a far better chance of experiencing social mobility in a city that generates a variety of new jobs and of potential mates. New workplaces and the growth of existing firms create new opportunities for all. In declining cities, some businesses shut down, and others lay off workers. The process is cumulative and the consequences are long term. The argument that people can move to a place with greater opportunity is offset by the reality that relocation costs are high and increase with an individual's age. At some point in a lifetime, a household becomes "locked in" to a job, a house, and a set of family connections. As people get older, the probability of relocation declines rapidly. A bad location choice at the age of 20 or 25 seals one's fate by age 35 or 40. That is the real dilemma of urban growth.

Further, the 2001 Census shows that more than half the Canadian cities with less than 250,000 population lost population over the last five years. Population forecasts suggest that the country as a whole will grow more slowly in the future and the effect of urban decline will be more widely felt, and will undoubtedly emerge as a major policy and political issue.

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Appendix A: The Cities

CMA	1971	Change	2001	Estimated 1971 Pop'n	2001 Pop'n	Gr. Index	Growth Rate from 1971	Notes
Abbotsford	0	0	1	41.50	147.4	1.00000	2.5518	Not included in CUT
Alma	1	1	1	28.80	30.1	1.15209	0.0451	
Amos	0	0	1	14.80	21.7	1.05920	0.4660	Not included in CUT
Asbestos	1	0	0	15.80	11.3	1.00000	-0.2848	Not in the 2001 Census
Baie-Comeau	1	1	1	30.73	28.9	1.21466	-0.0596	
Barrie	1	1	1	47.08	148.5	1.08226	2.1543	
Bathurst	1	1	1	23.51	23.9	1.23755	0.0164	
Belleville	1	1	1	76.16	87.4	0.94029	0.1475	Includes Trenton
Brandon	1	1	1	33.61	41.0	1.02776	0.2200	
Brantford	1	1	1	67.96	86.4	0.84631	0.2714	
Brockville	1	1	1	38.83	44.7	1.13533	0.1512	
Brooks	0	0	1	4.06	11.6	1.01587	1.8547	Not included in CUT
Calgary	1	1	1	427.45	951.4	1.05987	1.2258	
Campbell River	0	0	1	19.20	33.9	0.96459	0.7660	Not included in CUT
Campbellton	1	1	1	19.60	16.3	1.00000	-0.1684	
Camrose	0	0	1	8.80	14.9	1.00000	0.6932	Not included in CUT
Cape Breton	1	1	1	129.51	109.3	1.03445	-0.1561	Sydney and Sydney Mines
Charlottetown	1	1	1	44.20	58.4	1.07811	0.3212	
Chatham	1	0	0	57.68	66.1	1.09874	0.1460	Includes Wallaceburg. Massive annexation in 2001
Chicoutimi	1	1	1	149.24	154.9	1.01867	0.0380	
Chilliwack	1	1	1	35.79	69.8	1.07475	0.9503	
Cobourg	1	1	1	13.15	17.2	1.16349	0.3082	
Collingwood	0	0	1	10.45	16.0	1.06667	0.5306	Not included in CUT
Corner Brook	1	1	1	31.08	25.7	1.18193	-0.1732	
Cornwall	1	1	1	58.59	57.6	1.08507	-0.0170	
Courtenay	1	1	1	22.52	47.1	0.84335	1.0917	
Cowansville	1	1	1	11.89	12.0	0.99934	0.0091	

CMA	1971	Change	2001	Estimated 1971 Pop'n	2001 Pop'n	Gr. Index	Growth Rate from 1971	Notes
Cranbrook	1	1	1	16.52	24.3	1.37663	0.4710	
Dawson Creek	1	1	1	19.30	17.4	1.62162	-0.0983	
Dolbeau	1	1	1	12.60	14.9	1.00000	0.1825	
Drummondville	1	1	1	51.93	68.5	1.01830	0.3190	
Duncan	0	0	1	22.19	38.8	1.32107	0.7482	Not included in CUT
Edmonton	1	1	1	556.16	937.8	1.12128	0.6862	
Edmundston	1	1	1	21.70	22.2	1.00919	0.0232	
Elliot Lake	0	0	1	9.12	12.0	1.00192	0.3162	Not included in CUT
Estevan	0	0	1	11.13	12.1	1.20967	0.0873	Not included in CUT
Flin Flon	1	0	0	10.16	6.3	0.90681	-0.3797	Not in the 2001 Census
Fort St. John	0	0	1	8.39	16.0	1.01124	0.9063	Not included in CUT
Fredericton	1	1	1	53.33	81.3	0.99861	0.5246	
Gander	0	0	1	9.55	11.3	1.20895	0.1832	Not included in CUT
Granby	1	1	1	40.88	60.3	1.04013	0.4752	
Grand Centre/Cold Lake	0	0	1	16.68	27.9	2.73380	0.6730	Not included in CUT
Grand Falls	1	1	1	14.30	19.0	1.00000	0.3287	
Grande Prairie	1	1	1	13.33	37.0	1.00965	1.7762	
Guelph	1	1	1	67.63	117.3	1.01087	0.7345	
Haileybury	1	1	1	15.61	12.9	1.20086	-0.1737	
Halifax	1	1	1	258.43	359.2	1.03123	0.3900	
Hamilton	1	1	1	503.10	662.4	1.00000	0.3166	
Hawkesbury	1	1	1	11.00	11.6	1.00000	0.0545	
Joliette	1	1	1	29.06	35.8	0.98831	0.2321	
Kamloops	1	1	1	52.38	86.5	1.11920	0.6514	
Kapuskasing	1	0	0	12.80	9.2	1.00000	-0.2813	Not in the 2001 Census
Kelowna	1	1	1	58.60	147.7	1.09935	1.5207	
Kenora	1	1	1	16.70	15.8	1.00000	-0.0539	
Kentville	1	1	1	18.49	25.2	1.00478	0.3630	
Kingston	1	1	1	110.14	146.8	1.00767	0.3329	
Kirkland Lake	1	0	0	15.20	8.6	1.00000	-0.4342	Not in the 2001 Census
Kitchener	1	1	1	238.60	414.3	1.00000	0.7364	
Kitimat	1	1	1	11.80	10.3	1.00000	-0.1271	
La Tuque	1	1	1	14.96	12.4	1.06084	-0.1710	
Labrador City	1	1	1	11.00	9.6	1.00000	-0.1273	
Lachute	1	1	1	15.63	11.6	1.00870	-0.2581	
Leamington	1	1	1	33.50	46.8	1.12426	0.3969	
Lethbridge	1	1	1	42.03	67.4	1.02002	0.6038	
Lindsay	1	0	0	15.50	23.2	1.00000	0.4968	Massive annexation in 2001
Lloydminster	0	0	1	8.71	21.0	1.00137	1.4105	Not included in CUT
London	1	1	1	339.03	432.5	1.06578	0.2757	
Magog	1	1	1	16.70	22.5	1.00000	0.3473	

CMA	1971	Change	2001	Estimated 1971 Pop'n	2001 Pop'n	Gr. Index	Growth Rate from 1971	Notes
Matane	1	1	1	15.99	16.2	1.35492	0.0133	
Medicine Hat	1	1	1	34.30	61.7	1.00000	0.7988	
Midland	1	1	1	24.33	33.3	0.80569	0.3686	
Moncton	1	1	1	89.05	117.7	1.00845	0.3218	
Montmagny	1	0	0	12.40	11.7	1.00000	-0.0565	Not in the 2001 Census
Montreal	1	1	1	2859.76	3426.4	1.03446	0.1981	Includes St-Jerome
Moose Jaw	1	1	1	34.20	33.5	1.00000	-0.0205	
Nanaimo	1	1	1	40.96	85.7	0.96612	1.0921	
New Glasgow	1	1	1	38.60	36.7	1.00000	-0.0492	
Newcastle/ Miramichi	1	0	0	23.53	18.5	1.29268	-0.2137	Not in the 2001 Census
North Battleford	1	1	1	15.01	17.5	0.99379	0.1662	
North Bay	1	1	1	56.77	63.7	1.10443	0.1221	
Orillia	1	1	1	30.67	40.3	1.00880	0.3141	
Oromocto	1	0	0	11.40	8.8	1.00000	-0.2281	Not in the 2001 Census
Oshawa	1	1	1	171.50	296.3	1.00000	0.7277	
Ottawa-Hull	1	1	1	672.20	1063.7	1.08438	0.5824	
Owen Sound	1	1	1	26.91	31.6	1.04290	0.1744	
Parksville	0	0	1	6.91	24.3	2.03280	2.5181	Not included in CUT
Pembroke	1	1	1	26.33	23.6	1.29078	-0.1038	
Penticton	1	1	1	14.44	41.6	0.79752	1.8819	
Petawawa	1	1	1	14.30	14.4	1.00000	0.0070	
Peterborough	1	1	1	82.38	102.4	1.00100	0.2430	
Port Alberni	1	1	1	26.50	25.4	1.00000	-0.0415	
Port Hope	0	0	1	12.06	15.6	1.35458	0.2940	Not in the 2001 Census
Portage La Prairie	1	1	1	20.68	20.6	1.59091	-0.0040	
Powell River	1	1	1	18.12	18.3	0.92462	0.0098	
Prince Albert	1	1	1	34.92	41.5	0.99217	0.1883	
Prince George	1	1	1	57.61	85.0	1.16622	0.4754	
Prince Rupert	1	1	1	17.16	15.3	1.09306	-0.1084	
Quebec	1	1	1	508.10	682.8	1.01337	0.3438	
Quesnel	0	0	1	21.13	24.4	0.99209	0.1547	Not included in CUT
Red Deer	1	1	1	27.96	67.7	1.00932	1.4215	
Regina	1	1	1	148.32	192.8	1.05417	0.2999	
Rimouski	1	1	1	38.37	47.7	1.16978	0.2432	
Riviere-du-Loup	1	1	1	18.58	22.3	1.00434	0.2002	
Rouyn-Noranda	1	1	1	38.27	36.3	1.23456	-0.0515	
Saint-Georges	1	1	1	16.64	28.1	1.22376	0.6884	
Saint-Hyacinthe	1	1	1	43.90	49.5	0.98207	0.1276	
Saint-Jean-de- Richelieu	1	1	1	51.10	79.6	1.03030	0.5576	
Saint John	1	1	1	113.98	122.7	1.06820	0.0765	
Salaberry-de- Valleyfield	1	1	1	38.29	39.0	1.06966	0.0184	

CMA	1971	Change	2001	Estimated 1971 Pop'n	2001 Pop'n	Gr. Index	Growth Rate from 1971	Notes
Sarnia	1	1	1	82.21	88.3	1.04855	0.0741	
Saskatoon	1	1	1	167.41	225.9	1.14040	0.3494	
Sault Ste. Marie	1	1	1	83.68	79.8	1.02927	-0.0464	
Sept-Iles	1	1	1	27.16	27.0	1.11788	-0.0061	
Shawinigan	1	1	1	66.42	57.3	0.98986	-0.1373	
Sherbrooke	1	1	1	113.55	153.8	1.09495	0.3545	
Simcoe	1	0	0	13.00	15.7	1.00000	0.2077	Massive annexation in 2001
Smiths Falls	1	0	0	14.20	12.9	1.00000	-0.0915	Not in the 2001 Census
Sorel	1	1	1	41.81	41.0	0.95905	-0.0195	
Squamish	0	0	1	6.19	14.4	1.01429	1.3274	Not included in CUT
St. John's	1	1	1	145.04	172.9	1.10048	0.1921	Includes Carbonear
St.Catharines-Niagara	1	1	1	322.16	377.0	1.04292	0.1702	Includes Fort Erie
Stratford	1	1	1	24.63	29.7	1.00514	0.2060	
Sudbury	1	1	1	169.44	155.6	1.07445	-0.0817	
Summerside	1	1	1	15.09	16.0	1.07797	0.0602	
Swift Current	1	1	1	17.01	16.5	1.10479	-0.0302	
Terrace	1	1	1	16.66	20.0	1.17333	0.2004	
Thetford Mines	1	1	1	32.52	26.3	1.09120	-0.1912	
Thompson	1	1	1	19.00	13.3	1.00000	-0.3000	
Thunder Bay	1	1	1	116.56	122.0	1.01618	0.0467	
Tillsonburg	0	0	1	8.10	14.1	1.00000	0.7407	Not included in CUT
Timmins	1	1	1	43.00	43.7	1.00000	0.0163	
Toronto	1	1	1	2785.16	4682.9	1.07035	0.6814	
Trail	1	0	0	14.20	12.9	1.00000	-0.0916	Not in the 2001 Census
Trois-Rivieres	1	1	1	118.33	137.5	1.12377	0.1620	
Truro	1	1	1	33.97	44.3	0.97045	0.3042	
Val-d'Or	1	1	1	23.27	32.4	1.21838	0.3923	
Vancouver	1	1	1	1082.47	1987.0	1.00006	0.8356	
Vernon	1	1	1	28.35	51.5	0.89711	0.8167	
Victoria	1	1	1	202.27	311.9	1.03305	0.5420	
Victoriaville	1	1	1	33.14	41.2	0.98339	0.2432	
Wetaskiwin	0	0	1	6.36	11.2	1.00943	0.7612	Not included in CUT
Whitehorse	1	1	1	12.58	21.4	1.12291	0.7016	
Williams Lake	1	1	1	18.39	25.1	0.64767	0.3646	
Windsor	1	1	1	260.66	307.9	1.04809	0.1812	
Winnipeg	1	1	1	563.49	671.3	1.02490	0.1913	
Wood Buffalo (Ft. McMurray)	0	0	1	7.34	42.6	1.06423	4.8013	Not included in CUT
Woodstock	1	1	1	26.36	33.1	1.00623	0.2555	
Yellowknife	0	0	1	6.10	16.5	1.00000	1.7049	Not included in CUT
Yorkton	1	1	1	16.37	17.6	1.22153	0.0752	

Appendix B: The Variables

Population, 1971 estimated.	As explained in the text: the product of the Census population (as given in 1976) and the Growth Index
Population, 2001 estimated.	The 2001 population, estimated for the 1996 CMA/CA boundaries
Growth Rate, 1971-2001	[(pop2001– pop1971)/pop1971]
Aged 0-14	(Age group population/ total population); for both 1971 and 2001
Aged 15-44	ditto
Aged 45-64	ditto
Aged 65+	ditto
Household size	(Census population/ census dwelling units); for both 1971 and 2001
Born abroad	(Born abroad/ total population); for both 1971 and 2001
Mother tongue English	Mother tongue/ total population; for both 1971 and 2001
French:	ditto
Other:	ditto
Population Growth Rate	Growth rate in previous five years, 1966-1971 and 1996-2001
In-Migration Rate	(Domestic in-movers/ population five years and older). Domestic in-movers estimated as proportion of total in-movers in 1971. In 2001 the denominator is the total population.
Out-migration Rate	ditto
Net-Migration Rate	(In-migration rate – out-migration rate)
Natural Increase Rate	In 1971 estimated as five times the annual rate of ((births – deaths)/ population). In 2001 estimated as residual from (population growth - net migration – net immigration).
Immigration Rate	Estimated as proportion of total movers in 1971.
Employment Growth Rate	(Emp2001 – Emp1971)/(Emp1971 × Growth Index) for 87 places
Participation Rate	(Labour Force/ Population 15+) Only 87 places in 1971
Employment Rate	(Employment/ Labour force) Only 87 places in 1971
Employment Ratio	(Employment/ Population 15+) Only 87 places in 1971
Household Income	Average hhld income, 2001; average family income, 1971, converted to $2001
Income per Capita	Households × Average hhld income/ population; 2001 only
Income Distribution	Gini coefficient of income distribution, 2001 only
LF Primary	Farm, forest, mine etc./ total labour force; 2001 only

Population, 1971 estimated.	As explained in the text: the product of the Census population (as given in 1976) and the Growth Index
LF Manufacturing	Manufacturing/ total labour force; for both 1971 and 2001
LF Construction	Construction/ total labour force; for both 1971 and 2001
LF Infrastructure	Transport, communications, etc./ total labour force; for both 1971 and 2001
LF Private Services	Distribution, finance, personal services/ total labour force; for both 1971 and 2001
LF Public Services	Education, health, government/ total labour force; for both 1971 and 2001
Value of Dwelling	Median value, 1971, converted to $2001; median value 2001
Average Rent	1971 only
Owned	Owned/ total dwellings in 2001; 1971, use 1.0 – (rented/ dwellings)
Apartments	(Apartments/ dwellings) for both 1971 and 2001
Rooms/ Dwelling	As given, for both 1971 and 2001
Persons/ Room	(Dwellings × Rooms/ Population) for both 1971 and 2001
Built before 1946	(Before 1946/ total dwellings) for both 1971 and 2001
Built 1946-1980	(1946-1980)/ total dwellings), 2001 only
Built after 1980	(After 1980)/ total dwellings), 2001 only
Colour TV	(Dwellings with colour TV/ total dwellings), 1971 only
Two Cars	(Dwellings with two or more cars/ total dwellings), 1971 only