1991

Population concentration or deconcentration in Ontario? An examination of recent patterns and probable causal factors

Sinisa Aleksa
Wilfrid Laurier University

NOTICE

The quality of this microform is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us an inferior photocopy.

Reproduction in full or in part of this microform is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30, and subsequent amendments.

AVIS

La qualité de cette microforme dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de qualité inférieure.

La reproduction, même partielle, de cette microforme est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30, et ses amendements subséquents.

POPULATION CONCENTRATION OR DECONCENTRATION IN ONTARIO? AN EXAMINATION OF RECENT PATTERNS AND PROBABLE CAUSAL FACTORS

By

Sinisa Aleksa

B.A., Ryerson Polytechnical Institute, 1989

THESIS

Submitted to the Department of Geography
in partial fulfilment of the requirements
for the Master of Arts Degree
Wilfrid Laurier University
1991

ISBN 0-315-68692-8

ABSTRACT

The process of population deconcentration has received little attention from a methodological and causal perspective. In the early 1970's, most western and industrialized nations including Canada experienced an intense movement of the population away from the larger metropolitan and urban areas. As a result, much of the growth during this time period was taking place at lower levels of the settlement hierarchy. In fact, much of the growth in those areas had in the past been characterized by heavy out-migration and overall population losses. Research in the 1980's has been of a critical nature. There have been two main criticisms. First, there has been a concern with the spatial units of analysis. Secondly, the literature has been deeply divided on the primary causal processes and factors associated with population deconcentration (or concentration).

This thesis, therefore, is guided by two major objectives. First, there is a need to identify population patterns and probable causal factors. A comprehensive area classification was developed in order to group individual areas into regional, metropolitan and non-metropolitan components to reflect the influences of different spatial processes (i.e., regional agglomeration, spill-over). This leads to the second objective which is to investigate the association between observed population changes and the different causal factors. A series of multiple regression models was derived to assess the relative importance of the association between

independent causal factors and population change in different spatial contexts.

Ontario appears to be experiencing a process of both population concentration and deconcentration. From a regional perspective, there is a definite pattern of regional agglomeration into the central and eastern metropolitan regions. It may be possible to interpret the discernable patterns of population losses in the south-west and north as partially reflecting the dominant economic and employment pull of the highly urbanized regions. From a metropolitan-nonmetropolitan perspective, it can be concluded that the dominant demographic pattern being observed is one of decentralization rather than deconcentration. Population deconcentration as defined in this thesis is related to growth trends outside of the influence of metropolitan areas. This latter perspective can not be supported in any of the regions, except possibly in the high amenity regions in the central region. In general, the different causal factors hypothesized to influence these observed population growth patterns conformed to the theory. Several recommendations relating to future methodologies and policy matters are provided.

ACKNOWLEDGEMENTS

The author would like to thank his family and several special individuals. A special word of thanks goes to my mother and father who have supported me in many ways throughout my years of study. Without their love and support, these years would have been much more difficult. I am also indebted to the faculty members of Wilfrid Laurier's Geography Department for providing me with assistance whenever I needed it. A very special thanks goes to my advisor, Dr. P.S. Kanaroglou, for diligently reading my endless drafts and providing excellent suggestions along the way. I am also grateful to Drs. B.N. Boots and A. Hecht for their comments on earlier stages of the thesis.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF MAPS

CHAPTER 1. INTRODUCTION

1.1 Statement of the Problem and Research Objective(s)

The process of population deconcentration has received little attention from a methodological and causal perspective. In the early 1970's, most western and industrialized nations including Canada experienced an intense movement of the population away from the larger metropolitan and urban areas. As a result, much of the growth during this time period was taking place at lower levels of the settlement hierarchy. In fact, much of the growth was in those areas which had in the past been characterized by heavy out-migration and overall population losses.

In response to these trends, many researchers from a variety of disciplines immediately jumped at the chance to equate these trends with a new era of urbanization or "clean break" from traditional agglomeration. What came out of these efforts was an immense body of definitions and pretentious statements of probable causal factors (i.e., population turnaround, counter-urbanization). Many of these explanations, however, were primarily centred on the circumstances of the 1970's. As was quickly learned, the 1980's brought about a reversal in these population patterns, and a deep concern over what actually caused these patterns, and the transition from population deconcentration to once again concentration.

Much of the research in the 1980's has been of a critical nature. There have been two main criticisms. First, there has been a concern with the spatial units of analysis. Many authors believe

that the more conventional use of large and heterogeneous spatial aggregates (ie. counties) should be replaced by more spatial comprehensive methodologies which allow an identification of more localized patterns and causal processes among a greater range of area types. Secondly, the literature has been deeply divided on the primary causal processes and factors associated with population deconcentration (or concentration). A wide variety of tentative explanations has been proposed including employment- and people-led causes, and other exogenous factors such as impacts of government policy, technological innovations, and business cycle fluctuations. The review of literature has found very little consensus on the validation or overall importance of these different explanations.

This thesis, therefore, is guided by two major objectives. First, there is a need to identify population patterns and probable causal factors. A comprehensive area classification was developed in order to group individual areas into regional, metropolitan and non-metropolitan components to reflect the influences of different spatial processes (i.e., regional agglomeration, spill-over). Population growth rates for the 1970's and 1980's inter-censal years were then analyzed across these different area classifications to identify whether the demographic patterns reflect a pattern of population deconcentration or concentration. As well, a range of descriptive indicators of probable causal factors of these observed population patterns were examined across the same area classification. This was done to examine whether there were any commonalities between the trends in the hypothesized

causal factors and patterns of population change.

This leads to the second objective which is to investigate the association between observed population changes and the different causal factors. A series of multiple regression models was derived to assess the relative importance of the association between independent causal factors and population change in different spatial contexts. The independent causal factors included different composites of the area classifications in conjunction with measures of demographic processes, economic changes and local characteristics of individual areas. A population growth rate for the 1978-89 time period was used as the dependent variable. Separate regression models were specified for the different area classifications and regions to examine spatial differences in the nature of associations between population change and the causal factors. A map of regression residuals was later analyzed to assess the influences of other causal factors and spatial dependence in the data.

1.2 Evidence Of Population Deconcentration

A number of dramatic changes in the patterns of population growth and distribution has taken place over the past decade or so. During the earlier 1970's, there was a turnaround in the traditional patterns of migration in which there was a recognizable movement of people down the urban hierarchy and beyond metropolitan boundaries, and a resurgence of population growth among many small non-metropolitan areas. The late 1970's and early 1980's, in

contrast, have provided evidence of a reversal or slowing-down of the population turnaround where non-metropolitan growth once again lags behind metropolitan. This section provides a comparative review of the dominant patterns of population growth and distribution throughout the 1970's and 1980's, both within Canada and other developed countries.

1.2.1 United States

A turnaround in the long-standing and traditional urbanization forces was first observed in the U.S. during the early 1970's. The U.S. Bureau of the Census (1974) observed significant population gains in many non-metropolitan areas situated beyond metropolitan and heartland regions. Berry (1976) believed that this turnaround represented a new form of urbanization, whereby growth was tied to not only non-metropolitan areas close to metropolitan regions but also in those non-metropolitan areas well removed from the influence of metropolitan regions. Berry later adopted the term "counter-urbanization" to describe this new and emerging pattern of population distribution.

A number of distinct patterns of population redistribution have been observed in the U.S. First, it was observed that population growth through a turnaround in internal migration had diffused down to smaller areas at lower levels of the urban hierarchy and outwards to smaller and remote areas beyond metropolitan influence. A striking feature of this trend was that population gains amongst many non-metropolitan areas were mainly

from net in-migration flows. This was occurring at roughly the same time as some of the largest metropolitan areas were stagnating or even contracting (Morrison and Wheeler, 1977).

A second pattern of change has involved inter-regional shifts in population. This has been characterized by a movement away from the older urban and industrial regions of the north-east to those warmer amenity regions in the south and rural west. Population gains were not only registered in regions where moderate gains were observed in the past, but also in those regions having showed heavy net out-migration during the 1950's and 1960's. The pervasiveness of this growth was such that non-metropolitan growth occurred in all of the 26 regions in the earlier 1970's. Also significant is that 22 of the 26 regions showed diminishing net out-migration and increasing in-migration over the 1950' to early 1970's period (Ibid, 17).

A third, and more recent, feature of population redistribution in the U.S. has been the importance of urban to rural shifts within non-metropolitan counties. Lichter et. al. (1985) examined the relative population growth in non-metropolitan incorporated places with population over 2,500 (i.e., urban) and those places outside their boundaries (i.e., rural). What they found was that there was a sizeable increase in rural growth rates from -1.7 per cent during the 1960's to 19.9 per cent in the 1970's. The authors also show that during the 1970-80 period rural areas accounted for an unprecedented 80 per cent of the non-metropolitan absolute growth and 30 per cent of absolute national growth. This is significant

when considering the negative contribution of rural areas to non-metropolitan and national growth during the 1950's and 1960's. Lichter and Fuguitt (1982) have shown that such trends were fairly widespread in roughly two-thirds of U.S. non-metropolitan counties during the 1970's.

More recent evidence of the population turnaround in the 1980's suggests that there has been a reversal or slowing-down of the 1970's turnaround. Several authors have observed that population growth rates of metropolitan areas have once again surpassed those of non-metropolitan areas (Beale and Fuguitt, 1986). Both Richter (1985) and Engels and Healy (1979) have shown that non-metropolitan growth began to slow down during the last few years of the 1970's, while Forstall and Engels (1984) observed that the metropolitan growth surpassed non-metropolitan population growth as early as 1982. More skeptical of the observed 1980's slow-down of non-metropolitan growth, Johnson (1989) notes that, by historical standards, non-metropolitan growth appears to have persisted; growth rates on average are still high, non-metropolitan out-migration has remained minimal, and the differential between non-metropolitan and metropolitan growth continues to be relatively small (pp.318-319).

1.2.2 Other Developed Countries (Europe, Australia, Japan)

Similar patterns of population redistribution were observed in other developed countries. The shift of net migration flows from

metropolitan regions has been documented by Vining and Kontuly (1978). Applying a fairly consistent approach to eighteen countries, the authors compared net migration flows into core regions within these countries. They observed that net internal migration to core regions for eleven of these countries had either reversed itself toward sparsely populated regions, or had at least, fallen to very low levels. This was most evident in developed countries such as Sweden, France, West and East Germany, Norway, Denmark, Italy, Belgium, Japan, New Zealand, and the Netherlands. Some peripheral countries such as Poland, Hungary, Finland, Spain, Taiwan, and South Korea did not show any signs of any decline in net migration to their cores. National case studies for other countries not covered by Vining and Kontuly -- Australia (Hugo and Smailes, 1985) and Britain (Champion, 1987) -- revealed similar reductions in net internal migration flows to core regions.

Vining and Pallone (1982) later compared net migration flows between core and peripheral regions in twenty-two countries, including Canada and the U.S. They observed a dramatic shift in net migration flows from high density core regions to less urbanized/peripheral regions. The turnaround, however, appeared to be more pronounced in Canada and the U.S., and in those developed countries of western Europe (coinciding with those countries Vining and Kontuly identified as having shown great reductions in core migration flows). Generally, these patterns have been consistent with the patterns observed in many of the national case studies reviewed.

In a follow-up study to the work by Vining and his colleagues during the 1970's, Cochrane and Vining (1988) looked at net internal migration flows between core and peripheral regions for 17 of the 22 countries covered during the early 1980's. The authors observed that net migration flows to core regions have once again increased, although not to the levels reached in 1960's. However, this reversal did not appear to be consistent in all the countries. Several north-western European countries, such as Belgium, Denmark, Germany, and France showed a significant dampening of out-migration from core regions, while other European peripheral countries, Japan, South Korea and Taiwan continue to show relatively high net migration flows to core regions. Findings from the U.S. and Canada suggest a complete reversal in net migration flows back to the core regions (p. 224).

More detailed studies of European countries provide a slightly different picture of population redistribution. In a comprehensive study of fifteen countries, Hall and Hay (1980) examined population and employment change over the 1950-75 period across core and peripheral rings of 539 daily urban systems (analogous to U.S. and Canadian metropolitan regions), and 351 residual non-metropolitan areas. The author's findings are similar to Vining and Pallone whereby population deconcentration was evident in several of the more industrialized countries -- mainly Britain, Belgium, the Netherlands, Switzerland, France and West Germany. In contrast to the studies by Vining and colleagues, Hall and Hay were careful to emphasize the spatial process of the turnaround, where a

progressive decline of the core areas during the 1960's and accelerating growth of ring areas and non-metropolitan areas in the 1970's produced what the authors referred to as a "clean-break" from metropolitan growth. However, the authors acknowledge that European settlement systems at that point had not experienced the widespread metropolitan decline or rural resurgence throughout non-metropolitan regions as observed in the U.S.

Adopting a different approach, Fielding (1982) investigated whether the patterns discussed so far could be identified in the settlement hierarchy. He hypothesized that a migration turnaround would have to involve a fundamental reversal in the positive relationship between net migration and settlement size, which was characteristic of urbanization up to the 1970's. Examining a similar cross-section of western Europe as above, Fielding found that the process of urbanization had been replaced by counter-urbanization, whereby the positive association between net migration and settlement size (typical of the 1950's and 1960's) changed to a relatively strong negative one in the 1970's (p. 13). Coinciding with the other studies in Europe, the author showed that many of the larger and older industrial core cities showed net migration losses in the 1970's, while rural regions with small to medium sized areas showed net migration gains. Fielding, however, is careful to emphasize that this shift from urbanization, at least in statistical terms, does not mean that there had been an end to rural population decline in most European countries (p. 18). Applying the same approach for 1980's migration data in western

Europe, Fielding (1986) later found evidence of a significant reversal to the 1970's turnaround in which the association between net migration and settlement size had become positive once again.

1.2.3 Canada

Canada is certainly no exception to the widespread phenomenon of population deconcentration. As in most industrialized countries, Canada showed a slowing down of metropolitan growth which happened to coincide at roughly the same time as the 1970's turnaround. A study by Robinson (1981) examined the nature of the slow-down in metropolitan growth. By examining aggregate inter-censal population data for the period between 1901 and 1976, the author was able to show a progressive decline since the 1950's in the relative growth rates of metropolitan areas. For example, average metropolitan growth rates showed a continuous decline from about 4.2 per cent in the 1950's, 2.7 per cent in the late 1960's, and 1.3 per cent in the early 1970's. By the 1970's, it was observed that the proportion of the national population in metropolitan areas, not surprisingly, showed very little change, and even decline in the urbanized provinces of Ontario, Quebec and British Columbia (p. 28). It should be added that the available evidence on the slow-down in Canadian metropolitan growth suggests that it was nowhere near the pace or extensiveness as observed in the U.S. over a similar period.

The slow-down in metropolitan growth in Canada has more in common with the European experience rather than rapid decline of

American cities. The slowing down of metropolitan areas during the 1960's was attributed primarily to the changes in the locational preferences of employment and residents from central cities to the suburbs. However, the 1970's marked the beginning of decline or stagnation of entire metropolitan areas, and not just central cities (Bourne and Logan, 1976). This paralleled the time when several of the larger metropolitan regions -- mainly Toronto, Montreal, and Vancouver --began to expand their functional spheres of influence integrating many smaller areas which were beyond their official boundaries. Although metropolitan decline may have in fact been observed, from a statistical perspective, higher levels of regional population concentrations were paradoxically developing around some of the largest metropolitan regions creating what has become to be known as "megalopolitan" urban regions (Ibid, 136).

As in the U.S., Canada experienced changes in the patterns of inter-regional (or provincial) migration. Similar to the American north-east and south-west shifts in migration, there was a western shift in inter-provincial migration flows from the industrial core of Central Canada (Ontario and Quebec) to amenity-rich British Columbia and "booming" Alberta. Termote (1987) has shown increasing out-migration flows from the industrial core of Central Canada (especially Quebec) and a declining share of the national population over the 1966-81 period. However, much of the growth in the early 1980's has once again favoured Ontario, and to a lesser extent British Columbia and Alberta (Statistics Canada, 1987).

There has been a turnaround in the traditional core to

periphery migration flows. Bourne and Simmons (1979) noticed for the first time a sudden population resurgence in small and remote areas. They associate their findings with important shifts in population away from the largest metropolitan regions, mainly Toronto and Montreal. In a follow-up study, Simmons (1980) later compared net migration flows across a hierarchical system of 124 urban-centred regions for the 1966-71 and 1971-76 time periods. A comparison of relative migration flows for the two periods showed a reduction in migration flows from smaller to larger centres, and an increase in the migration flows from larger to smaller areas. The author noticed that these trends occurred across all urban size groups and in all regions of the country (p. 161).

Adopting more detailed geographical classifications, several studies have investigated the underlying components of urban to rural transfers of population. Field (1988), for example, examined migration exchanges among different levels of the urban hierarchy and the rural sector between 1971-76. His analysis showed that the rural sector in Canada gained from all levels of the urban hierarchy, particularly from census metropolitan areas (CMA's). Such gains by the rural sector were registered by not only those areas contiguous to metropolitan areas but also by those areas well removed from the spheres of metropolitan influence. Population deconcentration appeared to be predominant in Ontario and British Columbia, while the remaining provinces continued to exhibit various forms of urban agglomeration or conurbation processes (p. 46).

Another study by Joseph et. al. (1988) examined differential growth patterns of the rural farm and non-farm population during the 1961-71 and 1971-81 inter-censal periods. Based on the proximity of census divisions to major urban centres and degree of settlement characterizing each county, the authors established three provincially-based categories of regions (urban core, rural hinterland, and remote hinterland). The authors provide convincing evidence of patterns consistent with population deconcentration in which rural non-farm growth rates have increased for all three area-types. It is important to note that the magnitude and direction appears to vary considerably among the provinces. Nevertheless, one consistent pattern observed was the rapid decline in the rural farm population across all of the area-types and provinces. The authors do acknowledge several methodological problems associated with the use of relative population growth rates, and reserve any decisions to suggest that the observed patterns represent any form of "counter-urbanization" (p.29).

More recent evidence of metropolitan and non-metropolitan migration in Canada suggests that there has been a slow-down or reversal to the population turnaround. Anderson and Papageorgiou (1989) examine annual migration flows between 1966 and 1982 for twenty-five census metropolitan areas and the non-metropolitan aggregates in each province or region. It was observed that net internal migration rates during the late 1960's and 1970's for metropolitan regions changed from being positive to negative, while those for non-metropolitan components changed from being negative

to positive. They provide evidence that a gradual slow-down in non-metropolitan growth occurred in the late 1970's. The 1980's, on the other hand, marked a possible end, or at least, a slow-down to the turnaround with both metropolitan and non-metropolitan internal migration rates once again converging towards zero (p. 15). These patterns are consistent with more recent evidence of Canadian metropolitan population growth in Canada (Biggs and Bollman, 1991).

Applying a traditional heartland and hinterland model to urban development in Canada, Yeates (1975, 1984, and 1985) has investigated the changing nature of urbanization in Canada's heartland (defined as the Windsor-Quebec city axis). The author examined the changing distribution and emerging spatial pattern of population densities in census sub-divisions over a period from 1921 to 1981. Two dominant trends were observed. First, there was a deconcentration of populati· and employment from the heartland in conjunction with a physical expansion of urban centres. Secondly, there was evidence of a regional concentration of population and economic activities in Central and South-western Ontario. In part, this was linked to the relative decline of the Quebec portion of the Central Canada heartland (Yeates, 1985, 110-113).

The changes in rural towns and villages has received considerable attention in Canada. Coinciding with the period of metropolitan decline during the 1960's and 1970's, Hodge and Qadeer (1983) have provided a wealth of descriptive evidence to suggest a demographic and economic revival in many small towns and villages

(Hodge and Qadeer, 1983). Similarly, Dahms (1984 and 1986) has documented dramatic increases in the non-farm population and a movement toward non-traditional economic functions in many small towns and village communities in rural Ontario. Stabler (1987) also observed similar patterns of demographic and economic re-structuring in many prairie region towns and villages.

The majority of Canadian research, however, has focused primarily on describing local aspects of rural or non-metropolitan population growth. A relatively large body of literature on the development of the "urban field" has provided an abundance of evidence of strong decentralization processes and significant demographic changes in the fringes of Canadian metropolitan and urban regions (Russwurm and Bryant, 1984). For the most part, this body of literature has focused mainly on the push and pull factors in ex-urban migration decisions, and the implications of ex-urban settlement in small towns and villages within specific urban fields (see, for example, McRae (1981) and Brunet (1980) in Ottawa-Montreal axis; Coppack (1988) and Walker (1987) in the Toronto fringe; and Davies and Yeates (1991) in Oxford County (South-western Ontario)). All of the case studies have highlighted the extensiveness and prevalence of ex-urban development in rural and semi-urban areas. However, very little is known about the demographic changes or implications of ex-urbanization on those places beyond the influence of the urban field.

1.3 Scope and Limitations

The general scope of the thesis focuses on the identification and description of population trends and statistical associations. The term "causality" has been mentioned several times already. It is important to make clear what this term implies. In the context of the regression models, it is strictly used in a theoretical sense to identify those independent factors believed to be associated with population change. This study makes no attempt to confirm or explain any cause-effect relationships between different causal factors and population changes. In order to this, one would require a much more sophisticated methodology that takes into account the interactions between the different causal factors (i.e., econometric models), and a richer database which incorporates exogenous factors as well (i.e., recessions, inflation, etc.). The main goal of this thesis, in comparison, is to examine the relative importance of the associations between population change and a selected, rather than exhaustive, set of causal factors.

The limitations to this thesis are mainly in the data. There are two main types of limitations. First, some of the data are inconsistent in terms of the time periods covered compared to the study's coverage period. For example, the regression models which examined population change between 1978-89 included some independent variables which only covered a five year period between 1981-86. It is argued that the elimination of this information would have hindered the study's objective to examine a broader

range of causal factors. Secondly, all of the variables used in the analyses were either percentages or rates of changes. This obviously does not allow an assessment of the in and out flows of people or employment between different areas and regions. This type of analysis is essential in order to examine the real nature of the population deconcentration process which is based on the balances of flows in population between metropolitan and non-metropolitan areas. To compensate for this weakness, it was necessary to use specific area types to incorporate these flows and processes (i.e., metropolitan adjacency). Given the nature of the data, the patterns are interpreted in terms of their consistency with various processes (i.e., relatively high growth rates) rather than reflecting actual growth processes (i.e., demographic spill-over).

1.4 Data Sources

The data used in this thesis were obtained from several sources. The 1981 and 1986 data on housing, employment, industry, and migration were obtained from published Census publications or from Statistics Canada university consortium magnetic tapes. Population and migration data for the different time periods were derived from various Statistics Canada publications. Geographical information for area classifications were based on careful examinations of 1981 and 1986 census maps of Census Sub-divisions (CSD's). Other geographical data was obtained from Ministry of Transportation Information maps. Additional population, housing and government expenditure data were retrieved from the Ministry of

Municipal Affairs Data Retrieval System (MARS).

1.5 Organization of the Thesis

The thesis is organized in the following way. Chapter 2 provides an evaluation of different growth concepts and terms used to describe population deconcentration. This chapter also contains an assessment of different approaches and methodologies. In Chapter 3, there is an comparative assessment of different perspectives on explanations of population deconcentration. A number of explanations are examined ranging from those that emphasize changes in employment and economic structure, impacts of government policy, consumer sovereignty, and other exogenous factors (business and migration cycles). Chapter 4 contains a descriptive analysis of demographic trends and causal processes. An area classification is defined in this chapter and used as the basis for the descriptive analyses. Chapter 5 provides a multivariate analysis of population change. There is also a discussion on the model's specifications and variables. Chapter 6.0 contains a summary of the major findings and a discussion on recommended future research.

CHAPTER 2 TOWARDS AN UNDERSTANDING OF DEMOGRAPHIC PATTERNS AND CAUSAL PROCESSES

2.1 Evaluation Of Growth Processes and Concepts

A number of "catch-all" phrases have been adopted over the years to explain the observed changes in population growth and distribution. The terms "turnaround or reversal migration" have been used to describe changes in migration patterns among metropolitan and non-metropolitan areas. Similarly, phrases such as counter-urbanization, decentralization, or deconcentration have been widely used to describe the slowing-down or end in population concentration. More recently, several terms such as rural resurgence or country-side urbanization, have emerged to describe the broader aspects of rural growth and development within the broader context of counter-urbanization. Among the myriad of terms and definitions, there has been considerable confusion over the meaning and overlap of these terms and definitions, particularly in terms of their interpretations. This section clarifies some of the ambiguities over the use of different terms with a critical evaluation of selected terms and definitions.

2.1.1 Definitions - Counter-urbanization, Decentralization or Deconcentration?

One of the earliest models to gain world-wide acceptance as an explanation of recent patterns of population re-distribution and growth was Berry's (1976) idea of "counter-urbanization". According to his interpretation, counter-urbanization reflects a process of demographic deconcentration beyond that of suburbanization or

metropolitan decentralization. Berry's interpretation of this new phenomenon provided a clear division between extended urbanization (or suburbanization), whereby growth is diffused to mainly peripheral areas within a metropolitan area's daily urban system at the expense of the central city, and more recently counter-urbanization in which areas beyond the influence of metropolitan regions have experienced a resurgence of growth. Berry was careful to note that population growth occurring within the boundaries of metropolitan commuting fields represents a continuation of the long-established process of suburbanization (or local decentralization) rather than counter-urbanization. Counter-urbanization, by definition, must then be either some new form of urbanization or an advanced stage of local decentralization?

This logically led some authors to speculate whether a growing concentration of people beyond daily or metropolitan systems represented a fundamental "clean break" from traditional urbanization processes (Vining and Strauss, 1977). The clean break idea was used by Robert and Randolph (1983) to demonstrate that counter-urbanization has evolved out of decentralization, and now resembles a pattern of deconcentration. In contrast to Berry's initial distinction, they envision counter-urbanization to be a result of both decentralization and deconcentration. The authors use the terms decentralization and deconcentration to describe respectively movement of people from inner cities to other areas within the daily urban system, and movement down the urban settlement hierarchy and beyond the daily urban system to rural or

remote areas. They claim that both are prerequisites for counter-urbanization (p. 78).

According to the authors, much of the confusion over whether counter-urbanization has been present or not, may have resulted from imprecise definitions of the terms, resulting in counter-urbanization being linked to "decelerating levels" of urbanization compared with "new" forms of growth beyond metropolitan boundaries. The authors go on to demonstrate that decentralization and deconcentration processes, in the case of Britain, have been going on almost in parallel during the 1970's, although the latter does not appear to be as extensive as observed in the United States. It should be added that the authors do not clarify whether the so-called "deconcentration" phase of development is entirely independent from metropolitan processes of change.

Coombes and his colleagues (1989) have proposed a more precise definition of the "clean-break" idea. According to the authors, the clean break hypothesis, if accepted, implies that counter-urbanization (or its later stage -- deconcentration as prescribed by Robert and Randolph) is associated with a "new" system of spatial patterns of growth and decline independent of the urban hierarchy. They are careful to distinguish between the significance of metropolitan-centred forces of change and those which represent something much more. The authors are somewhat more sceptical about accepting the clean break hypothesis, and envision a number of conditions necessary in order for a clean break to be identified :

> "a clean break surely requires - as a minimum - either that decline is not limited to the urban centre but extends through the whole metropolitan regions, or that growth is endemic throughout substantial parts of the non-metropolitan areas and is not limited to the peri-metropolitan zone.... this alone would merely represent a direct reversal of centralizing urbanization....."

The authors go on to say :

> ".....a truly fundamental clean-break would require that growth and decline are no longer related to the urban hierarchy at all, instead they are dependent upon quite different spatial features and processes.....growth and decline would be distributed right across the urban hierarchy, between metropolitan and non-metropolitan areas, with no systematic relationship whatsoever to the urban size of the area concerned (p.10)"

The authors also provide a regional dimension to the controversy surrounding counter-urbanization and the idea of a clean break. Coombes and his colleagues believe that a clean break from agglomeration processes should not be confused with the effects of regional shifts in population and economic activity or with the development of new agglomerations, even if they are in remote and peripheral locations. In many cases, such shifts in population are easily labelled as counter-urbanization when in fact the developments reflect different stages of urbanization or strong "regional shifts" in urbanization. As Coombes et. al. (1989) and Champion (1989) have suggested, population movements toward urbanized regions during the industrial revolution, could have easily been interpreted as counter-urbanization, using today's definition of the term, rather than a "shift" in urbanization, since growth was being diverted to smaller areas at the expense of the largest areas which developed in the previous stage of urbanization.

Similar parallels can be drawn to more recent and advanced urbanization trends where growth has continued and moved further out into smaller places while the larger suburban areas have now begun to either stagnate or decline. According to Champion (1989) such growth, whether peripheral or remote, does not represent a "long-term" transition to a settlement pattern independent from the urban system, but rather a "continuous process of growth and decline across the urban system" (p. 25). A fundamental clean break from agglomeration process would therefore have to represent some form of diffused development away from larger metropolitan areas which is dominated by smaller-scale systems of cities (Bourne, 1980) or rural-based hierarchical relations which do not conform to the spatial relations and arrangements prescribed by central place theory (Hodge, 1983, 27).

2.1.2 Conceptual and Methodological Issues

A number of conceptual issues can be identified from the above discussions on counter-urbanization and other related terms. First, much of the literature on population redistribution, and counter-urbanization in particular, has been based on very simple interpretations of spatial structure and form. In most cases, population redistribution has been examined using crude regionalization frameworks based on a simple dichotomy of space and processes (i.e., metropolitan/non-metropolitan or core/periphery categorizations). This has been common among cross-national studies which view counter-urbanization as an international or continental

phenomenon (Fielding, 1982; Vining and Pallone, 1982; and Vining and Kontuly, 1978), and also by nation-specific studies which have labelled counter-urbanization to describe widespread changes in the national settlement systems (i.e., U.S., Britain).

There are two important implications of these types of investigations. On the one hand, counter-urbanization has become tightly bounded in the definitions of the spatial aggregates to reflect a "process" which is the opposite of spatial concentration or urbanization. Vartiainen (1989) believes that this has led to idealistic abstractions of actual spatial processes and the "multi-dimensional" nature of settlement systems (p. 218). On the other hand, there has been a neglect of the existence of other spatial processes. New ideas on the study of counter-urbanization and population redistribution have emerged in the 1980's which emphasize much more than an analysis of people across some arbitrary boundary of a daily urban system (typical of studies in the 1970's). There is now a general consensus to broaden the conceptual frameworks of counter-urbanization research to investigate shifts in population down the settlement hierarchy and across functional hierarchies of settlements (i.e., high-technology centres, manufacturing areas). Champion (1989), for instance, has commented on the need to investigate which other demographic and economic processes are operating alongside population shifts.

A second issue concerns the uncertainty over the timing and spatial scale of counter-urbanization. In his critique of Berry (1976), Champion (1989) has raised two important questions about

what constitutes counter-urbanization. First, he suggests that Berry's labelling of 1970 as the time counter-urbanization emerged was based on the observation of a reversal in internal migration from the largest metropolitan areas to non-metropolitan areas. In statistical terms, the effects of this reversal on metropolitan and non-metropolitan aggregates brought about new patterns of change and distribution which emerged over the inter-censal time period of 1970-75. Such evidence was logically interpreted to mean that the national settlement was moving in the direction of "counter-urbanization". Champion, however, argues that this has led many to believe erroneously that counter-urbanization is a national or continental phenomenon that is prevailing at all spatial scales (p. 23). For instance, Fielding (1982) argues that counter-urbanization may be a global or international phenomenon. He believes that cross-national studies have showed consistent counter-urbanization tendencies in all western and industrialized countries. This would suggest, at least intuitively, that counter-urbanization may be part of a broader global process of change.

Dean and his colleagues (1984) take on a different interpretation. They argue that national perspectives of counter-urbanization conceal the importance of variations in sub-national or local processes which are clearly more important in describing and explaining actual trends. The authors maintain that a failure to recognize regional and local processes :

> ".....may result in the explanation of a reality that is quite unrelated to actual geographical areas and experiences of individual residents there.....Processes of population redistribution appear to be capable of having a profound impact on the social life and social composition of specific localities, and this is highly worthy of study (p. 179)"

This has also opened an inquiry at lower spatial scales. Vertiainen (1989), for instance, believes that counter-urbanization tendencies are more likely to be function of more regional and localized processes unique to specific regions of a nation. He has further argued that any interpretation, or confirmation of counter-urbanization, as a result, would require that analysts distinguish between these specific modes of change (i.e., macro-regional shifts, hierarchical re-distributions and region-specific patterns), and identify possible explanations which are particular to each mode of change.

A third issue concerns the idea that counter-urbanization is viewed primarily from an urban perspective emphasizing "push" factors from metropolitan areas. Along the lines of a clean break, some authors suggest that counter-urbanization, as a minimum, may imply a "socio-psychological" separation by individuals from many of the negative qualities of metropolitan life (Dean et al., 1984). At the same time, however, it may be argued that metropolitan-origin migrants even with marginal geographical leaps from metropolitan areas may not entirely escape from urban-based systems. In reality, they will still maintain other forms of linkages whether they be social, employment, or shopping (Perry et al., 1986).

There have been several arguments against these predominantly "metropolitan-origin" frameworks of analysis. Cloke (1985) believes that counter-urbanization should also be viewed from a rural perspective with a greater emphasis on rural-based "pull" factors. He argues that non-metropolitan growth may be linked to the degree a particular locality is receptive, or capable of sustaining, growth from metropolitan-origin forces of change. A number of local factors are proposed ranging from housing markets, land costs, quality of life, and infrastructure (p. 17). Along the same lines, Rudzitis (1991) has revived the traditional "sense of place" perspective. He emphasizes the inter-play of nature or uniqueness in small rural areas. It is believed that a stronger sense of place, using the above definition, implies a stronger community and local economy (p.83). In addition, Coffey and Polese (1984) stress endogenous factors in local development with particular mention of local entrepreneurship and local initiatives as the main forces in long-term development. All of the these views when applied to non-metropolitan growth provide alternative interpretations of the forces underlying counter-urbanization and population deconcentration.

Finally, research in population deconcentration has been tightly bounded within the positivistic tradition of analysis. In many of the studies, the identification, and to a large extent the explanation, of counter-urbanization has been through an application of selected statistical indices or correlates of population change. Any major deviations from the traditional

urbanization patterns across standard geographical areas are interpreted to imply either population concentration or deconcentration. A major problem with this approach is that it has been usually guided by a crude and tentative theoretical framework based on the standard hypotheses of population deconcentration (i.e., employment growth, amenity, commuting). As a result, a large gap in understanding has been created in terms of the relative importance of broader social, economic and political forces underlying the respective hypotheses and their association to population distributions and change.

There are two main short-comings associated with the use of a positivist approach. First, it has often been characterized as being too narrow in terms of its outlook on the actual causal processes. In part, this can be attributed to the "parochial" views shared by many researchers who over-exaggerate the importance of direct cause-effect relationships at the expense of recognizing the importance of inter-dependent structures and relationships. Some authors argue that more broader approaches need to be adopted to emphasize the broader context of population deconcentration. Dean and his colleagues (1984), for example, have applied a behavioral approach to the study of urban to rural migration to investigate the relative importance of humanistic factors (i.e., preferences, motivations, values, sense of place, etc.). Adopting a more structural framework, Harvey (1978) has argued for some time that the fundamental changes in traditional urbanization are rooted in the dynamic nature of capitalist systems of production and

accumulation. Following Harvey's conceptualization of urbanization Coombes et. al. (1989) stress that the underlying nature of population deconcentration may therefore be associated with primarily the structural changes in these systems of production and accumulation (p. 18).

2.2 Assessment of Approaches and Analytical Methods

2.2.1 Spatial Areas of Analysis

A major concern in studies in population deconcentration, especially those dealing with trends at the sub-national level, has been the use of proper statistical aggregates to reflect the actual spatial processes. Many aspects of population growth have been addressed in earlier discussions pertaining to specific localized and regional processes and also decentralization and deconcentration processes from metropolitan areas. Central to the understanding of recent patterns of population change has been the need to develop spatial frameworks to be able to investigate the extent to which these individual, although obviously inter-related, processes influence actual patterns of population growth and distribution. This section will evaluate alternative spatial frameworks for analyzing the key processes underlying population change.

Over the years, it has become crucial that areas be defined in terms of their spatial dependence or functional linkage to other areas (or a group of areas). A number of concepts have emerged over the years to define the so-called "functional" urban region which

could effectively differentiate between metropolitan suburbanization and non-metropolitan growth processes. Perhaps the most common unit of analysis in studies of population redistribution has been the daily urban system or census metropolitan statistical area. A daily urban system or metropolitan area has three common characteristics : (1) contains at least one major urban core area designated on the basis of a minimal population size threshold; (2) the geographic scale is large enough to enclose the built-up area and small enough so that the population density is greater than that of most rural areas within the region; and (3) the outer boundaries of the area delimit the extent from which a significant percentage of workers commute to jobs in the central urban core (Bourne and Simmons, 1982). The criteria to delineate the actual boundaries of these areas have been journey to work or employment data. Those areas having a specified proportion of the population commuting for employment to the central urban core are viewed as being part of the metropolitan system.

There are several advantages to the use of metropolitan regions as units of analysis. First, such areas have been designed to distinguish between those areas with a high degree of economic and social integration with the major core area(s). This allows a clear differentiation between growth in areas resulting from decentralization tendencies compared to growth which may be linked to non-urban factors. The issue of whether counter-urbanization represents a clean break or urban spill-over can therefore be

addressed by distinguishing between growth among areas that are spatially contiguous to the boundaries compared to those that are farther away. Secondly, the actual physical extent of the metropolitan regions in terms of their commuting hinterlands allows an assessment of decentralization processes across the different scales and functional orderings of metropolitan systems. Some of the studies reviewed showed that the rate of decentralization or deconcentration varied across the urban system (Frey, 1989). According to Champion (1989), there have been few studies which have comprehensively examined population redistribution patterns across the urban system has a whole.

There are two cautionary points when using metropolitan regions. First, it is easy to misinterpret growth trends if metropolitan boundaries are not properly defined. For instance, metropolitan boundaries should be defined on the basis of commuting data at the end period of the time studied. This allows any growth taking place outside of the boundaries of the metropolitan regions (using earlier definitions) to be correctly labelled as metropolitan rather than non-metropolitan. This allows an analyst to differentiate whether the growth is from metropolitan expansion factors or counter-urbanization (Coombes et. al., 1989, 22). An additional advantage of using metropolitan regions defined at the end point of the time period is that it is possible to account for any new metropolitan regions or smaller urban agglomerations which emerge over the time period of study. Such growth could be

erroneously interpreted as non-metropolitan (Champion, 1989, 28-30).

A second cautionary note in the use of metropolitan areas is that they may be under-bound. On the one hand, the commuting threshold upon which metropolitan boundaries are delineated (i.e., 40 per cent of an outlying areas work in the urban core) does not rule out the possibility that those areas not meeting the threshold are entirely independent of the metropolitan region. It is probable that such areas may maintain some level of interaction. For vast metropolitan or "megalopolitan" regions, it is more than likely that many of the areas collectively, including those considered not adjacent to metropolitan areas, have fairly strong linkages to the metropolitan region as a whole (Champion, 1989).

This is why some authors feel that a broader concept of the extended influence of urban regions is needed. One popular approach has been the "extended" urban field concept. The urban field concept delineates a vast urban region, conceptualized to be considerably larger than the metropolitan area, where urban-origin residents participate in daily employment commuting, leisure and recreation travel. The concept is used to reflect the outward expansion of extensive metropolitan transportation and communication systems and changing spatial patterns of employment opportunities, residential choices, and lifestyle changes (Bourne and Simmons, 1982). An urban field is usually conceptualized through a series of extended distance rings up to approximately 100 kilometres from the urban core. It has been conventional to apply

population growth rates or concentration measures to see at what distance ring(s) population growth or concentration indices "break" from common levels. Hugo and Smailes (1985) argue that a more broadly defined urban region, particularly when applied to countries characterized by a vast physical area and highly concentrated settlement pattern, is useful for clearly identifying whether growth has taken place among the truly remote areas.

There are three weaknesses to the urban field concept. First, it may over-estimate the influence of some metropolitan regions if a standard radius is used across different sized metropolitan areas. It is probable that urban fields of older industrial metropolitan regions will not be as extensive compared to larger metropolitan areas which are based on advanced transportation and communication systems. One way to overcome this problem could involve a standardization procedure on the basis of some criteria to reflect the perceived differences discussed above. This however may lead to a second problem. For example, the concept could take on a rather ambiguous meaning if it is standardized on some "static" or perceived measure of functional relationship. Finally, the use of the urban field may create some interpretation problems. For example, the issue of urban spill-over starts to become complicated and confusing when areas begin to fall into more than one urban field, or when information about an area's functional orientation to one or more metropolitan region is not known.

While the conceptualization of metropolitan areas and spheres of influence has taken precedence in most studies, there has been

a growing concern in recent years over the actual interpretation of "non-metropolitan". Conventionally, the term non-metropolitan applied to only those areas which were not part of the metropolitan labour hinterland. Based on this distinction, non-metropolitan areas have been defined by their population size, density, and adjacency status to metropolitan areas. Over the years, this has been the basis upon which studies have addressed the recent phenomenon of population redistribution from metropolitan to non-metropolitan areas. A reversal in the non-metropolitan and metropolitan migration flows or relatively large shifts in population growth rates in the non-adjacent or distant areas as an aggregate were associated with a fundamental break in urbanization as discussed in earlier sections.

There are two important weaknesses associated with the use of the conventional non-metropolitan term. First, the term "non-metropolitan" in most studies of migration and population redistribution has, and continues to be, based on very large statistical aggregates. Hodge (1983) notes that non-metropolitan communities despite comprising the largest number of settlements in most countries are viewed as the "residual" rather than an inter-dependent part of the larger settlement system. Therefore, it is imperative to further disaggregate non-metropolitan areas in order to identify rural-based processes or factors of change which may not only be different from metropolitan-origin forces but also have varying implications for many non-metropolitan areas.

A second weakness of the conventional non-metropolitan unit

focuses on the rather large geographic units (usually counties or census divisions) used to define non-metropolitan status. An implication of this is that the county (an aggregate of even smaller individual spatial units) contains a range of different processes and growth experiences. Therefore, such areas when used as units of analysis or building blocks for larger aggregates conceal a diversity of growth processes and patterns which become more and more difficult to identify and assess with higher levels of aggregation. This problem has been addressed by Kephart (1988) in his analysis of non-metropolitan county growth in the U.S. Applying a method to control for heterogeneity, the author's findings show that aggregate rates of growth have an "implicit dynamic of change". It is this internal diversity in aggregate measures (i.e., social, economic, or demographic) which change over time to alter the composition of the aggregate measure and its relative importance in areas used to determine the aggregate rate. As a consequence, an aggregate measure such as a simple measure of population growth may not always be a good predictor of individual patterns of causal processes when examined in the context of larger aggregate measures.

2.2.2 Statistical Techniques and Multivariate Analyses

A number of techniques have been applied to investigations of population deconcentration. The types of statistical techniques frequently used have been mainly descriptive usually involving an examination of simple statistical indices over space, time and

across different area classifications. More recently, however, there has been greater interest in applying multivariate methods to examine a wider range of causal factors underlying population deconcentration. Much of the experimentation with multivariate analysis has involved the use of the conventional multiple regression model. This section provides a brief review of the major strengths and weaknesses of several of the more commonly used statistical techniques and methods.

Hoover Index

A common technique which has gained popularity throughout the 1970's and 1980's has been the Hoover index. The Hoover index was initially used to investigate population concentration for different geographical classifications. Population concentration is described by the following equation :

$$H_t = \frac{1}{2} \Sigma \mid P_{it} - a_i \mid 100$$

On the right side of the index of concentration (H_t), the proportion of a nation's or region's population in sub-area in year (P_{it}) is subtracted by a sub-area's proportion of the nation's or region's land area (a_i) for k number of subareas. If P_{it} is equal to ai for all the sub-areas, then the population is perfectly uniformly distributed implying that Ht will equal 0. This implies an evenly distributed population. A value of H_t between 0 and 100 indicates the percentage of the population which needs to be redistributed in order to obtain an even population distribution

across the sub-areas (k). Hoover indices have commonly been applied to different regionalization frameworks which take into account the growth concepts discussed earlier (i.e., spill-over). When examined over time, it is possible to relate relative shifts or sharp drops in the index to patterns of population concentration or deconcentration.

There have been many applications of the Hoover index. Vining and Strauss (1977) were the first to use the Hoover index to see whether population redistribution patterns in the 1970's represented a clean break from past urbanization. Hoover indices were derived across several geographical scales, ranging from counties to economic sub-regions and states, and for ten-year intervals between 1900 and 1980. Applying a slightly more detailed regionalization scheme, Vining and Kontuly (1978) later used the Hoover index in cross-national analyses of population deconcentration in several western countries. Gordon (1979) adopted the use of functional or disaggregated metropolitan regions to see whether there was indeed a "clean-break" in population deconcentration from metropolitan systems. A number of national case studies later emerged using the Hoover Index to investigate the "clean-break" hypothesis in West Germany (Kontuly et al., 1986) and the United States (Long and DeAre, 1982). More recently, Coombes and his colleagues (1989), adopting a more explanatory framework, calculated Hoover Indices for both population and employment in an attempt to establish an association between population and employment deconcentration.

The Hoover Index, despite its popular use, does have several obvious weaknesses. First, it is highly descriptive and inductive in nature. As a result, it is very difficult to incorporate or empirically assess associations with other causal factors of population deconcentration. Secondly, the index is highly sensitive to different spatial scales and units of analysis. This leads to serious problems in the interpretation and comparison of patterns when investigated across different units of analysis (Vining and Strauss, 1977). Thirdly, the measure is restricted to relatively short-term comparative analyses. According to Gordon (1979), the Hoover index when examined over longer periods may become biased and unpredictable, especially if definitions of spatial units do not reflect proper definitions in the respective time periods.

Shift-Share Model

A second technique which has gained recognition, particularly in the U.S. and Canada, has been the shift-share model. A shift-share model is a technique which has been traditionally used to assess the relative importance of different components of regional employment growth. The technique disaggregates regional growth into three components. First, there is the "national growth component" which represents the expected level growth in a region when based on the national growth rate. The second component, structural effect or industry mix, refers to the level of growth associated with the initial regional concentration of sectors characterized by

growth rates above or below the national average. Thirdly, there is the regional or shift component which is a measure of whether growth in a particular region was positive or negative compared to other regions (Glasson, 1978, 10-114).

The shift-share model has been adopted to investigate patterns of employment deconcentration. A study done by Barkley (1988) used the shift-share technique to assess employment shifts in high-technology manufacturing sectors among metropolitan and nonmetropolitan regions in the United States. Polese and Coffey (1988) also utilized the shift-share technique to examine deconcentration tendencies among selected industrial sectors among core, urban heartland, and rural hinterland regions in Canada. In a more comprehensive application, Plane (1989) decomposes migration and employment into respective regional components. In comparison to the previous authors, Plane then examined correlations among the migration and employment shifts in order to assess the association between employment and migration patterns. As with the Hoover Index, the shift-share model is purely descriptive and also tends to be sensitive to similar problems of spatial scale.

Multivariate Methods

The use of multivariate models to test theories concerning population deconcentration or counter-urbanization tendencies has been very limited. A common, and perhaps the most dominant, multivariate technique has been the multiple regression model. In most cases regression models have been used to investigate the

association between population change (or net migration) and other traditional social and economic independent (explanatory) variables. Also common is the testing of some of the growth concepts of population deconcentration (i.e., urban spill-over, regional shifts) through the use of dummy variables (1 or 0) to distinguish areas by either their regional local or metropolitan adjacency status.

Some studies, on the other hand, have looked at the changes in the associations among variables by specifying different regression models corresponding to the pre- and post-turnaround periods (McCarthy and Morrison, 1977). Other studies have specified region-specific regression models to investigate the spatial differences in probable causal factors and processes (Beale, 1977). This has created a large body of literature on the use of multiple regression models to investigate the underlying features and causes of population deconcentration. This body of literature serves as a basis in the following chapters to assess the relative importance of different independent variables commonly used in the multiple regression.

This chapter provided a review of the empirical evidence and theoretical concepts describing recent patterns of population deconcentration (Table 2.1). It was established that the pattern of population deconcentration is a global trend occurring in most developed countries. Most recent evidence has suggested a reversal or slowing-down in the population deconcentration process. An evaluation of the theoretical concepts showed that there is

TABLE 2.1 SUMMARY OF RESEARCH ON POPULATION DECONCENTRATION IN THE 1970'S AND 1980'S

Criteria	1970's	1980's
Major findings	- slowing down of metropolitan growth in most industrialized countries - resurgence of growth in remote rural areas (speculation that patterns represent a "clean-break" from traditional urbanization processes)	- revival in metropolitan growth and slowing down in non-metropolitan growth
Geographic Scale	- U.S. county level - cross-national comparisons of western and industrialized countries	- national case studies - sub-national or regional studies within countries
Spatial Units of Analysis	- county (mainly in the U.S.) - core and periphery regions	- county levels (including urban and rural components) - communities in European studies
Mode of Inquiry	- description and identification of population and migration trends	- identification and associations with different social, economic and geographical factors
Quantitative Measures	- population growth and net migration rates	- population growth and net migration rates - more emphasis on decomposing the rates (i.e., distributions, percentage shifts, etc.)
Statistical Techniques and Methods	- indices of population concentration (Hoover Index) - Shift/share model of employment change - Multiple Regression	- same in 1970's - method of classifying areas has become more sophisticated (i.e., functional regions, hierarchy, economic functions)

considerable disagreement over different terminologies and definitions used to describe population deconcentration. As a result, the approaches used so far have not contributed to a better understanding of the relationship between observed population patterns and underlying causal processes. The following chapter concentrates on the first part of the problem which is to investigate some probable causes of population deconcentration.

3 DEVELOPING A THEORETICAL AND METHODOLOGICAL FRAMEWORK OF ANALYSIS

3.1 Some Tentative Explanations of Population Deconcentration

A variety of explanations has been proposed to understand the underlying causes of population deconcentration. The explanatory aspect of population deconcentration research has only recently emerged and therefore deserves some discussion. In the literature reviewed, there were numerous factors and perspectives proposed. However, a closer examination at the body of literature revealed that it was possible to synthesize, with great care, many of the explanations into four dominant paradigms or models of explanation.

The purpose of this chapter, therefore, is to identify and critically evaluate each one of these explanations. These explanations have been categorized in the following manner (1) Employment Decentralization and Economic Re-structuring; (2) Impacts of Government Policy; (3) Consumer Sovereignty; and (4) Economic and Migration Cycles. This section is then followed by a review of the major "explanatory" factors (many of which are drawn from the four models) often investigated in the context of population deconcentration and non-metropolitan growth. The final section of this chapter draws together the four models and the various explanatory factors into a unified conceptual framework designed to assist in modelling non-metropolitan population change and growth.

3.1.1 Employment Decentralization and Economic Re-structuring

This model emphasizes the importance of employment growth and structure in explaining population deconcentration. According to Fielding (1982), the key causal factors in individual and household migration behaviour are the large institutions and businesses. The author, therefore, sees migration behaviour as partially being influenced by broader market forces, especially the spatial distribution of job opportunities and the operation of the national and inter-regional labour markets. Migration, as a result, is a means in which the distribution of the population adjusts to the changing patterns of job opportunities and wage levels. Those areas having a "tight" labour market characterized by relatively low unemployment and relatively high wages are expected to attract migrants. In contrast, those areas having a "slack" labour market where unemployment levels are relatively high and wages are low are likely to push workers to leave while attracting a much smaller proportion of in-migrants. As migration exchanges occur between areas, the author proposes an eventual equilibrium whereby migration to "tight" labour market areas will reduce the labour shortage and wage levels, while out-migration from "slack" labour markets reduces unemployment and pushes up wages. At some point in time, there will be virtually no differences across space in terms of unemployment and wage levels (pp. 20-21).

The migration process as viewed by Fielding may partially be explained by the rise of "basic" and "non-basic" employment opportunities in small urban and rural areas. Moseley (1984)

believes that a resurgence in selected resource-based economies, and more recent growth in manufacturing and services in rural areas has contributed to significant "basic" employment. There are two beneficial impacts from the rise in basic employment. First, basic employment attracts considerable "export" earnings by producing local goods and services for a larger market outside of the region. Secondly, once basic employment grows, non-basic or multiplier employment is attracted to service the local market. An important effect of this cumulative and causative process is the creation of jobs and a rise in the demand for labour; increase in the wage levels; which then attracts labour migrants from surrounding areas (p. 451).

An improvement in employment conditions in non-metropolitan and non-urban areas may be explained in part by fairly recent trends of restructuring and spatial re-organization in several key industries. One important trend has been the dispersal of labour-intensive manufacturing and service employment from large metropolitan regions to small towns. Manufacturing is now less constrained to specific urban centres or locations for supplies, especially with improvements in transportation and communication (Ray and Roberge, 1981). Within most industrialized nations, manufacturing industries are increasingly re-locating into smaller areas and communities where more environmental amenities exist and direct costs of production are lower (Bourne, 1980, 42). There are two important traditional features of manufacturing which may have contributed to growth in small towns. First, manufacturing is seen

as being "city-forming" in that it is highly linked to job creation in major growth industries such as construction, transportation, and trade industries. Secondly, a large part of manufacturing output is exported to neighbouring regions, other provinces and countries, thus creating important functional links with these areas and regions (Ray and Roberge, 1981).

Secondly, specific types of producer service activities are also being attracted to small urban and rural areas. Producer services can be defined as those activities involved in introducing innovative ideas, methods, and technologies in the distribution of goods and services to other businesses and sectors of the economy. A major feature of these industries is that many of them are not dependent on the agglomeration economies of larger urban centres (Robinson, 1980, 52). The producer service industry can be disaggregated into several service sectors which include activities such as accounting, computer, architectural design, engineering, advertising services, and so on. Similar to the importance of manufacturing, producer service activities may have several important "growth-inducing" functions in small rural towns: (1) they integrate local industries into a more competitive and efficient complex; (2) encourage import substitution; and (3) generate direct revenue through inter-regional trade (p. 370) (Michalak and Fairbairn, 1988).

Thirdly, counter-balancing the metropolitan out-movement of manufacturing and services has been the metropolitan agglomeration of high technology and information industries. Most western

industrialized nations are experiencing a pronounced regional re-structuring process where high technology and information industries in terms of national economies have become far more important than labour-intensive manufacturing. As already noted, this has resulted in the "phasing out" of old-line manufacturing plants from metropolitan areas, and rapid growth in advanced information and communication services (Beauregard, 1989; Thrift, 1988). A major result of this process has been a world-wide expansion of technological production and markets in which the "major" nodes of production and communication are now centred at the highest levels of the urban hierarchy. One important feature of this process is that those urban centres and regions having the specific requirements of technologically advanced and innovative systems of production (i.e., efficient transportation and communication systems) will show dominant growth trends (Castells, 1985, 12). Clearly, there have been many examples of technological complexes which have highlighted the valuable link between techological change and urban growth (see, for examples, Bathlet and Hecht, (1990) in the Canadian Technology Triangle (CTT), Steed and Gegenova (1983) in Ottawa's Technology Complex).

Regional re-structuring has several implications on regional patterns of population deconcentration. According to Frey (1987), a polarization of growth will take place in those major metropolitan areas. The author has labelled these areas the "command and control" centres. Such areas are the largest national centres supporting the majority of corporate head offices and

advanced producer services (p. 255). The author predicts that two demographic processes are likely to emerge. First, a larger proportion of a nation's or regions's population will be attracted to these major urban regions in response to increasing job opportunities and relatively higher wages. Secondly, as labour wages fall and unemployment rises, there will be a rapid increase in growth at lower levels of the metropolitan hierarchy, especially in those small areas close proximity to these "command and control" centres. Frey links the latter prediction to the fact that there has been a rapid convergence across many areas with respect to accessibility to transportation, services and employment. Other urban centres supporting more routine manufacturing lines of production and traditional consumer-oriented services (ie. retirement or resort communities) are expected to show inconsistent gains depending on their local economic attractions (p. 244).

Finally, population change can be partially related to several important changes in resource-based economies in small urban and rural areas. One important change has been the rise in the importance of "amenity" as an actual rural economic resource. It is broadly defined to describe physical features of an area such as lakes, hills, and forests; or man-made features like theme or recreation parks. The recent popularity in non-urban recreation as well as the high income elasticity of demand for leisure is believed to have had a significant impact on the growth of small resort and recreation areas (Moseley, 1984). An important effect of these trends has been an increase in local expenditures on

recreation activities and services. In turn, this has initiated many other positive local spill-overs ranging from expansions of existing service industries (i.e., hotels and restaurants), improvements in recreation facilities, and location of new service businesses. More job opportunities implies that many of these areas should continue to attract in-migrants while also encouraging many more to stay.

Mineral and energy developments have been an important source of growth in peripheral urban and rural areas. Such areas have the potential to create a considerable number of jobs during times when resource prices and demand are fairly high as was the case in the mid and late 1970's world energy crisis. Such events resulted in the growth of many peripheral areas since a larger share of capital expenditures commonly directed to major urban centres were redirected to remote resource areas for energy exploration and new production facilities, especially in western Canada (Yeates, 1985, 110). In addition, there was a strong effort to search for alternative energy resources such as uranium in the case of Ontario where provincial government subsidies to large foreign resource companies contributed to the rapid growth in several northern peripheral areas (i.e., Elliot Lake, Kapuskasing, etc.). In general, however, the growth experiences of many of these peripheral resource towns has been sporadic. Ray and Roberge (1981) link this to the exploitive nature of multi-national corporations (MNC's) dominating the resource industry. The authors argue that the objectives of MNC's which emphasize rapid growth, profit

maximization, and technological control are in direct conflict with long-term regional stability (p. 17). This is particularly the case in those resource towns which are characterized by a dominant industry. A decline, or reduction in production, in a dominant industry has severe implications for local and regional population and employment change.

Changes in the structure of agriculture have influenced employment growth in small urban and rural areas. There are two main forces of change. First, many agriculture-based communities, especially those close to highly populated regions, continue to be affected by non-traditional land uses and urban economic activity. For example, farming has become dominated by highly specialized and mechanized corporations. The effect has been an overwhelming drop in the number of traditional farm households able to compete with the more productive farming companies, or who can afford the high costs associated with operating and maintaining farmland (Bunce, 1984). Much of the farmland has been abandoned or sold or is being converted to mainly non-traditional urban land uses (i.e., residential sub-divisions, industrial parks). Many of these areas provide an opportunity for migrants or businesses to buy large tracts of land at relatively low costs, and with limited control over the actual use of the land ((Joseph and Smit, 1981). A consequence of this has been a very rapid process of population and economic growth in many existing rural settlements, as an increasing number of people and businesses are being attracted to these areas (Bunce, 1984). A second type of change in agriculture

communities has been the rapid decline of agriculture in peripheral communities. An increasing number of farms are being abandoned because of poor topography and low productivity. In particular, it has been those areas with no viable alternative industry or amenity which have not been able to attract in-migrants or encourage residents to stay (Parson, 1984).

There are a number of flaws with the employment and restructuring approach to understanding recent patterns of population growth and distribution. One flaw of the model is its claim that there is a clear link between population and employment deconcentration in which the people's residential preferences are still predominantly shaped by job considerations. Several studies having investigated patterns of employment decentralization more or less conclude that the relationship between employment location and population mobility is not as clear. Collins (1972), for example, looked at the mobility of manufacturing firms in Ontario between 1961-66 and found that the location of manufacturing firms, whether coming from within the province or from abroad, followed a pattern of concentration within approximately 80 kilometres of the metropolitan region of Toronto. It should be noted that Collin's study was during a time when urban agglomeration was still dominant.

However, more recent studies on the location of manufacturing in Canada (Coffey and Polese, 1987) and the U.S. (Barkley, 1988) show that the patterns observed by Collins are still dominant in the 1970's and early 1980's. In fact, the authors have shown that

growth inducing manufacturing industries (typically those involved in high-tech and innovative activities) have shifted toward small to medium communities within influence of present day metropolitan boundaries, which by historical standards are now more vast and spread out. Estall (1983) has made an important distinction between present day and past locations of manufacturing. He concludes that the locational preferences are similar to those in the past, except for the fact, that many more areas are now being drawn into the "extended" physical and functional sphere of metropolitan influence.

Similar patterns of concentration (or moderate dispersal) have been observed in producer service industries. In Canada, Coffey and Polese (1987) show that producer-service employment is concentrated within the six largest metropolitan areas. Their analysis clearly shows that the producer-service industry locational preferences are very much oriented to the larger metropolitan region of at least 500,000. In contrast to other industries, producer-service location is guided by metropolitan-centred factors such as overall market and specialized labour needs. The costs of producing and delivering producer services would clearly rise rapidly in areas beyond the influence of metropolitan areas and those centres where such factors are not available (p. 608).

Corresponding to Coffey and Polese's findings, Gillespie and Green (1987) have shown that the general pattern of locational shifts in producer service industries has been at the intra-regional level rather than at the core-periphery regional level. In

their analysis of Britain, the authors show a relative decentralization of producer services to outer areas of the London metropolitan region, and spill-over to freestanding towns and cities within the London sphere of influence. In general, producer service activities remain concentrated in the highly developed region focused on London with its relatively high concentration of corporate head offices and professional labour market (p. 409).

Several reasons have been suggested to explain the increasing divergence between employment and population deconcentration. First, an increase in car ownership and willingness to commute to work in conjunction with improved metropolitan, and more recently non-metropolitan, transportation and communication systems have lessened the constraints on residential location (Hodge and Qadeer, 1983, 95). Many people, especially those professional and skilled employed in manufacturing and producer services, are physically moving farther away keeping in mind that their existing work or job opportunities are within driving distance. Secondly, many smaller urban and rural areas have promoted themselves as mainly "residential" centres for the larger ex-urban population. An emphasis on residential functions by many of these small urban and rural centres may certainly be considered an important reason why population mobility has not followed employment deconcentration (Shepherd and Congdon, 1990). Consequently, one must view the direct association between employment growth and population change more cautiously particularly when considering the growth experiences of more distant and remote rural communities.

A second flaw in the employment and restructuring model is its poor ability to explain observed patterns of migration. On the one hand, migration behaviour predicted by this model is counter-intuitive to what has been observed in most industrialized nations. As discussed, population is expected to move from those areas having limited job opportunities and lower wages to areas where job vacancies and wages are higher. This appears to contradict the patterns of population deconcentration which has been documented in most western industrialized countries. In terms of this model and its link to turnaround migration, it is peculiar to see that it has been the larger urban areas, which are characterized by relatively higher wages and lower levels of unemployment, having lost population by migration, while rural areas having more or less the lowest wages and highest rates of unemployment which have gained (Fielding, 1982, 21).

On the other hand, the model implicitly assumes an inverse relationship between in-migration and out-migration. With respect to the model, it is expected low growth areas will have a high rate out-migration matched by a low rate of in-migration. This would apply to high unemployment/low wage areas where the unemployed population adjusts by moving to other areas. In contrast, high growth areas are predicted to have relatively high rates of in-migrants and low out-migration as many of the unemployed from low growth areas move to these areas. Fielding (1982) has gone on to show that gross in-migration and out-migration have a positive rather than negative association. In his study of urban and rural

areas in Western Europe, he observed that most of the high growth rural areas have relatively high rates of in and out-migration, while old industrialized regions have relatively low rates of in and out-migration (p. 21). This would suggest that population growth in small rural areas is a function of both increased flows of gross in-migration and proportionally less numbers of out-migrants. In fact, Grafton (1982) in his study of small towns in England has found that reduced out-migration in remote rural areas may have played an especially important role in the resurgence of remote rural areas.

A final flaw of the employment and restructuring model is its inability to predict the type of migrants who are likely to be involved in this pursuit of job opportunities and relatively high wages. It would appear that the prerequisites for migration, mainly job opportunities and high wages, would encourage those individuals and households who have the most to gain from relocating. Intuitively, this would imply that it is the unemployed and poorly paid labours are likely to show the highest propensity to move.

Most studies on counter-urbanization and rural resurgence, however, have shown that it has been the well-paid and economically secure individuals and households rather than their less fortunate counter-parts which have been involved in migration. Fielding (1982) links this to social class differentials between manual workers involved in manufacturing and functionary workers who are more educated and skilled. In the case of manual workers, they are faced with less opportunities when considering re-location to other

areas. In the short-term, it is beneficial for them to stay and take advantage of transfer payments and family support until local opportunities arise. In contrast, functionary workers are more likely to move to areas where matching jobs and wages are available since the moves are linked in various ways to long-term career interests and advancements (p. 26-27).

3.1.2 Impacts of Government Policy

Various levels and policies of government are believed to strongly influence population deconcentration. According to this perspective, the spatial pattern of population and economic growth is viewed as being determined by government deconcentration policies and mechanisms, ranging from local financial subsidies to businesses, distribution of capital grants, and regional development initiatives. In terms of the causal model, it is believed that population growth occurs as a result of government policy and expenditures which go towards improving the local infrastructure and level of services in smaller communities, or as subsidies to existing or incoming businesses to move to these areas. The end result is that growth in the number or capacity of businesses increases job opportunities which in turn attracts labour migrants into the area (see Figure ?).

Federal and provincial levels of government have exercised considerable control over the direction and pattern of growth and development. Several policy mechanisms have been used by these levels of government to encourage deconcentration processes. First,

the federal and provincial governments have an "implicit" policy to increase job opportunities in small urban and rural areas by relocating numerous ministerial operations and functions to these places. These forms of policy are believed to attract migrants to depressed urban and rural regions and lead to increased retention of many people who would have otherwise migrated to more prosperous regions (Robinson, 1981. 50). Such policy, particularly in the relocations of relatively large administrative functions, may have the added effect of encouraging public employees to migrate to these areas through relocation allowances, and thus contributing to greater social and demographic diversity in these areas.

Secondly, the federal government in conjunction with respective provinces has facilitated deconcentration policy through the availability of numerous forms of subsidies to specific businesses and regions. Several forms of "community-based" programs or subsidies have been designed to either sustain or encourage growth in small urban and rural areas. First, there are subsidies to encourage the location of businesses into depressed regions. An example of this has been the Industrial Regional Development Program (IRDP) administered by the Federal Department of Industrial Expansion (DRIE). The program categories regions into one of four "tiers" based on their need of assistance, and provides as much as 30 per cent of the capital investments required for companies to relocate in these areas (Ryval, 1987, 23-24). Secondly, the Industry and Labour Adjustment Programme (ILAP) has been formed to alleviate the hardship of large-scale industrial decline in

designated communities. Through a local community adjustment committee made up of public officials, business and labour representatives, the program provides consulting services and interest-free loans to encourage firms to establish, expand or re-organize operations. As well, federal and provincial levels of government in the early 1980's had initiated, on a trial basis, the Local Economic Development Assistance Program (LEDA) to provide private and public sources of technical and financial assistance to small-scale businesses and local entrepreneurs in smaller urban and rural communities (OECD, 1983, 97-100). Finally, the federal and provincial governments also exercise considerable control over licensing and permits in natural resources required in the development of large-scale projects on federally-owned lands. This is particularly important in the growth and viability of resource-based economies of peripheral communities and regions (Robinson, 1981, 51).

A final way the upper-level governments have encouraged decentralization has been through national and sectoral policy. National policies, administered through various federal and provincial departments, have traditionally been based on broad objectives with the intentions of reducing regional disparities in income and social welfare. This has been accomplished through the allocation of a variety of transfer payments such as unemployment insurance, child care assistance, welfare programmes, etc. These transfer payments have three important benefits with respect to local population change. First, transfer payments provide a means

in which individuals and families relocating to smaller towns can minimize their losses, even though immediate job opportunities are not available at the destination location. Secondly, transfer payments have the advantage of at least stabilizing community incomes in order to maintain a local demand necessary upon which jobs and entrepreneurs are dependent (Britton, 1988). Finally, transfer payments allow people, particularly the young and unemployed, living in small rural towns to postpone any immediate out-migration in the hope that some opportunities for employment will open up, possibly through their own entrepreneurial initiatives (Robinson, 1981). Hodge (1983) attributes much of the resurgence of growth in small towns and villages in Canada to an increased participation of federal and provincial governments in equalizing access to a wide variety of urban and rural social services and programmes (p. 26).

Federally and provincially-induced sectoral policies have an important influence on the patterns of population change. Sectoral policies can be grouped into two types. One type of sectoral policy focuses on revitalizing or assisting leading economic sectors which are periodically vulnerable to swings in world market demand and supply (i.e., steel or oil refineries). In such cases, industry-specific subsidies are distributed to dampen the effects of a drop in demand and production. A second type of sectoral policy involves a promotion of large-scale projects (i.e., minerals, energy, telecommunications) in traditionally declining areas and regions. In contrast tc the former sectoral policy, this sectoral initiative

is based on the notions of a "growth pole" in which large and innovative industries having strong inter-industry linkages are located in depressed areas in order to generate local and regional growth (Darwent, 1969). However, a major problem is that the direct impacts of local economic growth may be tied to only the immediate area with limited spill-over to surrounding areas, or could induce possible stagnation or decline in nearby areas as population and economic activity are drawn to the investment foci (Yeates, 1980, 91).

Local and regional governments have an especially important role in influencing population redistribution. In contrast to most western industrialized countries, Canada has a decentralized municipal and regional planning system which gives local and regional governments considerable control over legislative and regulatory power on matters of land-use planning, expenditures, and perhaps most importantly methods of revenue-generation (Higgins, 1986, 49). Within certain guidelines outlined by provincial jurisdictions, local and regional governments have the political capability through local-initiatives to encourage and direct growth rather than be dependent on the growth prospects of other areas, or on the hope that migrants or foot-loose industries will eventually move to these areas. Such powers are not only used by the larger urban centres but also by other smaller incorporated communities with a population of a few hundred or several thousand. Many of these communities have local self-governing structures and processes which are comparable to larger communities, particularly

on matters of tax increases and land-use regulation. However, the reduced scale of these smaller municipalities and their limited resource base compared to the larger areas means that they are somewhat more dependent on the financial and technical assistance of larger regional jurisdictions or provincial governments (Hodge, 1986, 299-304). Such legislative powers allow many communities to have considerable local autonomy in terms of control of growth-inducing practices and initiatives. This is especially important in those areas which are without natural amenity features or locational advantages.

Numerous municipal strategies have been used to attract economic and population growth. The Bureau of Municipal Research (1982) has identified several important municipal strategies to ensure local growth. First, the provision of local infrastructure and social services is viewed as an important factor for attracting new businesses into an area. This includes adequate transportation facilities, water, sewerage and hydro. Secondly, there has been widespread development of municipally-owned industrial parks to secure the availability of sufficient industrial space to support a variety of economic activities. Many of the advantages and disadvantages of municipally-owned parks to local areas and businesses have been discussed elsewhere (Walker, 1980, 233-235). Thirdly, many municipalities are "promoting" themselves on the basis of non-urban amenities such as physical features, low crime rates, affordable housing, culture, restaurants, and so on. Many of these factors are viewed as important in the location decisions of

migrants and in-coming businesses (Bureau of Municipal Research, 1982, 16). Finally, marketing and promotion programs are seen as important factors in assisting and encouraging industries to locate or expand. An increasing number of municipalities are involved in aggressive promotional campaigns by means of circulation of brochures, booklets, and directories which highlight their major attractions (Ibid, 16). Such a structure of political responsibility has resulted in intense competition between communities for the purpose of increasing their tax bases (referred to as fiscal mercantilism).

There are a number of flaws associated with the perspective relating to the impacts of government policies as important causal factors in population deconcentration. First, it is very difficult to assess whether the impacts of government policy have been the "primary" determinants of economic and population deconcentration. The impacts of government policy have received very little attention as a viable hypothesis in the context of population and economic deconcentration. In part, this can be linked to the lack of good data, quantitative measures, and approaches which could assess the broader implications of government policies on population and economic deconcentration. Secondly, policy formulation and implementation at various levels of government has been usually uncoordinated with little consideration of the inter-linkages of the different policies. Bourne (1982) believes that policies are frequently conflicting and result in differential impacts over space and time, and in some policy initiatives off-

setting the effects of others (p. 287). Thirdly, the objectives of government policies with respect to population decentralization are often uncertain. Bourne (1980) again has pointed out two key discrepancies with government policies. One focuses on the issue of whether the policy is intended to be cumulative or self-correcting, while the other questions whether policy encouraged deconcentration or concentration of population and economic activity (p. 45). Finally, it is argued that government policies have only reinforced existing natural growth processes, which have been occurring prior to the implementation of certain policies. For example, Harrison (1982) believes that recent patterns of private business location and investment reflect behaviour which would have occurred regardless of subsidies or other programmes. He argues that it is the demand for products (or service) or realization of lower labour and production costs which overwhelmingly influence business decisions of "when, where, and how much to invest" (p. 253).

3.1.3 Consumer Sovereignty

The consumer sovereignty model of population deconcentration stresses the importance of consumer-led migration to small urban and rural areas. In contrast to traditional economic models, migration reflects a change in individual and residential consumption values and life-styles. According to Perry et. al. (1986), migration to the "country-side" can be interpreted as a decisive break with traditional urban-value systems and city-life. It represents not only a geographical but also ideological movement

toward an alternative life-style in which traditional dichotomies between work and non-work considerations no longer apply (p. 3). Such rationale is based on the "supply-based" model of economic development proposed by Goldberg and Webster (1979), whereby those areas which can offer a variety of lifestyle and amenity opportunities will attract individual and residential migrants. In terms of the cumulative causation process, communities become better serviced in response to an influx of new migrants; housing market adjusts through the construction of more dwellings; and employment market adjusts with more local businesses locating in these areas.

Several important reasons have been proposed to explain why individual and residential migrants are moving to smaller urban centres and towns. First, life-style considerations have to some extent replaced employment factors in residential location decisions. Robinson (1980) believes that there has been a change in the consumption values of migrants whereby people are actually searching for places to live rather than work. In general, society is characterized by higher incomes, increased mobility, and improved rural infrastructures. As a result, people are capable and willing to search longer and broader distances for the ideal "rural paradise" (Perry et. al., 1986, 3).

This leads to the second factor which stresses the importance of amenities. In a broad sense, local amenities have been interpreted to describe a variety of natural, scenic or historical features which are unique to some rural areas. Such features are

believed to be appealing to urban-origin migrants, and are considered as important factors in the residential decisions of these migrants. Many examples of amenities can be drawn from the literature on the role of amenities in residential migration decisions to small towns. Some studies, for example, have emphasized the attractiveness of natural and scenic beauty in metropolitan origin migration to rural areas (Adamchuk, 1987; Zuiches, 1981). Other authors, mainly SoFranko and Fliegel (1989), Williams and McMillan (1980), and Roseman and Williams (1980), believe that closer social and cultural ties in smaller communities have influenced the direction and selection of both metropolitan- and rural-origin migrant destinations. As well, some authors stress the importance of rural sentiment and renaissance. This reflects a desire among urban-origin migrants to be part of a rural landscape which is peaceful, tranquil and safe (Coppack, 1988; Williams and Sofranko, 1979).

The final factor views many of the negative features of large urban areas as important "push" catalysts in residential migration to rural areas. According to Wardwell (1980), many of the largest urban centres have reached a "limit" to growth in which a variety of social, environmental, and financial problems have emerged (p. 74-86). Examples of these negative problems include endless daily commuter traffic tie-ups, rising pollution levels, higher taxes, inefficient social services, and deteriorating infrastructures (Hlvento and Luloff, 1982; Blackwood and Carpenter, 1978). With respect to the quality of urban life, all of the mentioned factors

have made big city life both economically and psychologically undesirable. A rise in the level of dissatisfaction with urban living has contributed to an out-migration of urban residents to those rural areas which are perceived to have the essential amenity values discussed above.

Urban to rural migration has involved the movement of several social and demographic groups. Perhaps the most mobile group has been the household (with or without children) headed by a middle-aged (25-44) person(s). There are several reasons why this group is most likely to move. First, many of these people are financially better off than most households and more capable of moving to smaller areas, with either the head of the household having a high-earning and established occupation or both spouses retaining fairly secure and well-paying jobs. Secondly, this group of migrants is highly mobile both with respect to their capability as mentioned and willingness to commute on a daily basis between home and work (Frederick, 1990). Finally, one would expect that this migrant group has the most to gain from moving to rural areas, especially in terms of raising a family free from the high social and financial costs of urban living.

A second group of migrants has been the retired or close to retired elderly. There are two factors which have tended to increase the general mobility of the elderly. On the one hand, most of the retired or close to retired residents have either returned to their original places of residence or have moved to enjoy the leisurely opportunities and relatively low costs of small town

living (Robinson, 1980, 46). On the other hand, there has been a rise in the number of retired elderly capable of migrating, mainly a result from an overall improvement in the economic and health status among many elderly (Foot, 1982).

Some selective occupational groups such as professional and managerial workers have been involved in the residential re-locations to small towns and rural areas. These groups are able to afford higher costs of housing in amenity-rich areas, and are somewhat more loosely tied geographically to their place of work (Congdon and Shepherd, 1986, 1302). Some of the people are totally flexible in that they work from their home or have "freelance" occupations which reduce the time spent at their place work through various working arrangements (i.e., part-time or seasonal, work sharing, shorter work days or weeks) (Moseley, 1984, 451).

A final, less recognized migrant-type to smaller towns has been the "temporary or part-time" exurbanite such as the weekend cottager and tourists who on a regular basis venture to small towns to enjoy the recreational and leisurely opportunities. Although this group may not contribute directly to population growth, they are likely to influence the process of development through expenditures on local services and creation of local businesses and job opportunities which may eventually contribute to population growth.

There are several flaws with the consumer sovereignty model as an explanation of population change in small towns. First, the model as Perry et. al. (1986) have argued tends to be "mono"

directional and causal. It tends to over-emphasize the importance of the association between metropolitan-origin migration and amenity factors in small areas as the primary causal agent in rural population growth. Bourne (1980) has noted that the model because of its parochial view has "side-stepped" some of the main economic processes which have changed the range and spatial pattern of job opportunities. In addition, the model overlooks the role of corporations, public institutions and government policies in encouraging and discouraging migration (p. 44).

Secondly, the model has a simplistic interpretation of "unrestricted" residential preferences and choice. As an opponent of this model, Fielding (1982) has argued that model exaggerates the role of human motivation and preference in explaining migration behaviour. It ignores the reality in which many people in advanced industrial societies are not faced with the locational freedom or residential decision-making to choose where to live and work. In fact, most people are likely to be tied to their residential locations by a multitude of factors such as income constraints, family commitments or the location to jobs requiring their personal skills (p. 20).

Finally, the model has little value in predicting the geographical extent of migration. As Perry and his colleagues (1986) have argued, there is no "logical necessity" for amenity-induced migration to be linked to long distance moves to remote rural areas (p. 3). The authors believe that it is possible to live a rural way of life in some suburbs and within the peripheries of

metropolitan regions. If this argument is accepted, the consumer sovereignty model can be viewed as nothing more than a process coinciding with a scaled-up continuation of metropolitan commuting hinterlands, where the "metropolis" is still a dominant influence on the location of residential migrants (Hugo and Smailes, 1985, 12-13). As a result, the model may have little merit in explaining the resurgence of population growth in the remote and non-amenity areas which are beyond the influence of metropolitan areas.

3.1.4. Economic and Migration Cycles

Population deconcentration has been linked to world market forces and fluctuations in the business cycle. The concept of business cycle has been defined as a recurrent pattern of fluctuation in aggregate economic activity, often lasting from one year to twelve years (White, 1967, 20). A business cycle consists of the following three stages : (1) Expansion - increases in employment and production reach a relative "peak" in almost all economic activities; (2) Recession - most economic activities contract as unemployment continues to rise and production declines to relatively low levels; and (3) Recovery - employment and output begin to once again rise and merge into the expansion phase of the next business cycle.

Some authors, such as Hugo and Smailes (1985), believe that the demographic and economic re-surgence of many small urban and rural areas may be partially explained through the application of the business cycle. According to the authors, the reversal of

traditional rural to urban migration more or less corresponds to the recessionary stage of the business cycle, and therefore represents only a "temporary" fluctuation from the pattern of urban, economic and demographic concentration. Wardwell (1980) has argued that economy-wide recessions create disproportional slow-downs in investment in new industry in the largest urban centres. This in turn reduces employment opportunities in the largest metropolitan centres, and contributes to rising costs of living and services to residents and industry.

The smaller urban centres and rural towns, in contrast, are viewed to be primary destinations of new industrial investment and the re-location of new and highly innovative firms. In response to job opportunities in smaller areas and a growing dissatisfaction with the costs and service provision in larger urban centres, many urban-origin migrants find it advantageous to re-locate in small urban centres or rural towns. As well, a reduction in employment opportunities in the larger urban areas leads to a decline in the flows of rural-origin migrants to metropolitan centres resulting in an increased retention of population in many remote rural areas (Ibid, p. 78). However, when the economy begins to move into the recovery and growth stages of the business cycle in which unemployment declines, the traditional pattern of internal migration to large urban regions is expected to re-emerge and continue until the next recession period (Kontuly and Bierens, 1990, 3).

Several authors have criticized the usefulness of the

recessionary perspective as an explanation of population deconcentration. In a earlier paper, Vining and Kontuly (1978) found no conclusive evidence of any "association" between turnaround migration and fluctuations in business cycles. In a cross-national study of countries experiencing a migration turnaround, the cyclic recession hypothesis was unsuccessful in explaining the timing of the turnaround in migration during the recessionary period or predict a reversal to metropolitan regions during economic recovery. Similarly, the U.S. Bureau of the Census (1975, 1978), observed that non-metropolitan growth in the U.S. continued throughout the 1970's despite fluctuations in economic conditions during that decade. Alonso (1978), on the other hand, has argued that turnaround migration in most western industrialized nations began several years before the recession period.

In contrast to the relatively short-term nature of the business cycle, some authors have associated migration turnaround and population deconcentration to broader cyclical frameworks. Mera (1988), for example, argues that urbanization and demographic concentration processes occur in cycles of growth and decline and not in a "uni-directional growth path" in which a turnaround in traditional concentration is ultimately interpreted to imply an end to urbanization (p. 269). Adopting this relatively long-term perspective, Berry (1988) has recently used "long-wave" cycles to describe the longer-term association between the direction of migration and historical waves of national economic crises. The author found that distinct changes in the patterns of turnaround

migration coincide with upward and downward swings in the national economy. Over a period of 55 years, Berry observed that urban-ward migration occurred in a sequence of cycles which conformed to periodic upward swings in average annual rates of growth in real per capita national product. In terms of a reversal or slowing-down of urbanization, Berry argues that the 1970s and 1980s have not been so unique. Instead, these decades represent only one "segment of a longer-term rhythmic sequence" in which the explanations of trends during these periods are found in the dynamics of this longer wave of changes (pp. 250-251).

3.2 Relative Importance of Independent Explanatory Factors

Numerous variables have been used in empirical investigations of population deconcentration. This section provides a summary of explanatory factors which have frequently been used in multivariate analyses (primarily regression models) of non-metropolitan population change. A large cross-section of individual explanatory factors were examined from a variety of studies in terms of their consistency in signs and relative importance (among other factors). The evaluation process included only those explanatory factors having comparable definitions and those designed to measure similar growth-related concepts. It is important to mention, however, that the author made no attempt to compensate for different methodologies, approaches or statistical assumptions applied in each study.

The main objective, on the contrary, was to discretionally

evaluate the individual performances of the different explanatory factors. A total of 12 categories of variables reflecting different growth-inducing processes are assessed : (1) Regional Location; (2) Metropolitan and Urban Adjacency; (3) Industrial base; (4) Employment Growth; (5) Labour Market Changes; (6) Unemployment and Wages; (7) Housing Tenure, Costs, and Quality; (8) Car Ownership and Commuting; (9) Amenity and Recreation; (10) Population Size and Density; (11) Government Policy; and (12) Transportation.

1. Regional Location

The regional location of an area has an important association with population change. Most studies have used "formal" regions to control for variations in population growth which result from differences among larger relatively homogenous regions. Conventionally, formal regions have been delineated using a variety of criteria which are associated in some way to population change or development. Typical criteria which have been used include physical or topographical features, principal economic activities, average incomes, unemployment levels, political allegiance, stages of development, or any combination of the preceding criteria. Most studies have used pre-defined formal regions which more or less highlight differences in many of these criteria. Examples of these regions include economic planning regions, local development areas, administrative zones, census regions, etc. (Glasson, 1978, 35-57).

In multivariate models, formal regions have been defined through the use of dummy regional location variables (1 or 0). As

individual explanatory variables in multiple regression, they have performed fairly well in terms of their association with population change and contribution to the overall explanation in regression models. Beale (1977), for example, devised seven county-based regions to control for regional differences in population change in the United States. He observed that the regions were influential in terms of their overall contribution (i.e., R^2) to the regression models. In addition, the author observed that the importance of regional location had actually increased in the 1970's as compared to the 1960's to show the significance of broader regional shifts in population from the north-east to the south and west. These findings were supported by a similar study in the U.S. which employed regional dummy variables (McCarthy and Morrison, 1977).

However, it appears that regional variables may take on a greater importance in those studies where a relatively small number of socio-economic indicators and causal processes are specified. Much of the explanatory power of different variables are picked up by the regional dimensions. In fact, Congdon and Shepherd's (1986) study has shown that the importance of regional location variables (at least as individual parameters) diminishes with the addition of socio-economic variables. As well, there is a slight drop in the importance of regional variables when they are aggregated reflecting the loss of information on regional differences.

The most important application of the regional location variable involves the development of disaggregated regional regression models. This form of disaggregation has been effective

in showing how selected variables have different degrees of association with population change across the regions. A major advantage of this approach is that many of the criteria for which the regions are supposed to identify (for example, economic backwardness, high unemployment, out-migration, or amenity) are controlled, while more emphasis is placed on the observed patterns and associations within these regional contexts. This provides a good basis to compare the relative importance of different causal and spatial processes which may be specific or less evident in some regions. In addition, it allows a general assessment of the degree to which the regional models deviate from the aggregate model in terms of the signs and strengths of individual parameters. The reader is again referred to the work of Congdon and Shepherd (1986), Beale (1977), and McCarthy and Morrison (1977) for examples of regional disaggregated regression models.

2. Metropolitan and Urban Adjacency

The adjacency variable has been used to measure the influence of metropolitan or urban spill-over. It is usually represented by a dummy variable to identify non-metropolitan areas which are spatially contiguous to metropolitan areas or daily urban systems. A positive association between the adjacency variable and population change is interpreted as growth which is likely to be related to metropolitan-origin factors. Growth in non-adjacent areas, by definition, is therefore associated with non-metropolitan factors of change, and represents a form of "clean break" from

urbanization or agglomeration tendencies. The relative importance of metropolitan adjacency status has been investigated over different time periods and within different regional contexts.

In the studies reviewed, the adjacency variable appeared to be consistent in terms of representing metropolitan spill-over effects. When adjacency status was investigated within different regional contexts, both the sign and significance of the variable varied depending the general characteristics of the region. For example, Beale (1977) observed a relatively strong negative association between adjacency status and population growth within older industrialized regions, while fairly significant positive relationships were found in the high amenity southern regions (p. 121). In comparison, the adjacency variable when examined over time was more consistent at least in terms of its positive association with population growth or net migration implying a general stability of the influences of metropolitan-origin factors of change.

The relative importance in adjacency status shows variability over time. For example, a detailed account of the 1970's by Richter (1977) showed that the importance of adjacency status had declined in the mid-1970's and re-emerged in the late 1970's. These findings coincide with the rise in migration to more remote areas during the early 1970's followed by a reversal back to metropolitan and adjacent areas in the late 1970's. Richter's findings are consistent with Cook's (1987) analysis of the early 1980's which shows adjacency status to be once again one of the most important

causal variables. It is important to mention that the adjacency variable was more significant when a limited number of variables was used or a particular bias towards certain causal processes was hypothesized (see, Cook (1987)). In contrast, the adjacency variable becomes only moderately important, although usually significant, when a variety of other causal factors are considered.

3. Industrial Base

The importance of traditional economic base variables has declined. During the 1960's, economic base variables representing traditional growth-inducing industries (manufacturing and government) were positively associated with population growth. More recent studies which have focused on the 1970's provide empirical evidence showing that these variables have become insignificant, especially in terms of their association with population growth in small non-metropolitan areas. However, some variables describing areas having high levels of employment in declining resource sectors such as agriculture and mining have maintained relatively strong and negative associations with population change. McCarthy and Morrison (1977) link these trends to a weakening in the association between migration and an area's industrial structure as a determinant in migration and to the emergence of non-economic or non-employment factors in migration (i.e., life-styles, residential migration (p. 139).

4. Employment Growth

Some authors argue that recent patterns of population growth are associated with the changing geography of job opportunities. In a study of small urban areas in England, Congdon and Shepherd (1986) have investigated the importance of rural shifts in overall job opportunities, especially in manufacturing and financial services employment. The authors devise dummy indicators of growth in manufacturing and financial services, and an overall measure of change in job opportunities. All three variables showed a positive association with population growth, especially in those areas close to major urban and amenity regions.

Both the sign and relative importance of these variables varied across the different area types and regions used in the analysis indicating the locational selectivity of these industries. For instance, in the aggregated models the most important associations were observed between population change and growth in financial services and job opportunities. In the disaggregated models, the three growth indicators were among the most significant variables among the small metropolitan areas, while showing higher levels of variability among the different regions. Congdon and Shepherd's findings are consistent with Simmons (1980) analysis of the association between migration and similar measures of employment growth and job opportunities.

5. Labour Market Changes

The association between a number of labour variables and

population growth has been investigated. Cook (1987) has argued that non-metropolitan population growth reflects broader structural changes in the labour market. Along-side some of the more common independent variables such as commuting, adjacency and retirement migration, the author examines the association between net migration and non-farm self-employment and female labour participation. In order to highlight the "effects" of the two labour variables, the author derived two separate regression models in which one included the two variables while the other omitted them. In the full model, the labour variables showed a positive association with net migration and were the two most significant variables followed by adjacency and commuting variables. In contrast, the second model (omitting the labour variables) showed that the elimination of the labour variables caused a drop in the R^2 (8.9 %), and over-stated the importance of the employment growth variable when increasing job opportunities for women and non-farm self-employment were in fact more important (p. 415).

6. Unemployment and Wages

Unemployment and wages are two variables which conform to traditional economic theories of migration. According to Shaw (1975), it is argued that migrants will move from high unemployment and low wage areas to low unemployment and high wage areas. In addition, one expects high unemployment to contribute more to out-migration while low unemployment has a greater pull on in-migrants. Unemployment levels are therefore expected to be negatively

associated with population change while wage levels are likely to have a positive relationship with population change. In one of the few studies which examined both variables, Cook (1987) verified a negative relationship between net migration and unemployment. However, the hypothesized positive relationship between wages (measured as salary incomes) and net migration turned out to be negative. Although contrary to what was expected, the negative sign appears to be consistent with the findings of Beale (1977). McCarthy and Morrison (1977) (on Beale's findings) have argued that the negative sign is a result of changing migration patterns to areas specialized in recreation and retirement where wages or salaries are relatively low (p. 137). Furthermore, Simmons (1980) has shown that even a rise in relative wages may not be associated with overall population growth since its effects are more significant in reducing out-migration and not important in attracting in-migrants (p. 146).

7. Housing Tenure, Costs and Quality

The association between population growth and selected housing factors has received little attention. Traditional migration theory suggests that the availability of owner-occupied dwellings and relative costs of housing are important in residential migration decisions. A positive association between in-migration and owner-occupied dwellings has therefore been hypothesized to reflect the residential preferences of relatively young and economically well-off households. Likewise, a negative association between in-

migration and housing costs (often measured in terms of dollar values) is anticipated to reflect the desire of metropolitan-origin migrants to search for less expensive housing (Shaw, 1975). No empirical verification of these hypotheses could be found. Congdon and Shepherd (1986), however, have investigated the association between population change and growth in owner-occupancy and municipal renting. Both housing variables are seen as reflecting a general dispersal or spill-over of residential dwellings resulting from greater land availability and lower housing prices in small to medium sized areas. As expected, both variables showed a positive association with population change in nearly all of the areas and regions.

8. Car Ownership and Commuting

Car ownership and commuting data have only recently been examined. It has been hypothesized that non-metropolitan growth may have been the result of an increased use in the automobile for employment and recreational purposes. The lack of good local car ownership or commuting statistics has hindered any reliable tests of these variables. Only two studies were found which investigated the association between population change and car ownership and commuting. Borukhov and Werczberger (1981) employed a step-wise regression analysis to investigate the relationship between net migration and car ownership (measured as a rate per 1,000) for a sample of "new towns" in Israel. The authors found that car ownership was indeed positively associated and statistically

significant when regressed with in, out and net migration rates. As well, it was observed that car ownership was more significant for in-migration rather than out-migration. However, the car ownership when compared to measures of housing conditions or distances from large urban centres accounted for relatively small amount of the overall explanation. A similar positive relationship between population change and car ownership was observed by Congdon and Sheperd's (1986) analysis of population change in small urban centres in England. Higher regression co-efficients for the car ownership variable were observed among small "metropolitan" and small "freestanding" urban areas reflecting the importance of employment commuting in these areas.

The association between commuting and population change has only recently been evaluated. Cook (1987) examined the relative importance of two independent commuting variables in predicting non-metropolitan net migration. The author found that the commuting variable (represented by the percentage of resident county commuters) had a positive but relatively weak and insignificant association with net migration. However, when the commuting variable was combined with an urban adjacency dummy variable to account for the influences of the metropolitan labour-market, the regression co-efficients showed a marked increase in importance and statistical significance. This suggests that commuting, as a source of growth, is likely to be more important in those areas closer to metropolitan boundaries.

Applying a similar measure of commuting to population change,

Congdon and Shepherd (1986) found a positive association between population change and commuting. In contrast to Cook, the authors disaggregated their regression models by different labour market areas and regions. Their disaggregated results showed that the positive association between population change and commuting was significant in all of the labour market regions (including freestanding and rural areas), and in all but one of the larger planning regions. In part, this reflects the extensiveness of car ownership (also supported in their analysis) and the growing divergence between places of living and work.

9. Amenity and Recreation

Various measures of amenity and recreation are viewed to have an important association with population change. The amenity variable is one of the most consistent variables in terms of its positive sign and statistical significance. In one of the more comprehensive studies, Richter (1985) investigated the relationship between several composite measures of amenity and county net migration rates in the U.S. during the 1970's. Out of a total of 12 explanatory variables, six of them measured amenity-related factors. Three of them separately measured the presence of water, recreational development, and mild temperature. The remaining three variables were interaction indices of the three individual amenity variables. The findings verified that amenity factors continued to have fairly strong positive and significant regression coefficients throughout the decade, particularly in those counties with both

mild temperatures and recreational development. McCarthy and Morrison (1977), on the other hand, derived an amenity-related dummy variable based on an upper threshold in the proportion of non-metropolitan county residents employed in entertainment and recreation services. The authors regressed the dummy variable, along-side other common variables, against population change and net migration. Corresponding to Richter's findings, the variable turned out to be one of the most important in terms of its positive association and level of significance.

10. Population Size and Density

Both of these variables have received considerable attention in multivariate analyses of non-metropolitan growth. The greatest contribution of these two variables has been to demonstrate the reversal or slowing-down of urbanization where the smaller and less dense areas now exhibit the fastest rates of growth. Beale (1977) was one of the first to document this transition using multiple regression. In a comparison of U.S. county population growth rates in 1960's and 1970's, the author noticed that both of the variables became statistically significant during the latter decade. The signs of the regression coefficients for the two variables in some of the less developed regions had switched from positive during the 1960's to negative in the 1970's. Another U.S. study by Lichter and Fuguitt (1982) showed a similar reversal in the population density parameter. More recent studies have omitted the population size and density variables because of the interpretational problems

associated with the effects of highly "skewed" distributions of population growth rates.

11. Government Policy

Of all the factors reviewed, the association between government policy and population change has received the least attention. A major issue in applying measures of government policy has been the difficulty to derive a "true" measure of policy impacts which can be easily interpreted in terms of a "cause-effect" relationship. Nevertheless, there have been some applications of measures of government policy. One common measure of government policy has been the employment variable representing the percentage of the labour force in government-related activities (i.e., military, colleges, administration). McCarthy and Morrison (1977), for instance, showed that the association between government employment and population change to be positive, although diminished by historical standards. In addition, the authors examined the relative importance of government transfer payments. Two dummy indicators were used to distinguish between those counties eligible for either income-related and/or unemployment-related assistance. The analysis showed that the increase in migration rates has been greater for government assisted rather than non-assisted areas. Similarly, Congdon and Shepherd (1986) have examined the importance of various dummy indicators of "special" policy status such as new or expanded towns, greenbelt areas, and special development zones. Of these

variables, only the new or expanded town variable proved to be significant showing a fairly strong positive association with population change across all labour market and standard regions. Hall and Hay (1980), on the other hand, have shown that measures of government aid tend to be inconsistent in terms of importance, while sometimes reflecting relationships which are reverse of what was anticipated (p. 208).

12. Transportation

There has been no confirmation to date of any consistent association between accessibility to transportation and population growth. Briggs and Rees (1982) have looked at the impact of major freeways (in terms of their presence or new openings in counties) in the development of non-metropolitan areas in the U.S. An examination of the freeway variable over time, while controlling for other explanatory variables, showed a relatively weak association with net migration. The transportation variable's ability to explain net migration declined over time in a similar fashion as the traditional economic base variables. In terms of the variable's relative importance, it contributed very little to the amount of total variation explained in net migration rates.

Congdon and Shepherd's (1986), in comparison, used a dummy variable measuring the interaction between closeness to major motorways (1 if within 5 miles of a motorway; 0 otherwise) and non-metropolitan status. Higher population growth rates are associated with areas outside of the 5 mile influence of motorways. The sign

and significance of the variable's parameters varied across the different standard regions, ranging from negative values in the less northern and peripheral regions to relatively large positive values in the more developed core regions around London (p. 1313). In a similar study, Hodgson (1972) examined the association between population change and the distance to major transportation corridors. He found that the distance to major corridors made an insignificant contribution to the explanation of population change, partially because of its collinearity with other measures of accessibility and commuting.

Chapter 3 provided an evaluation of a wide variety of possible explanations of population deconcentration. It can be concluded that each one of the explanations (keeping the obvious limitations in mind) have some merit. In fact, many of these explanations as shown in the multivariate models did indeed conform to some of the theory. However, these studies reflected different time periods, study areas, and approaches so that it is difficult to come to a conclusive answer about the actual relationship between observed population changes and the different causal factors. The following chapter as a result will provide a case study to examine for any parallels between observed patterns of population change and many of these different causal processes and factors.

4. IDENTIFICATION OF DEMOGRAPHIC PATTERNS AND CAUSAL FACTORS: A CASE STUDY OF ONTARIO

This chapter provides an overview of demographic and economic trends in Ontario. The first section discusses the definitions and criteria used to develop a geographical classification of individual areas. The geographical classification has two important uses. First, it allows a differentiation between different spatial processes (i.e., urban spill-over) while still recognizing the inter-dependent structure of the larger settlement system (i.e., location and metropolitan influence). Secondly, the classification, when linked with other variables, provides a good description of the underlying causal processes and factors affecting individual areas. The two following sections provide a detailed account of demographic trends and probable causal processes and factors associated population change.

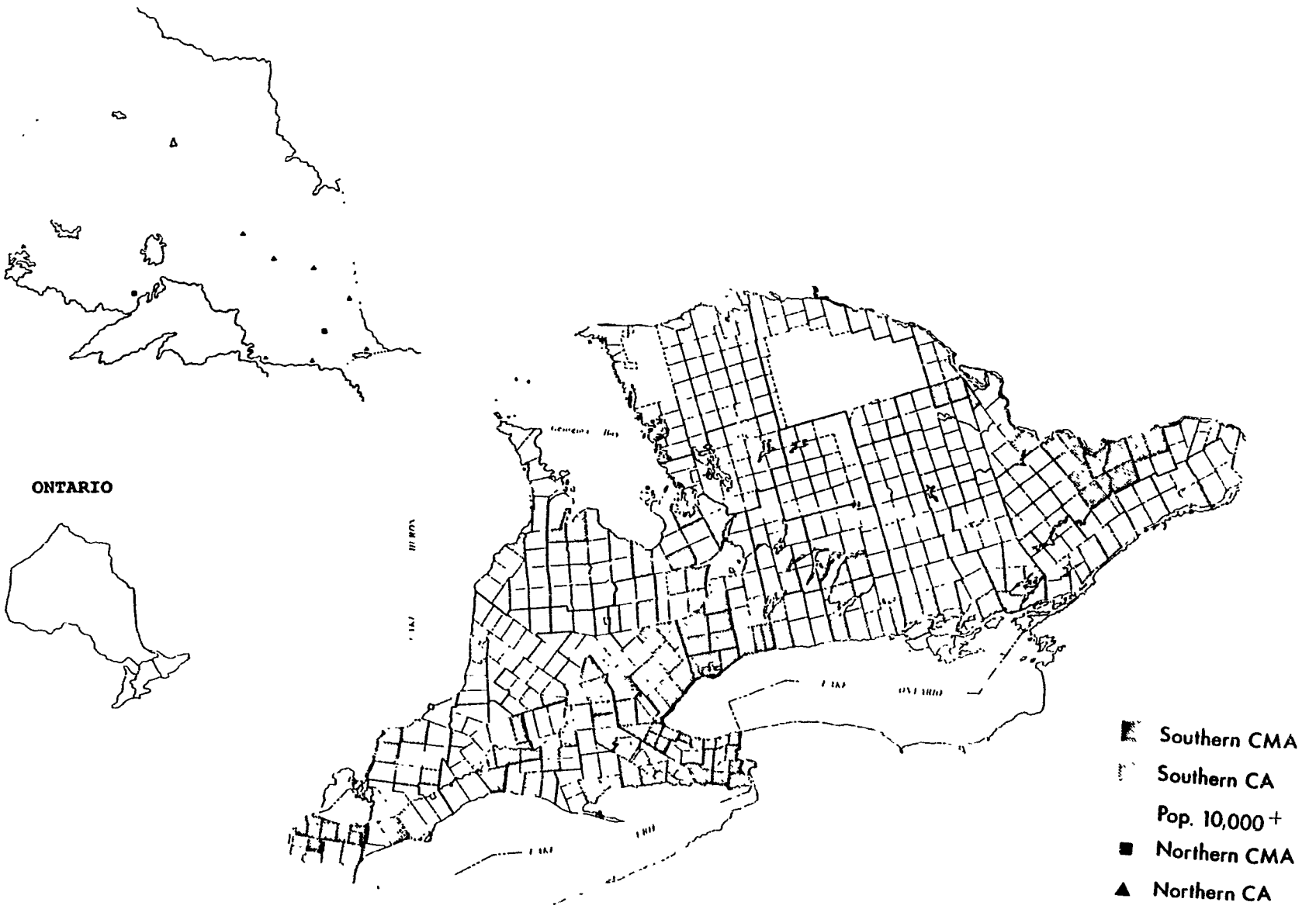
4.1 Geographical Classification of Individual Areas

4.1.1. Definitions and Criteria

The primary unit of analysis in this paper was the individual municipality or community. A total of 583 incorporated non-reserve census sub-divisions (CSD's) and census consolidated sub-divisions (CCSD's) were examined. The former group (CSD's) refers to individual municipalities identified by Statistics Canada and the Ministry of Municipal Affairs, while the latter group of CCSD's applies to an agglomeration of two or more larger individual municipalities situated close to each other. Since the majority of

data were available at the census sub-division or municipal level, it was necessary to aggregate many of the original census sub-divisions (313) in accordance with the larger census consolidated sub-divisions (as defined by Statistics Canada). This reduced the number of areas from the 896 to 583. An advantage of using both CSD's and CCSD's is that they provide a more accurate representation of individual communities, while also accounting for the high level of spatial dependence which had likely existed between many of these areas prior to aggregation. It should be noted that some of the original variables such as averages (i.e., incomes, dwelling values) and population rankings were not aggregated. Instead, the figures for the largest municipality were taken to be representative of the larger consolidated sub-division. From this point, both the CSD's and CCSD's will be referred to as individual areas or municipalities.

A geographical classification of the municipalities was later done to recognize the importance of a range of causal processes and factors working at the different spatial and hierarchical levels. First, the areas were grouped into one of four economic or planning regions (i.e., central, south-west, east, and north) (Map 4.1). These regions were devised in 1974 by Statistics Canada and the Ontario provincial government for statistical and planning purposes. The economic regions despite being quite extensive in terms of the coverage area have proven to be useful. On the one hand, they highlight some of the broader historical and geographical factors as well as the traditional core-periphery



MAP 4.1 DISTRIBUTION OF CENSUS METROPOLITAN AND AGGLOMERATION AREAS

contrasts (i.e., incomes, unemployment, economic base, etc.) which are perceived to be important factors associated with regional variations in population change. On the other hand, while controlling for some of the differences between the regions, it is possible to use the regions to compare intra-regional patterns of population change and the different causal factors and processes underlying these demographic changes. For instance, it is likely that the decentralization of manufacturing may be more important in population deconcentration in the manufacturing-oriented central region, whereas other economic or non-economic factors may take on greater importance in the predominantly resource or agriculture regions (for example, south-western or northern Ontario). For a more complete discussion of these regional differences and their implications, the reader may want to refer to the following authors (Ontario (1970, 1976, 1976, 1978); Gentilcore (1972); Spelt (1972); and Yeates (1975)).

Metropolitan and Urban Areas

In order to recognize some of the more localized causal processes, the municipalities were differentiated with respect to selected functional or locational criteria. First, the areas were classified as either belonging to a Census Metropolitan Area (CMA) or Census Agglomeration Area (CA). In Ontario, there are 10 CMA's and 42 CA's based on 1986 definitions (Map 4.1). Both CMA's and CA's are broad labour market areas delineated by Statistics Canada to estimate the level of interdependence between large urban core

areas and their employment hinterland. The actual boundaries of CMA's and CA's are based on specific daily employment commuting thresholds between the core areas and surrounding hinterland areas.

There are two main differences between CMA's and CA's. First, CMA's have an urbanized core of at least 100,000 population while CA's have minimum 10,000 population. Secondly, CMA's on average have a much larger daily commuting hinterland than CA's. Only those areas located within the most recent 1986 CMA or CA boundaries were classified into CMA or CA classifications. It should be added that the CMA's, for preliminary analyses, were differentiated into CMA cores reflecting the largest CMA city, and the remaining or suburban CMA areas (i.e., rest of CMA). In the case of the Toronto CMA, the core area was defined as the municipality of Toronto (including the City of Toronto, Etobicoke, North York, York and East York) to eliminate the effects of earlier urbanization and suburbanization processes.

CMA and CA classifications have two important purposes. One is that the classifications allow a differentiation between growth trends in areas which may be mainly related to local decentralization trends from the core areas of the CMA's and to a lesser extent the CA's. It is expected that much of the growth achieved in the smaller outer areas within the outer boundaries of CMA's is mainly attributed to the decentralization of people and employment from the larger urban cores. Secondly, CMA and CA classifications allow an assessment of growth trends across the different levels and functions of the urban system. In other words,

it is expected that certain CMA's and CA's (for example, Toronto and Ottawa) will have particular features such as accessibility to highways, employment, or services, among other factors, which will be conducive to in-flows of migration and overall rates of population growth. It is these trends which are likely to be very important in encouraging growth processes to spill-over to smaller urban centres and towns which are close or beyond the influence of these larger metropolitan centres.

Non-metropolitan and Non-urban Areas

Those CSD's and CCSD's not situated within the boundaries of CMA's or CA's were classified as non-metropolitan or non-urban. This classification was made up of three additional categories to reflect different spatial processes and the relative distance from metropolitan and urban areas. First, some areas were labelled as "non-metropolitan adjacent" if they were spatially contiguous to either a CMA and CA, and if the individual area is within a 50 km. radius of a CMA core. The latter criterion refers to the 50 km radius reflects the approximate "maximum" distance of daily commuters to travel to work (Dahms, 1988). This variable accounts for any growth spill-over processes which may have crossed into the smaller areas within proximity to the CMA's and CA's. As well, it compensates for the fact that the actual boundaries of some rapidly growing CMA's are likely to be under-bound. It should also be noted that several CA areas were labelled as adjacent since they are spatially contiguous to CMA's (i.e., Leamington to Windsor CMA and

Tillsonburg to London CMA in South-western Ontario, Guelph to Kitchener-Waterloo and Brantford to Hamilton CMA in Central Ontario).

The second non-metropolitan classification included those areas not adjacent but within a 50 to 100 kilometre radius of CMA cores. This classification is intended to be a proxy measure of the broader influence of the extended urban field. The standard 100 km. radius is used to reflect the outward expansion of extensive metropolitan transportation and communication systems, and the changing spatial patterns of employment opportunities, residential choices, and lifestyle changes (Bourne and Simmons, 1982).

A distance radius was not applied to CA's for three main reasons. First, many of the CA's do not have the physical infrastructure or range of economic activities to maintain a high level of interaction with many of surrounding areas. Secondly, the relatively small size and employment base of CA cores implies proportionally smaller daily commuting thresholds for many of the CA's. Thirdly, there are many cases where the CA's fall within the 100 km. radius of CMA's. In this respect, CA areas are viewed as independent agglomerations which are likely to be one of the major recipients of economic growth spill-overs from CMA's since, according to urban systems theory, spill-over growth in the form of information, technology, and economic activity should first filter down into the lower levels of the urban hierarchy and then beyond (Lloyd and Dicken, 1977, 421).

This leads to the final non-metropolitan classification which

refers to those areas which are beyond 100 kilometres of metropolitan core areas. This classification is important for two reasons. First, it identifies mainly those areas which are at the lower levels of the settlement hierarchy and beyond the influence of metropolitan regions. As a result, these areas are likely to have relatively low levels of interaction with metropolitan regions, and are not expected to benefit from the decentralization of the metropolitan-origin causal processes described above. It should be noted once more that there are cases where some CA's are beyond the influence of metropolitan regions, and therefore their growth status, following once more the logic of urban systems theory, is important in examining population deconcentration among peripheral areas. Secondly, the classification includes those areas which are likely to be typical of the peripheral areas portrayed in traditional core-periphery models of development. For example, it is expected that many of these areas are characterized by relatively low incomes, aging housing stocks, high out-migration of the young and educated, poor labour mix, and so on. Such characteristics, along-side other factors, should be important in highlighting why certain areas have grown or declined.

4.1.2 General Characteristics

Distribution of Areas

Table 4.1 shows the distribution of areas when cross-tabulated by population size. About three quarters of the areas (442 of 579) in Ontario's settlement system are outside of metropolitan and

TABLE 4.1 NUMBER OF AREAS BY POPULATION SIZE AND AREA CLASSIFICATIONS

Area Classification	Population Size, 1981						
	LT 2,500	2,500-4,999	5,000-9,999	10,000-24,999	25,000-49,999	Over 50,000	Total
CMA Core Area					1 (7.1)	14 (93.3)	15
Rest of Metropolitan Area (CMA)	5 (8.2)	5 (8.2)	10 (10.4)	21 (34.4)	10 (16.4)	10 (16.4)	61
Census Agglomeration (CA)	10 (16.1)	13 (21.0)	12 (19.4)	14 (22.6)	8 (12.9)	5 (8.1)	62
Adjacent to CMA or CA	40 (31.7)	34 (27.0)	28 (22.2)	15 (11.9)	7 (5.6)	2 (1.6)	126
Within 100 km. radius of a CMA's Core	49 (40.8)	36 (30.0)	28 (23.3)	7 (5.8)			120
Beyond 100 km. radius of a CMA's Core	149 (76.0)	26 (13.0)	14 (7.1)	7 (3.6)			196
	253	114	92	64	26	31	580

Chi-square : 464.97 (.0000)

( ) parentheses show percentages of row totals

Note : The total population figure of 580 and not 583 was due to missing population data for three areas.

urban boundaries. The majority of these areas are relatively small in population (typically under 10,000). However, those areas beyond 100 kms. of CMA's tend to be smaller with populations less than 2,500 (76 %). Those areas within 100 kms. of CMA's, in contrast, have a slightly higher proportion of areas in the larger size groups (2,500 to 10,000). The significant chi-square statistic is likely to imply that an area relative metropolitan location is probably a good predictor of its population size, and vice versa.

Table 4.2 shows the distribution of areas by classification and economic regions. Central Ontario is clearly the most highly urbanized with an overwhelmingly large number of its areas in CMA's (31) and CA's (20). The extensiveness of urbanization in the central region is also evident by the relatively large number of adjacent areas. The south-western region, in contrast, has a higher proportion of its areas either adjacent (27.6 %) or within 100 kms. (37.0 %) of CMA's. Eastern Ontario, on the other hand, has roughly half of the areas either within 50 to 100 kms. (28.3 %) or beyond 100 kms. (30.3 %) of CMA's. The northern region is perhaps the most different with nearly 70 per cent of the areas beyond the influence of CMA cores. The table's significant chi-square may indicate that an area's location in one of the four regions (compounded with implicit historical factors) influences its locational status relative to metropolitan areas.

TABLE 4.2 NUMBER OF AREAS BY ONTARIO ECONOMIC REGIONS AND AREA CLASSIFICATIONS

Area Classification	Economic Regions				
	Central	South-West	East	North	Total
CMA Core Area	10 (6.3)	2 (1.6)	1 (0.7)	2 (1.3)	15
Rest of Metropolitan Area (CMA)	31 (19.6)	13 (10.2)	9 (6.3)	8 (5.1)	61
Census Agglomeration (CA)	20 (12.7)	10 (7.9)	20 (14.1)	12 (7.7)	62
Adjacent to CMA or CA	46 (29.1)	35 (27.6)	28 (19.7)	17 (10.9)	126
Within 100 km. radius of a CMA's Core	30 (18.9)	47 (37.0)	41 (28.9)	3 (1.9)	121
Beyond 100 km. radius of a CMA's Core	21 (13.3)	21 (16.5)	43 (30.3)	114 (73.1)	199
	158	127	142	156	583

Chi-square : 201.49 (.0000)

( ) parentheses show percentages of column totals

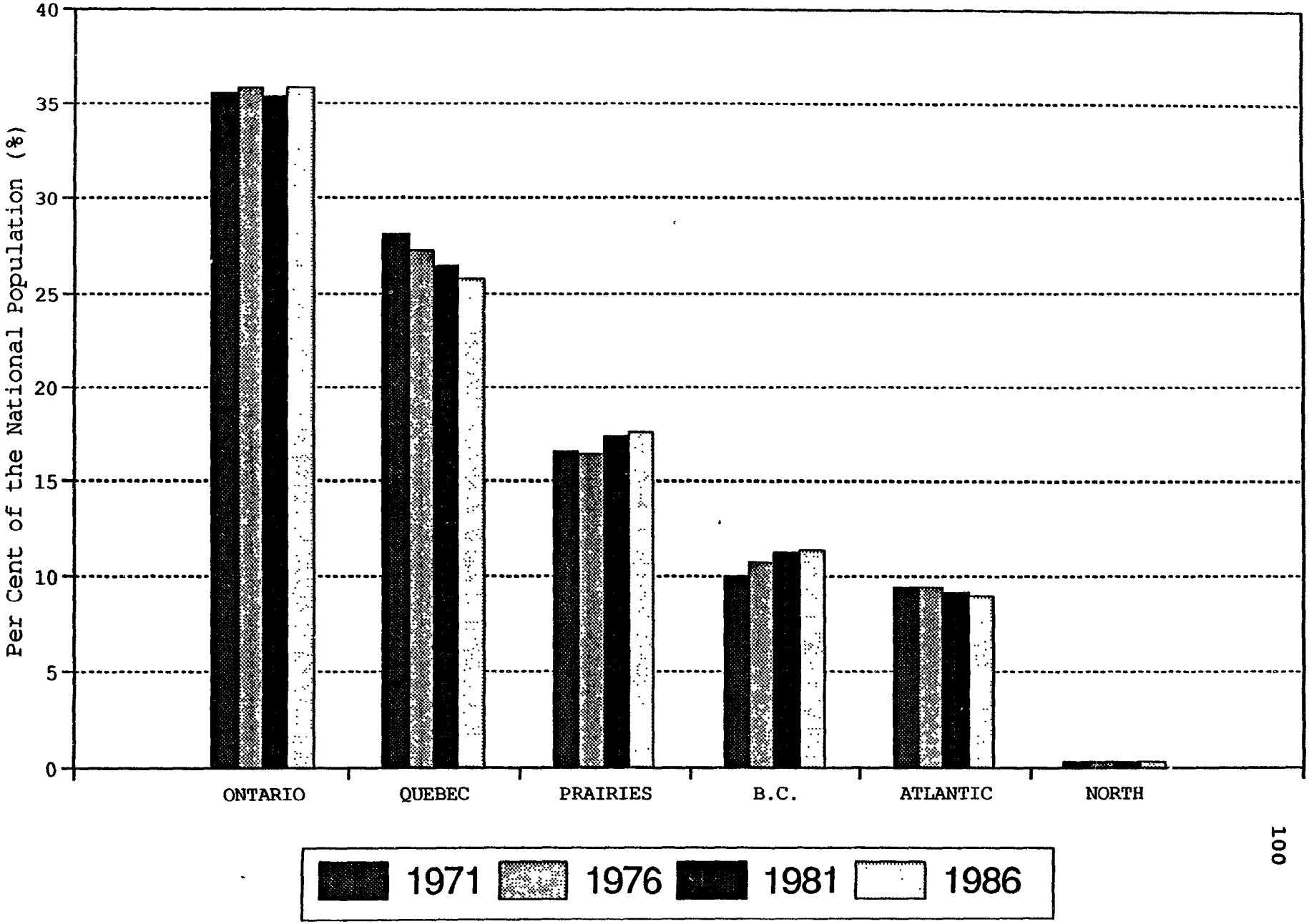
4.2 Population Trends in the 1970's and 1980's

This section provides a comparative summary of regional population change in the 1970's and 1980's. The main objective of this section is to identify any discernable patterns of population growth and decline. A particular emphasis is placed on investigating regional variations in population change and the manner in which these patterns have varied over the two decades. The following analyses describe population changes at the regional and sub-regional levels as well as across different time periods.

4.2.1 Inter-provincial Population Change

Figure 4.1 shows the distribution and relative change in the Ontario population relative to the rest of Canada. Ontario accounts for the highest proportion of the country's total population. Throughout the 1970's and 1980's, Ontario has managed to maintain its relative share of Canada's total population at about 35 per cent. This is considered significant in light of the western shift in population from the heartland (Ontario and Quebec) to the prairies and B.C. which had occurred during the late 1970's. Quebec, on the other hand, has not maintained any stability in its percentage of the population. It experienced a decline its share of the population falling from 27.9 per cent in 1971 to 25.7 in 1986. Similar declines were observed in the Atlantic provinces and Northern Territories.

FIGURE 4.1 DISTRIBUTION OF POPULATION BY PROVINCE AND REGION, 1971-1986



In terms of absolute growth, it can be seen that Ontario has re-emerged as one of the dominant growth provinces in the 1980's. Figure 4.1 shows that the Ontario's total population grew by nearly 1.5 million people between 1971 and 1986. Much of its growth can be attributed to relatively large absolute growth during the first half of the 1970's and to a resurgence of growth in the 1980's. It is important to mention that none of the other provinces or regions have been able to achieve comparable levels of growth in the 1980's (488,408 compared to 124,740 in B.C.). Even the modest growth achieved by the prairie region and B.C. is relatively low when compared to previous inter-census years. The overall low level of growth in Quebec, especially in the early 1980's, seems to confirm that it has not been able to recover from earlier decades of growth. The evidence presented so far appears to be consistent with Yeates's (1985) predictions which suggested a convergence of population toward a "new" central Canada heartland which now focuses on the central and south-western parts of Ontario (p. 110). As will be seen, Yeates's prediction appears to be less accurate in the case of the south-western region.

4.2.2 Population Change in Economic Regions

Table 4.3 provides an analysis of population change by the four economic regions between 1971 and 1986. In terms of the population distribution, it is clear that central Ontario is the most populated region containing about 5.5 million people or 62.3 per cent of the province's total population. Its share of the total

TABLE 4.3 POPULATION CHANGE BY ECONOMIC REGION, 1971-1986

Economic Region	Population 1986 (000's)	Absolute Growth			Percent Distribution of Absolute Growth		
		1971-1976	1976-1981	1981-1986	1971-1976	1976-1981	1981-1986
Central	5,597 (63.2%)	402,227	299,030	395,885	73.0	82.1	80.8
South-west	1,274 (14.4%)	67,041	26,862	21,437	12.7	7.4	4.4
East	1,257 (14.2%)	68,858	38,155	85,014	12.5	10.5	17.3
North	722 (8.2%)	12,854	306	-12,238	2.3	0.1	-2.5
ONTARIO[1]	8,850	550,980	364,353	490,098	100.0	100.0	100.0

( ) Parentheses indicate the percentage of the total provincial population

[1] Ontario totals are based on the aggregations of incorporated CSD's (excluding indian settlements and reserves)

Source : Derived from Statistics Canada Population Counts (1971, 1976, 1981, and 1986)

population has increased by about +1.7 per cent from 60.6 per cent in 1971. In contrast, the south-western and eastern regions have approximately the same shares of the total population at about 14 per cent. It is important to note that south-western Ontario's population share has declined by -1.2 per cent since 1971. The eastern region's population, in comparison, has remained stable throughout the 1971-1986 period. Finally, northern Ontario representing Ontario's so-called hinterland contains only 8 per cent of the total population. The northern region's population share has fallen by -1.5 per cent from 9.7 in 1971.

As observed at the inter-provincial level, there appear to be several distinct patterns in regional population change. The period between 1971 and 1976 represented a period of relatively high growth, both in terms of the province and the regions. Most evident was the absolute and relative growth in the central region which accounted for nearly three quarters of the province's total growth. The 1976-81 period marked a different pattern of relatively low provincial and regional growth. This can be partially explained by the western shift in population to the prairie regions and B.C. as mentioned earlier. The resource-oriented regions, south-western and northern Ontario, may have been most affected by this western-shift as both showed relatively low levels of absolute and relative population growth.

The 1980's, in comparison, represent a period of resurgence in Ontario. In terms of absolute growth, central Ontario has nearly returned to its early 1970's growth levels of 400,000. However, its

overall share of the 1980's growth has slightly dropped from 82.1 per cent during the 1976-81 period to 80.8 per cent in the 1980's. One reason for this has been the emergence of eastern Ontario as a major growth region. During the 1980's, the eastern region accounted for a relatively high (17.3 %) of the province's total growth, nearly doubling its contribution compared to the late 1970's. The south-western and northern regions, on the other hand, have not been able to recover from the 1970's declines in population. South-western Ontario continued to show a decline both in terms of absolute and relative growth, while the northern region shows a relatively large absolute loss in population during the 1980's.

4.2.3 Population Change in Area Classifications

Table 4.4 shows absolute and relative population change in the different area classifications. With respect to the population distributions, the highest shares of the total population are accounted by the CMA cores (35.4 %) and suburban (31.7%) components. The percentage of total population in CMA cores, however, has dropped by about -16.5 from 51.9 % in 1971. This was matched by a rise in the percentage of people in the suburbs of CMA's (+7.7 from 24.0 %). This provides some indication of trends consistent with rapid suburbanization. The CA and adjacent areas, in contrast, represent about 11.0 per cent of the total population. These area types have also had noticeable upward shifts in the share of the total population since 1971 (CA's share went up by

TABLE 4.4 POPULATION CHANGE BY AREA CLASSIFICATIONS, 1971-1986

Area Classification	Population 1986 (000's)	Absolute Growth			Percent Distribution of Absolute Growth		
		1971-1976	1976-1981	1981-1986	1971-1976	1976-1981	1981-1986
CMA Cores	3,137 (35.4%)	36,836	-39,435	45,997	6.7	-10.8	9.4
Rest of Metropolitan Area (CMA)	2,808 (31.7%)	318,465	323,085	368,346	57.8	88.7	75.2
Census Agglomeration (CA)	975 (11.0%)	47,278	20,062	20,730	8.5	5.5	4.2
Adjacent to CMA or CA	997 (11.3%)	85,364	37,005	33,987	15.5	10.1	6.9
Within 100 km. radius of CMA Core	485 (5.5%)	31,107	10,679	17,355	5.6	2.9	3.5
Beyond 100 km. radius of CMA Core	448 (5.1%)	31,930	12,957	3,683	5.8	3.6	0.8
ONTARIO[1]	8,850	550,980	364,353	490,098	100.0	100.0	100.0

( ) Parentheses indicate the percentage of the total provincial population

[1] Ontario totals are based on the aggregations of incorporated CSD's (excluding indian settlements and reserves)

Source : Derived from Statistics Canada Population Counts (1971, 1976, 1981, and 1986)

+7.2 % from 3.8 % and adjacent share rose by +1.96 from 9.3 %). The lowest shares of the total population are in those areas within and beyond 100 kms. of metropolitan CMA cores (5.5 and 5.0 per cent respectively). Both of these areas have shown virtually no change in their shares of the total population compared to 1971.

As in the previous tables, population change during the early 1970's was highest across all of the area classifications. Suburban parts CMA's showed the most consistent absolute and relative growth throughout the 1970's, especially in the latter half. In the 1980's, the percentage of absolute growth by rest of CMA areas has dropped since the late 1970's peak. The slowing down of suburban growth may be linked to the remarkable resurgence occurring in CMA cores. In the 1980's, CMA cores following an absolute and relative decline in the late 1970's have once again grown with absolute figures exceeding that of the first and second half of the 1970's (45,999 and 36,836), and total growth also surpassing that of the 1970's.

The notions of metropolitan spill-over or regional concentration appear to be evident in the table. In particular, it has been those areas within 100 km. of CMA cores which have shown both absolute and relative gains in population during the 1980's (17,355 in the 1981-86 period compared to 10,679 in the late 1970's). This may imply a regional concentration as more people are moving toward the major regional growth centres from other parts of province and from within the metropolitan region. There has been a large absolute and relative decline in population growth in areas

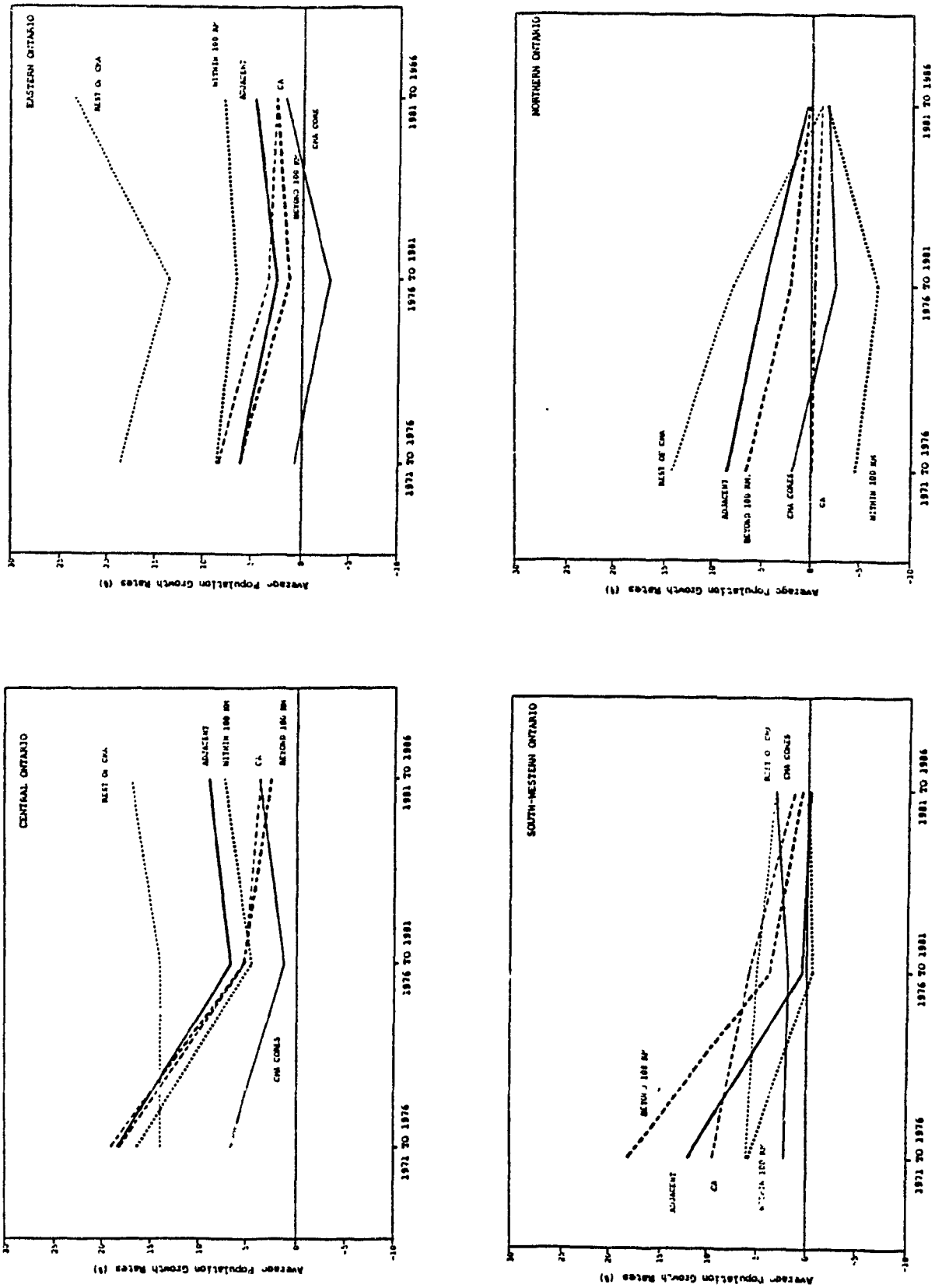
beyond 100 kms. of CMA cores.

4.2.4 Relative Shifts in Population Change

Figure 4.2 shows a regional breakdown of relative shifts in average population growth rates over the 1971-76, 1976-81 and 1981-86 periods. The urbanization and metropolitan spill-over patterns noticed at the regional level appear to be evident in central and eastern Ontario. In both regions, population growth rates on average are highest among the suburban parts of CMA's (REST OF CMA). Also common in both regions are relatively high growth rates among areas adjacent to CMA's or CA's and those areas situated within 100 km of CMA cores. Each of these area types and CMA cores to a much lesser extent have showed either relative stability over the years (eastern adjacent and within 100 km. areas) or clear upward shifts in the average growth rates into the 1980's (REST OF CMA's, adjacent and within 100 km. areas in the central region). CA's and areas beyond metropolitan influence, on the other hand, have not been able to recover from fairly high levels of growth in the early 1970's. In both regions, CA's and areas beyond metropolitan influence have showed downward shifts in average growth rates into 1980's. It should be noted that both of the regions have experienced a resurgence in the CMA core areas.

The patterns of population growth observed in the southern and northern region are different. Such patterns appear to be consistent with the overall declines in both regions observed earlier. There appears to be a vivid picture of downward shifts in

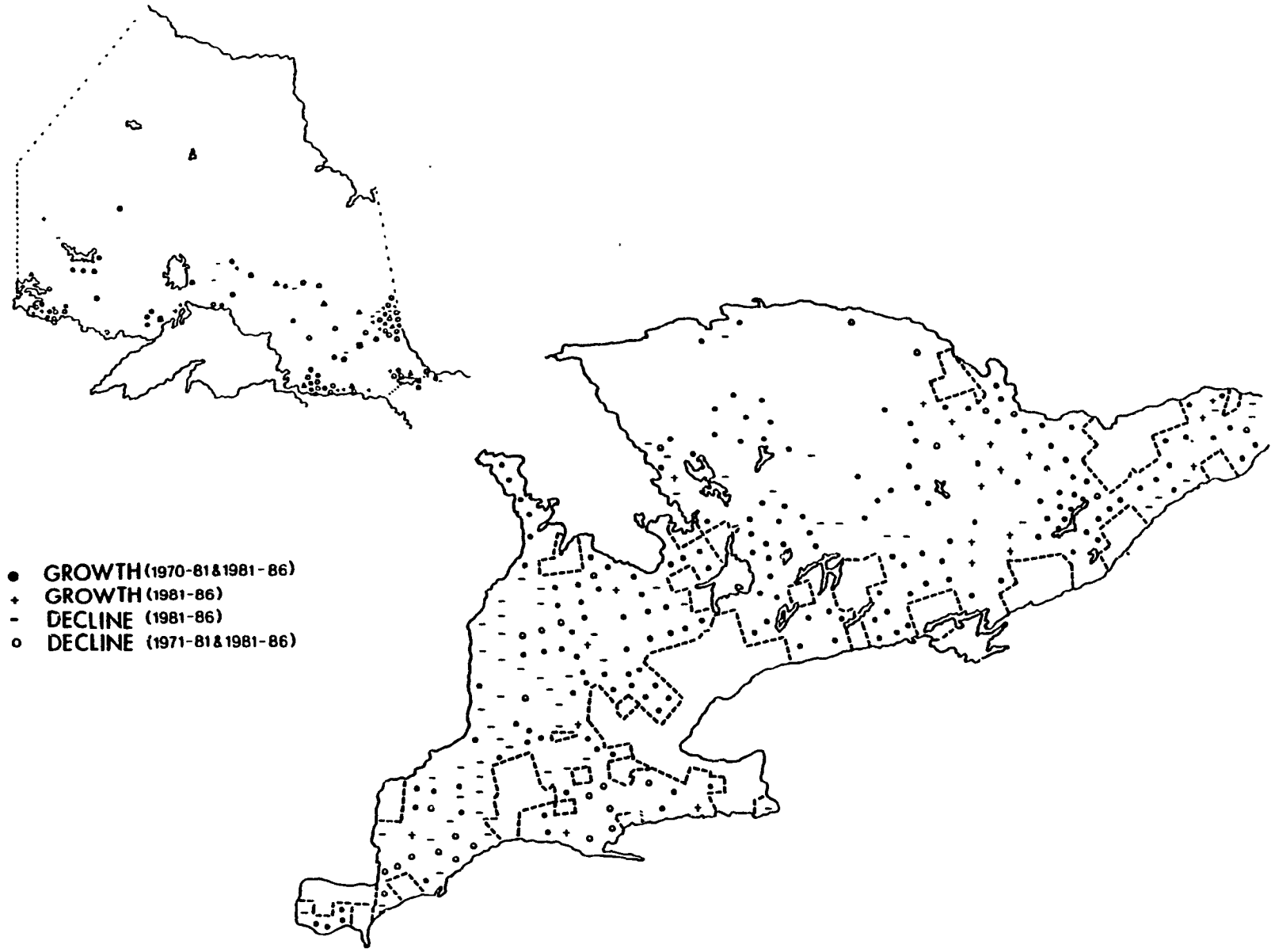
FIGURE 4.2 RELATIVE SHIFTS IN AVERAGE GROWTH RATES, 1971-1986



average growth rates in nearly all of area types. However, there is some stability in the REST OF CMA areas in south-western Ontario (mainly London's growth off-set by decline in Windsor) as evident by the constant levels in average growth rates. The only sign of resurgence is among the CMA cores (mostly in London) which showed a slight upward shift into the 1980's. In comparison, the northern region shows a widespread decline or stagnation in all of the areas. Note that all of the classes have converged at about the zero growth rates in the 1980's. There has been an upward shift in northern CMA cores (Sudbury and Thunder Bay). However, the average growth rates continue to be negative.

4.2.5 Spatial Distribution of Growth and Decline

The pattern of absolute growth and decline is shown in Map 4.2. Each area was labelled according to its growth status in the 1970-81 and 1981-86 periods. There are several striking clusters of continuous growth areas (growth in the 1970's and 1980's). Several clusters of continuous growth areas can be seen within 100 kms. of the Toronto CMA, especially in the high amenity areas east of Lake Simcoe and just north of Peterborough. This provides some indication of the probable demographic spill-over from the larger urban centres. There is a similar cluster of high amenity areas beyond the influence of Toronto in the Muskoka region just east of Georgian Bay (possibly reflecting retirement migration). The eastern region shows comparable clusters of continuous growth areas in a stretch of amenity areas around Rideau Lake and along Rideau



MAP 4.2 PATTERNS OF ABSOLUTE POPULATION GROWTH AND DECLINE IN THE 1970'S AND 1980'S

River within the influence of Ottawa and several urban CA's. Much smaller clusters of continuous growth could be seen in the south-west (for example, at the most northern tip and just south of Owen Sound and north of Kitchener-Waterloo). Some clusters can also be seen in several northern adjacent areas around Thunder Bay and Sault Ste. Marie, and in selected areas in the north-west. Again, this may be associated with spill-over from the respective urban areas combined with special local attractions offered by these areas (i.e., land, housing, amenity). The number of growth centres in the south-west and north is surely small when compared to the central and eastern regions.

The patterns of new growth in the 1980's is not as striking. In general, there are no widespread groupings of recent growth areas. However, there appears to be a stretch of emerging growth areas in the amenity regions in the Pembroke-Ottawa-Kingston triangle. The important feature of this cluster is that is surrounded by predominantly continuous growth areas. This may imply that this new growth may be a result of spill-over growth from the surrounding areas or interdependent structures with these areas. Some minor clusters of new growth were observed among several amenity areas around Rainy River in the north-west) and east of Thunder Bay (coast of Lake Superior). No major clusters of emerging growth areas (aside from a few in the south-west) can be seen.

The distribution of declining areas takes on a rather different spatial pattern. A number of discernable patterns of decline in the south-west are evident. In contrast to the

continuous growth due to urban spill-over in the Toronto and Ottawa fields, there appears to be continuous decline in areas surrounding some of the stagnating urban centres such as Hamilton, Niagara, Haldimand-Norfolk (in the south-west part of the central region) and Windsor, Chatham and London (in the south-western region). A number of continuous declining areas were also observed in the North (especially in Timiskaming on the Quebec border).

What is even more striking about the south-western region is the clear pattern of new declining areas in the 1980's. This pattern is especially clear in areas within 100 kms. of the Windsor and London CMA's (Chatham-Sarnia-London triangle). As well, there is a relatively large stretch of new declining areas bordering Lake Huron (around Bruce and Kincardine) to just outside of Kitchener-Waterloo. This pattern has two implications. First, it suggests the presence of possibly "new" causal factors in the 1980's specific to this region (i.e., resource decline, plant closures, government policy). Secondly, on a more optimistic note, this may represent a mere fluctuation in population change in which many of these areas may rebound back to positive absolute growth by the end of the 1980's.

4.3. Causal Processes and Factors

This section investigates a variety of causal processes and factors (drawing from the review of explanations in Chapter 3) which may be associated with some aspects of the population trends observed in section 4.2. The same area classifications are used to

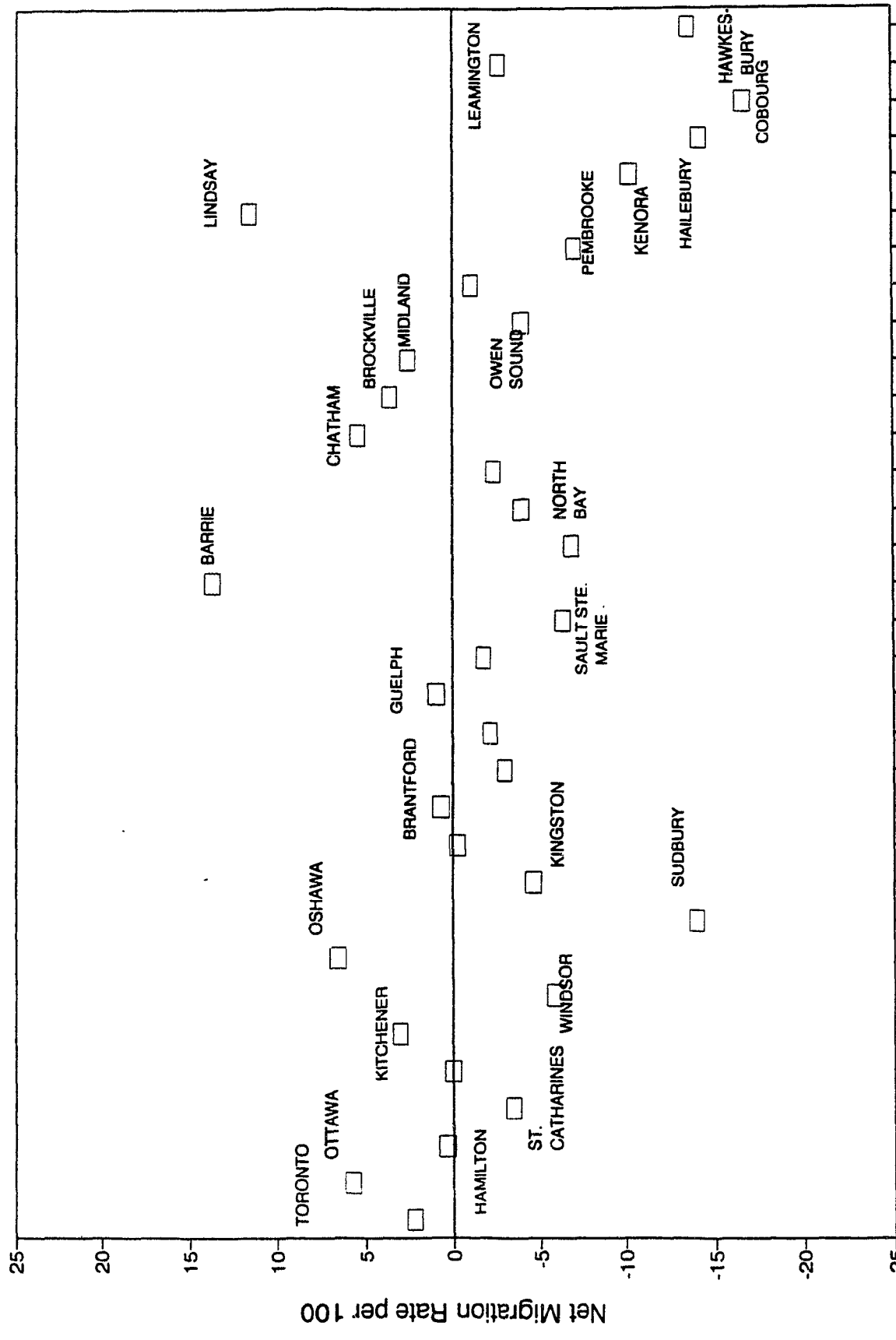
identify any patterns in these causal processes and factors which may parallel the observed population trends. There is no attempt, at least in this section, to establish a direct relationship between the patterns of population change and those of the causal processes. This will be done in the subsequent chapter.

4.3.1 Demographic Processes and Factors

Metropolitan and Urban Migration

Figure 4.3 shows net migration rates for the population rankings of CMA's and CA's. In terms of the ten CMA areas in Ontario, relatively high positive net migration rates were observed in the larger and economically-advanced centres such as Toronto, Oshawa, and Kitchener in central Ontario and Ottawa in eastern Ontario. The highest net migration rates were observed in Barrie and Lindsay. Both areas are within 100 km. of metropolitan Toronto. In the case of Barrie, its growth may be linked to the economic prosperity in this area resulting from its relative closeness and accessibility to Toronto. Lindsay, on the other hand, is situated within 50 km. of Toronto and just west of Peterborough in central Ontario. Its growth is likely to be associated with the growing number of ex-urbanites and retirement migrants moving from the larger Toronto and Peterborough areas. Relatively high net migration rates were observed in several smaller CA's such as Chatham (south-west), Brockville (east), and Midland (northern part of central Ontario). Their growth is likely to be associated with growth in the local and specialized economies.

FIGURE 4.3 NET MIGRATION IN CMA AND AND CA AREAS, 1976-1986



The remaining CMA's and CA's, especially those in south-western and northern Ontario have been either relatively stagnant or have experienced fairly high negative migration rates. A clear pattern of relatively low migration rates were observed in the five smallest CA's. These areas are more or less resource towns located at the peripheries of their respective regions such as Kenora and Haileybury (north), Cobourg (central), Leamington (south-west), and Hawkesbury (east). Relatively low migration rates were are also consistent among larger regional peripheral CMA's or CA's having specializations in resources such as Sudbury, Sault Ste. Marie, North Bay, Timmins, Sarnia, Orillia, and Owen Sound. Similar patterns of relatively low net migration rates were characteristic of the older manufacturing areas (Hamilton, Windsor, Belleville, and Cornwall) and in those areas having less diversified economies such as St. Catharines (central) and London (south-west).

Non-metropolitan and Non-urban Migration

The distribution of the highest and lowest (±10.0) net migration rates show a clear spatial pattern (Map 4.3). With respect to the highest positive migration rates, more than half were represented by adjacent areas ranging in size from 1,864 to 28,067. Typically, these adjacent areas are spatially contiguous to the northern boundary of the Toronto CMA or the north and east boundaries of the Oshawa CMA (in several areas in the amenity-rich Peterborough and Victoria counties). There were patterns of high migration rates, although to a slightly lesser extent, in some

MAP 4.3 HIGHEST AND LOWEST NET MIGRATION RATES IN NON-CMA AND NON-CA AREAS, 1976-81

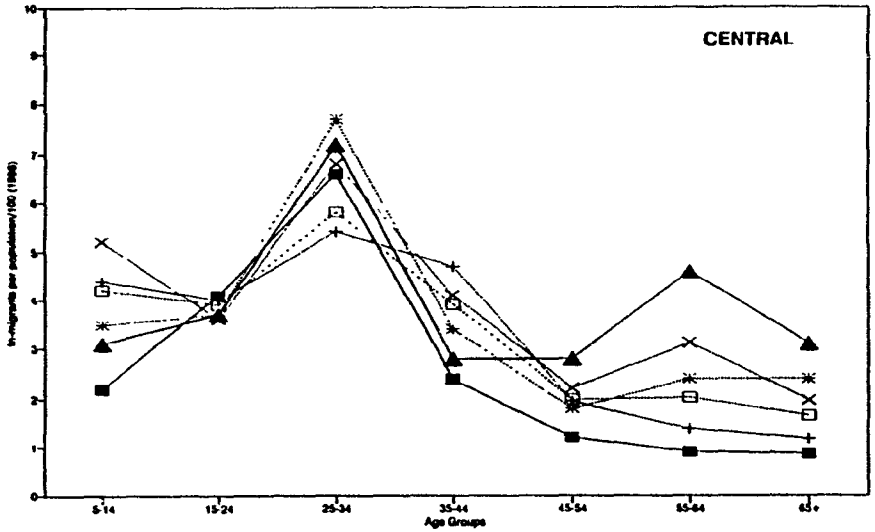
smaller areas ranging in size from 327 to 3,793 situated either within or beyond 100 kms. of CMA's. In fact, many of these areas are those "new" or "continuous" growth centres observed earlier. Examples include those close to CA's (Barrie and Peterborough) and within the influence of the Toronto and Oshawa CMA's. Similarly, there are those areas beyond 100 kms. of CMA's east of Georgian Bay and north of Peterborough, and near Ottawa.

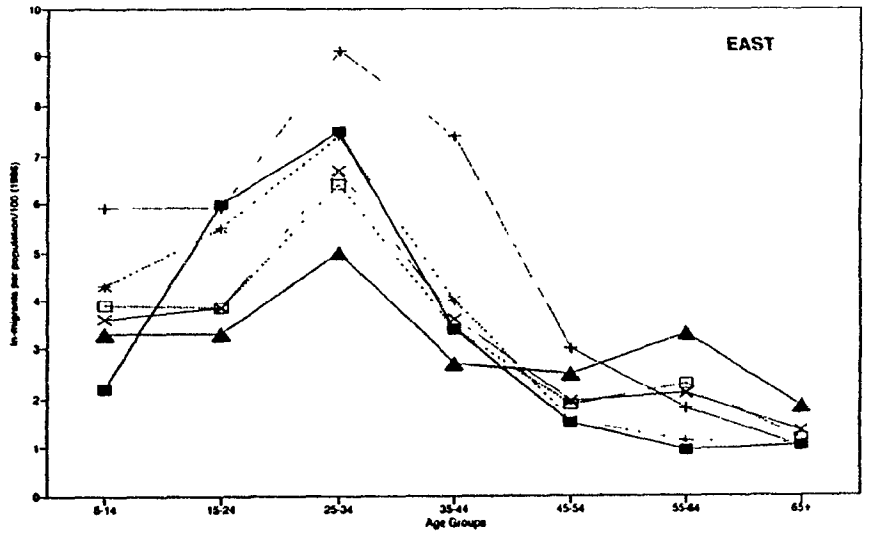
The pattern of low negative migration rates, in comparison, is very different. There is a clear cluster of high negative migration rates in the northern region around Timiskaming beside the Quebec border (consistent with declines observed earlier). The eastern region shows a smaller stretch of negative rates in areas in the central part of the region. It should be noted that this decline may have been temporary as evident by the positive population growth observed in the 1980's (as shown in the previous map). In the south-west, there are no real clusters of high negative migration rates. In fact, several of the declining areas shown in the previous map have relatively high positive migration rates or very low negative migration rates (around Bruce and Kincardine). Referring back to the previous map, this may imply that the decline in this region may a result of migration losses in the 1980's. Central Ontario, in comparison, had only four areas with migration rates (less than -10.0) indicating the relative stability in this region.

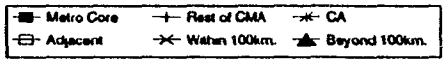
Age Profiles of Migrants

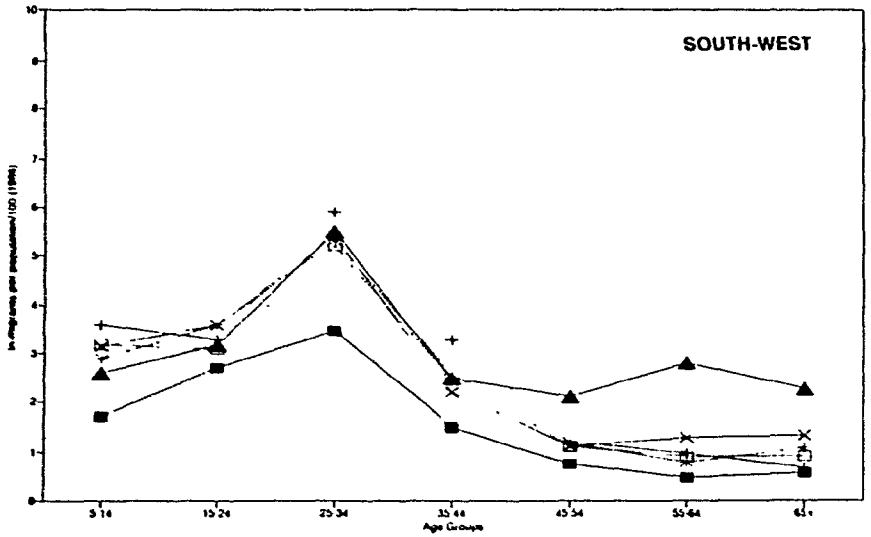
Figure 4.4 examines the mobility characteristics of selected age groups by region. An examination of mean in-migration rates show several distinct patterns. It confirms two intuitive hypotheses concerning the mobility of specific age groups. For example, the highest rates of in-migration were observed among the youngest age groups (25-34, 35-44, and mainly dependents 15-24) reflecting their ability and willingness to be involved in migration for a variety of reasons (i.e., recreation, employment or residential considerations). It is important to make one important distinction between these younger migrants. The 25-34 and to a lesser degree 15-24 migrants are somewhat more mobile than the 35-44 migrants. In part, it is believed that the former age groups are likely to be made up of more independent individuals or young couples with no children who are more flexible to move for employment and career opportunities, or residential cost considerations. In contrast, the 35-44 age group is more likely to reflect residential or household migration where the decisions to move are based on family considerations (i.e., affordable housing, services, schooling) rather than career and employment considerations. The in-migration rates of the older age groups particularly the elderly (55-64 and 65 and older) were significantly lower confirming their low mobility status. In contrast to the younger age groups, the older migrants tend to remain in their present dwellings.

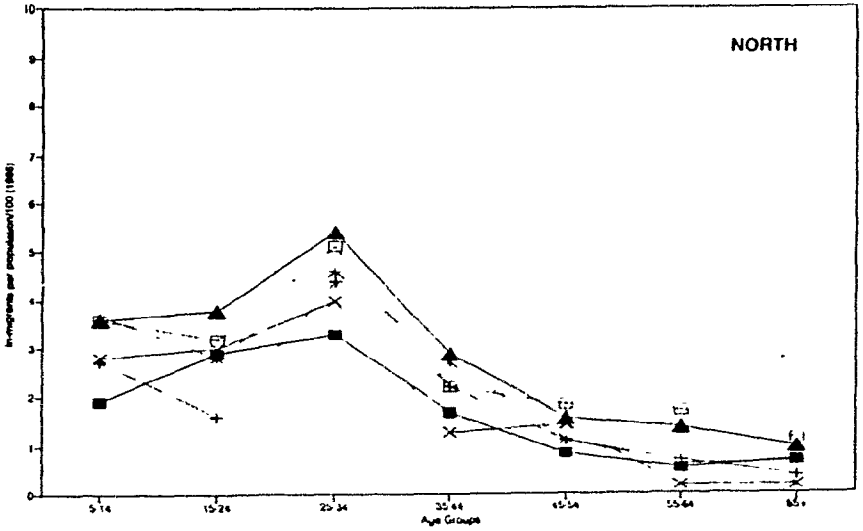
Figure 4.4 AGE PROFILES OF IN-MIGRANTS, 1981-86











Each migrant group shows a distinctive migration pattern across the different area classifications. The in-migration rates for the youngest age groups peak more or less in the outer areas of the CMA's (Rest of CMA) implying a pattern consistent with suburbanization. This is especially the case in eastern Ontario where the average in-migration rates of the 25-34 and 35-44 age groups peak in the outer areas of the Ottawa CMA, and suddenly drop in the remaining area classifications. A similar pattern of migration was observed in the outer areas of the Windsor and London CMA's in south-western Ontario. However, the pattern is not as peaked or does it significantly drop in areas within and beyond metropolitan influence.

The suburbanization trend, by comparison, takes on a slightly different nature in the central region. In central Ontario, for example, the highest average in-migration rates for the outer parts of the CMA's involve the 25-34 and 35-44 migrants. This pattern to some extent is consistent with the growing desire of household migrants to maintain residential dwellings in smaller and well serviced suburban areas while still maintaining employment links to the metropolitan areas. In contrast, the 25-34 age groups show higher average in-migration rates in smaller Census Agglomeration areas and towns beyond 100 kms. of the CMA's confirming their willingness at least in the central region to move to farther areas. This pattern in part reflects the vastness of the central region's transportation system as well as the urban spill-over which has been taking place in several of the CA's (i.e., Barrie or

Guelph) and small towns outside of the immediate boundaries of the Toronto CMA. The northern region, on the other hand, has no patterns consistent with suburbanization trends. In fact, the net migration rates among the youngest migrants show slightly higher peaks in areas adjacent to CMA's or CA's, and in those areas within and beyond 100 kms. of the metropolitan areas.

The older age groups (55-64 and 65 + years) show similar patterns of in-migration. On average, each region is characterized by relatively high rates of elderly in-migration in areas outside of metropolitan areas. Of the four regions, central Ontario shows much higher levels of elderly in-migration in areas within and outside of CMA's. This distinction is less evident in the other regions. However, on average, elderly in-migration rates tend to peak in areas beyond 100 km. of CMA's partially reflecting retirement migration and also the measures sensitivity to the effects of population size. The highest peaks of average in-migration rates were observed in the peripheral areas in the central and south-western regions. One explanation of this trend is the presence of several amenity-rich regions and potential retirement towns in Bruce-Grey counties (south-west) and Simcoe, Haliburton, Muskoka, and Peterborough regions (central).

Changes in Farm Households

The highest concentration of farm households, on average, appears to be in the predominately rural south-western region (30.8 %) (Table 4.5). This figure is considerably higher than the

TABLE 4.5 DISTRIBUTION AND CHANGE IN FARM HOUSEHOLDS[1], 1983-89

Area Classification	Average Percentage of Total Households (1989)					Average Percentage Point Shift (1983-89)				
	Central	South-West	East	North	Provincial Average	Central	South-West	East	North	Provincial Average
CMA Cores	0.2	0.0	0	0.1	0.2	-0.0	-0.0	0	-0.0	-0.0
Rest of Metropol-tan Areas (CMA)	4.7	14.4	3.4	5.1	6.6	-0.9	-3.5	-1.4	0.01	-1.4
Census Agglomert-ion (CA)	6.0	10.8	7.3	4.1	6.8	-0.8	-1.0	-1.4	-0.4	-0.9
Adjacent to CMA or CA	16.5	29.9	17.6	10.7	19.7	-2.5	-3.7	-3.5	-1.9	-2.9
Within 100 km. radius of CMA Core	19.2	44.2	17.5	0	27.8	-2.5	-3.8	-2.9	0	-3.1
Beyond 100 km. radius of CMA Core	2.5	23.3	9.9	9.9	10.5	-0.5	0.1	-2.6	-2.1	-1.8
Regional Averages	10.5	30.8	12.7	8.9	15.0	-1.6	-2.9	-2.6	-1.8	-2.2

[1] Farm Household refers to occupied private dwellings occupied by a farm operator(s).

Source : Ministry of Municipal Affairs Data Retrieval System (MARS)

provincial average (15.0 %), and average figures in the rest of the regions which range from 8.9 per cent in northern Ontario to 12.7 per cent in eastern Ontario. The largest numbers of farm households, on average, are found in areas either adjacent to CMA's or CA's (19.7 %) or within 50 to 100 km. of CMA's (27.8 %). The average figures in farm households typically drop significantly for the remaining area classifications. Overall, these patterns of farm households closely reflect the distributions within the different regions. However, the central region has a very low average percentage of farm households in areas beyond 100kms. of CMA's (2.5 %).

Table 4.5 also provides average percentage point shifts in the proportions of farm households. Overall, there appears to be a distinct pattern of decline in farm households. The largest negative shifts in farm households relative to the provincial average (-2.2) were observed in south-western (-2.9) and eastern (-2.6) regions. In terms of the area classifications, the highest negative shifts were in the areas adjacent to CMA's or CA's (-2.9) and within 100 kms. of CMA's (-3.1) suggesting the increasing threat of urbanization on rural life-styles. These area classifications had comparable negative shifts within each of the regions. It should be noted that the suburban parts of the Windsor and London CMA's showed some of the largest negative shifts in farm households. In addition, there was evidence of considerable decline in farm households in areas beyond 100 kms. of CMA's in eastern and northern Ontario.

4.3.2 Economic Processes and Factors

Distribution of Total Industry Employment

Table 4.6 show the distribution of employment in selected industries in the different regions. Central Ontario's dominance as the economic core of the province is striking. In contrast to the other regions, the central region has a relatively high concentration of employment in a variety of industries ranging from manufacturing to various service industries. Much of the employment is situated within the CMA's. However, central adjacent areas when compared to those in the other regions have relatively higher levels of employment (aside from primary industries) in many of the industries implying that some possible spill-over in employment (especially in manufacturing) has taken place.

The rest of the regions show either very low levels of employment concentration or highly specialized economies. The south-western region's specialization in primary industries (mainly agriculture) is evident in the high primary employment levels among the areas within metropolitan influence (adjacent and within 100 kms.). Similar to the central region (although to a lesser extent), some economic spill-over may have taken place in the adjacent areas. The eastern region, on the other hand, has a clear specialization in government employment. Much of the government employment is located within CMA's and CA's while there is no real indication of any spill-over. The northern region, as in the south-west, has very high levels of resource specialization (minerals and mining), especially among the peripheral areas. Northern urban

TABLE 4.6 DISTRIBUTION OF INDUSTRY BY AREA CLASSIFICATIONS, 1986

Area Classifications	Primary	Manufact-uring	Finance	Govern-ment
Central	8.4	22.1	4.2	5.4
CMA Cores	0.9	25.0	6.5	4.5
Rest of CMA	4.1	24.1	6.1	4.5
CA	5.1	30.2	3.9	4.7
Adjacent	12.1	22.7	3.5	5.3
Within 100 kms.	14.1	19.4	3.2	5.7
Beyond 100 kms.	5.5	13.3	3.9	7.6
South-west	19.5	21.6	3.3	3.3
CMA Cores	0.8	32.1	4.2	3.8
Rest of CMA	8.5	25.7	4.5	3.3
CA	9.1	26.2	3.8	3.9
Adjacent	19.2	26.2	3.4	3.3
Within 100 kms.	25.8	20.2	2.9	2.7
Beyond 100 kms.	18.1	11.5	2.9	4.6
East	12.1	16.2	3.1	10.6
CMA Cores	0.4	5.4	4.9	26.4
Rest of CMA	3.4	7.1	5.6	23.4
CA	4.0	16.6	3.2	16.6
Adjacent	15.8	18.6	3.8	8.7
Within 100 kms.	12.2	17.2	3.2	9.0
Beyond 100 kms.	15.6	15.5	1.9	7.4
North	15.9	13.7	2.3	7.5
CMA Cores	5.9	11.7	4.0	8.6
Rest of CMA	15.5	11.3	3.1	9.4
CA	9.4	19.1	3.5	7.4
Adjacent	16.4	11.1	2.8	6.6
Within 100 kms.	16.9	26.6	1.5	4.6
Beyond 100 kms.	16.6	13.5	2.0	7.5
ONTARIO	13.8	18.3	3.2	6.8

Note : Figures are averages across respective regions and area classifications.

Source : Derived from Statistics Canada Publications (Catalogue No. 94-112)

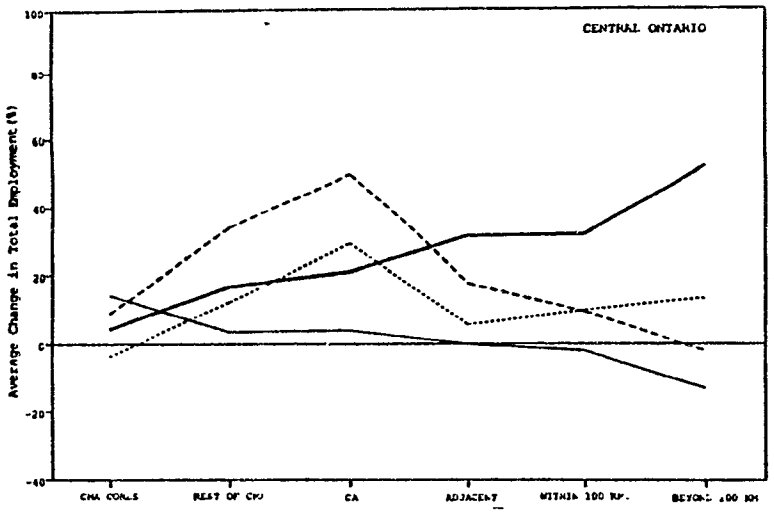
areas, in comparison to the other regions, have no major industries and very little diversity. The northern peripheral areas when compared to those in the other regions have a slightly higher and more diversified economic base, especially in services.

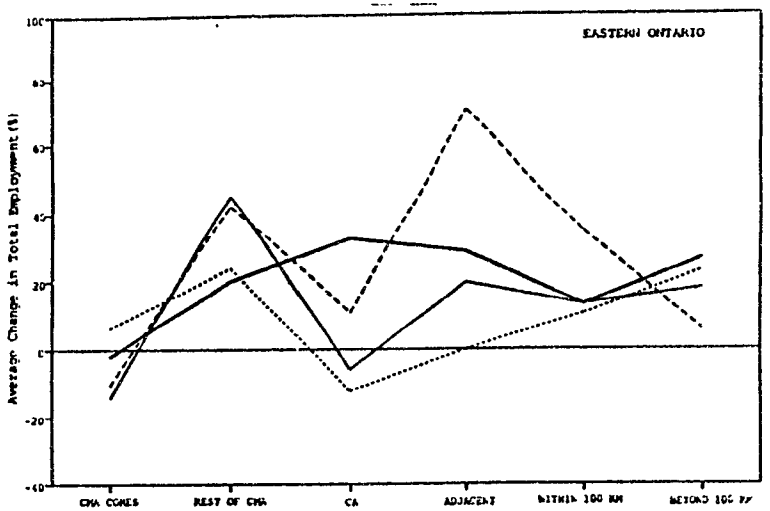
Changes in Selected Industries

The growth patterns of selected industries have varied in the different regions (Figure 4.5). Growth in manufacturing has tended for the most part to concentrate within the boundaries of CMA's and CA's. The central region, for example, shows a clear growth trend in the suburban parts of CMA's and CA's. Much lower average rates of growth were observed among the non-CMA and non-CA areas. Similar peaks in REST OF CMA manufacturing growth are evident in south-western and eastern regions. However, in these regions, there were actual losses in manufacturing employment in the CA's matched by surprisingly higher rates of growth in areas beyond metropolitan influence. Northern Ontario, on the other hand, has almost zero growth in manufacturing across all areas types. As in the south-west and east, only those areas beyond metropolitan influence have managed to achieve modest levels of manufacturing growth (partially a statistical artifact of the sensitivity of growth rates to initial employment levels).

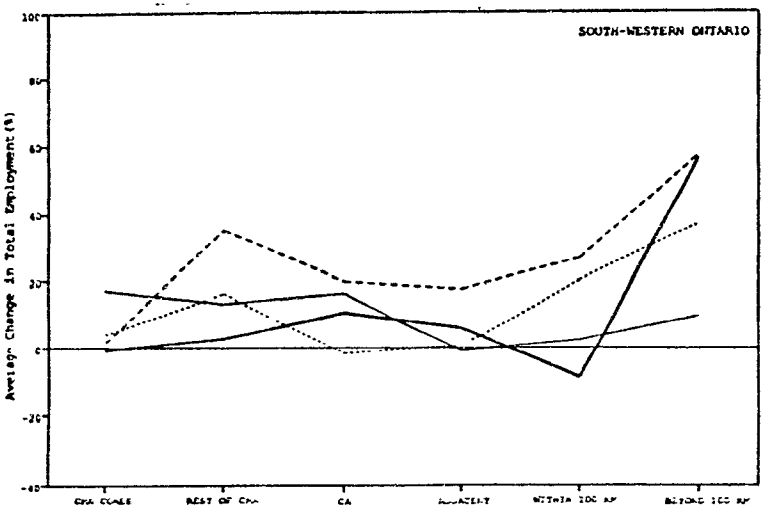
There has been variability in the growth of financial services employment. Growth in financial services, as in manufacturing, has remained very close to metropolitan and urban areas. Peak levels of growth in financial services are typical in the REST OF CMA areas

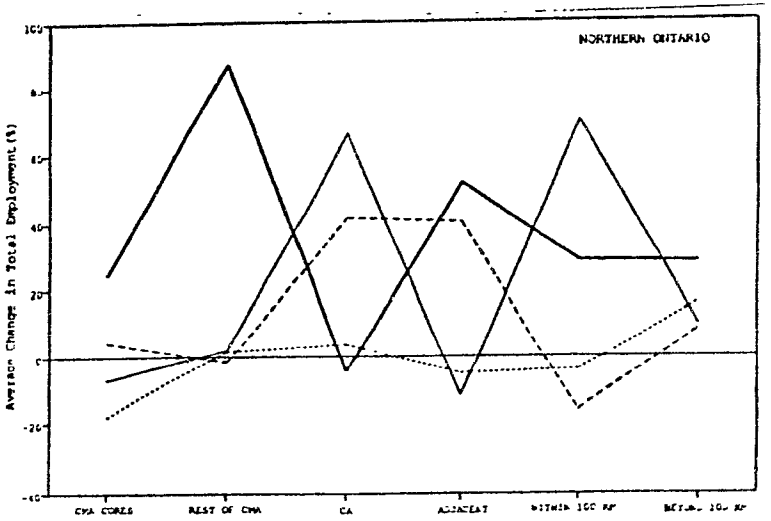
FIGURE 4.5 CHANGE IN TOTAL EMPLOYMENT FOR SELECTED INDUSTRIES, 1981-86





PRIM ····· MFG - - - FINANCE ——— GOVERN





and CA's in the southern regions. This is especially the case in Central Ontario where the average growth levels in finance employment drops sharply for non-CMA and non-CA areas. However, in the east, growth in financial services employment has been higher among the adjacent areas. Similarly, there has been significant finance employment growth in northern adjacent and CA areas. In the case of the south-west, the highest average rates of growth in financial services have been among the areas beyond 100 kms. of the CMA cores.

There has been considerable growth in government employment. In the central region, there is an overall pattern of higher average growth levels in non-CMA and non-CA areas, especially those beyond 100 kms. of CMA cores. This pattern is very much different to the urban-centred growth patterns of manufacturing and finance employment. The south-western regions also has relatively higher rates of growth in government employment in areas beyond metropolitan influence coinciding with relatively lower levels in the metropolitan and urban areas. Eastern Ontario, in comparison, has comparably higher levels of growth in government employment across the different area types. In the north, there is a clear pattern of growth among the suburban parts of CMA's (highest compared to other regions), adjacent areas, and areas beyond CMA's. This pattern appears to be consistent with patterns of provincial government employment re-location to peripheral urban centres in the north and in selected smaller areas functioning as small regional administrative areas.

The patterns of growth in primary employment have not been as promising. The central region, for example, shows very low levels of growth in primary employment characterized by actual losses in the agriculture-based areas within and beyond the influence of metropolitan CMA's. This pattern can be interpreted to be consistent with the rapid urbanization of many small areas within the influence of the Toronto urban field. Similarly, low levels of growth in primary employment are observed for the most part in the south-west region. The relatively high rates may be attributed to the effects of relatively low levels of initial primary employment rather than a major resurgence in agriculture. A similar argument can be made for the case of moderate growth levels in the eastern region. In contrast, there appear to be relatively high rates of primary employment among the northern CA's. Growth in primary employment among the within 100 kms. areas is slightly exaggerated because of the small number of areas in this classification.

4.3.3 Government Policy

Federal and Provincial Capital Grants

The pattern of changes in capital grants has maintained an emphasis on declining areas (Table 4.7). On a regional basis, the largest increases in capital grants occurred in the eastern (157.7 %), northern (139.0 %), and central (97.2 %) regions. In these regions, the increases in capital grants were clearly higher for adjacent areas and those within and beyond 100 kms of CMA's. On the one hand, this may reflect an effort by government to encourage

TABLE 4.7 CHANGES IN FEDERAL AND PROVINCIAL CAPITAL GRANTS BY ECONOMIC REGIONS, 1984-88

Area Classifications	Changes in Annual Per Capita Capital Grants, 1984-88				
	Central	South-West	East	North	Provincial Average
CMA Cores	15.2	41.6	0.9	n.a.	16.7
Rest of Metropolitan Areas (CMA)	28.7	77.4	21.6	n.a.	39.4
Census Agglomeration (CA)	28.6	48.9	68.7	-53.2	50.7
Adjacent to CMA or CA	152.9	39.6	184.4	20.0	114.9
Within 100 km. radius of CMA Core	81.6	37.7	206.8	n.a.	105.6
Beyond 100 km. radius of CMA Core	213.5	28.1	180.2	173.4	143.2
Regional Averages	97.2	41.3	157.7	139.0	98.6

Source : Ministry of Municipal Affairs Data Retrieval System (MARS)

growth in declining and stagnating areas to improve the local infrastructure. On the other hand, the government may be working to maintain recent growth by providing expenditures to improve local service levels. South-western Ontario, by comparison, showed a relatively low increase in capital grants (41.3 %). In contrast to the other regions, larger increases in capital grants were observed among CMA's and CA's rather than in the more remote areas. This pattern tends to coincide with an effort by government to foster new growth into the older and larger urban centres in the region.

Local Development Expenditures

Table 4.8 provides an analysis of the regional differences in local development expenditures. At the regional level, the highest per capita expenditures were observed in northern, south-western and eastern Ontario. In terms of the area classifications, the highest per capita expenditures were among areas beyond 100 kms. ($324.6) of CMA's. The levels of per capita expenditures were less in the other area classifications ranging from $185.2 in the suburbs to $277.5 in areas within 100 kms. of CMA's. The provincial average of local expenditures was comparable to that of the central region with the highest per capita expenditures in areas beyond metropolitan influence ($349.7 compared to the regional average of $229.9). In contrast, the highest levels of expenditures in the south-west and east were observed among CMA cores ($469.1 and $365.8 in the respective regions). It is difficult to imply any patterns in the north because of the insufficient data.

TABLE 4.8 PER CAPITA LOCAL DEVELOPMENT EXPENDITURES[1] BY ECONOMIC REGIONS, 1983

Area Classifications	Per Capita Local Development Expenditures ($), 1983				
	Central	South-West	East	North	Provincial Average
CMA Cores	225.5	469.1	365.8	n.a.	271.2
Rest of Metropolitan Areas (CMA)	166.9	211.2	207.3	n.a.	185.2
Census Agglomeration (CA)	251.4	307.7	223.9	455.4	256.4
Adjacent to CMA or CA	187.3	230.7	219.6	247.7	212.8
Within 100 km. radius of CMA Core	248.6	337.4	230.0	n.a.	277.5
Beyond 100 km. radius of CMA Core	349.7	315.2	326.6	309.9	324.6
Regional Averages	229.9	291.2	255.9	308.6	260.7

[1] includes expenditures on local planning and development, sewage, water systems, roads, etc.

Source : Ministry of Municipal Affairs Data Retrieval System (MARS)

4.3.4 Local and Regional Conditions

Unemployment

Average unemployment rates in 1986 were notably higher in the northern and eastern regions (Table 4.9). The average unemployment rates in these regions ranges from 7.3 per cent in the east to 8.2 per cent in the north (as compared to the provincial average of 6.7 %). Considerably lower levels of unemployment were observed in the central (5.8 %) and south-western (5.6 %) regions. The northern region is characterized by widespread unemployment across all the area classifications, except among the CA areas which have managed to stay below provincial average. Eastern Ontario, on the other hand, seems to have higher rates of unemployment in remoter areas including the CA's (in which many are situated along the St. Lawrence and beyond the influence of the Ottawa CMA). The only prosperous areas in terms of low unemployment have been those areas situated in the suburbs of the Ottawa CMA (4.9 %). In terms of relative unemployment levels, the central region has below average rates across all the area classifications, especially in the suburbs and adjacent areas. Unemployment does converge to the provincial average in areas beyond the influence of CMA's. By comparison, the opposite pattern is observed in south-western Ontario. Average unemployment levels are surprisingly higher among the urban and metropolitan centres (ranging from 7.1 % in the suburbs to 9.4 % in core areas) compared to areas within (4.4 %) and beyond (5.1 %) the influence of CMA's.

TABLE 4.9 REGIONAL UNEMPLOYMENT RATES (1981)

Area Classifications	Average Unemployment Rates (1981)				
	Central	South-West	East	North	Provincial Average
CMA Cores	5.6	9.4	6.3	7.4	6.3
Rest of Metropolitan Areas (CMA)	4.9	7.1	4.9	8.8	5.9
Census Agglomeration (CA)	6.7	7.8	7.1	5.7	6.8
Adjacent to CMA or CA	4.9	6.1	6.4	7.4	5.9
Within 100 km. radius of CMA Core	5.7	4.4	6.7	7.0	5.6
Beyond 100 km. radius of CMA Core	8.1	5.1	9.1	8.6	8.3
Regional Averages	5.8	5.6	7.3	8.2	6.7

Source : Derived from Statistics Canada Publication (Catalogue No. E-376)

Employment Growth

The highest rates of employment growth were observed in the central (13.2 %) and eastern (9.9 %) regions (Table 4.10). This is considerably higher than the average rates found in the south-western (5.5 %) and northern (5.8 %) regions. On average, it is common among the regions for employment growth to be notably higher in suburban areas compared to other areas. Employment growth in central (22.9 %) and eastern (29.6 %) suburbs is the highest. These patterns may portray a rapid suburbanization of industry to the suburbs as well as greater regional concentration of industry to the major metropolitan areas (in this case being Toronto and Ottawa). The relatively high rates of growth in adjacent and remote areas of the central region appear to be consistent with the decentralization tendencies of today's industries. It is important to mention that these decentralization patterns of employment were not observed in the remaining regions, except for some employment spill-over to areas within the influence of the Ottawa CMA in the east. In south-western Ontario, average employment growth in the relatively low unemployment "peripheries" was lower than the levels in urban and metropolitan areas possibly signalling a moderate economic re-surgence in the larger south-western urban centres. In comparison, the north experienced actual declines in total employment among its larger urban centres accompanied by moderate levels of growth in the remoter areas.

TABLE 4.10 REGIONAL EMPLOYMENT GROWTH, 1981-86

Area Classifications	Percentage Growth in Total Employment, 1981-86				
	Central	South-West	East	North	Provincial Average
CMA Cores	4.9	9.3	3.1	-3.6	3.8
Rest of Metropolitan Areas (CMA)	22.9	12.9	29.6	10.6	20.1
Census Agglomeration (CA)	9.4	9.3	7.5	-3.5	6.6
Adjacent to CMA or CA	10.3	2.9	6.5	10.8	7.4
Within 100 km. radius of CMA Core	14.8	4.9	15.6	4.3	10.9
Beyond 100 km. radius of CMA Core	10.7	4.7	3.9	5.8	5.8
Regional Averages	13.2	5.5	9.9	5.8	8.8

Source : Derived from Statistics Canada Publications (Catalogue No. E-576 and 94-112)

Labour Mix (White-collar and Skilled Occupations)

There is a clear concentration of white-collar occupations among the core and suburban parts of the CMA's (Table 4.11). This pattern is evident in the Ottawa CMA in eastern Ontario (20.3 % in the suburbs and 18.9 % in the core), and in the suburbs of central Ontario (13.9 %). Lower levels of white-collar jobs were observed in the south-western and northern CMA's. Overall, percentages of white-collar occupations in the remaining areas were close to the provincial average. Only the northern region, particularly the remoter areas, showed percentages which were either lower or barely meeting the provincial average. In comparison, the proportion of white-collar occupations in areas beyond 100kms. of CMA's in south-western Ontario actually surpassed the provincial average (11.9 % as compared to 9.0 %).

The distribution of skilled occupation resembled a slightly different pattern with less metropolitan concentration. The central and south-western regions, on average, had higher levels of skilled occupations across all the areas. Those areas outside of CA's and CMA's showed a very close balance in percentage of skilled occupations as compared to the white-collar occupations. In south-western Ontario, the percentage of skilled occupations was slightly higher in areas adjacent and within 100 kms. of CMA's. The picture is slightly different in the eastern and northern regions where the percentages of skilled occupations barely meet the provincial averages. In the east, this can be attributed to the large numbers of white-collar occupations and mainly administrative and service

TABLE 4.11 DISTRIBUTION OF WHITE-COLLAR[1] AND SKILLED[2] OCCUPATIONS, 1981

Area Classification	Occupation, 1981							
	Central		South-west		East		North	
	White-collar	Skilled	White-collar	Skilled	White-collar	Skilled	White-collar	Skilled
CMA Cores	12.7	10.2	10.2	10.7	20.3	2.5	11.5	6.8
Rest of Metropolitan Areas (CMA)	12.9	8.9	11.2	8.8	18.6	2.9	8.9	6.9
Census Agglomeration (CA)	9.5	9.2	9.9	8.7	10.4	7.6	9.7	7.9
Adjacent to CMA or CA	9.7	9.4	8.4	9.3	8.9	7.3	8.1	6.6
Within 100 km. radius of CMA Core	8.4	7.6	7.4	7.5	9.4	7.3	9.0	13.2
Beyond 100 km. radius of CMA Core	6.9	5.0	9.7	6.7	7.4	5.8	7.5	6.6
Regional Averages	9.9	8.4	8.6	8.1	9.5	6.6	7.9	6.9

[1] Refers to persons employed in professional and managerial occupations

[2] Refers to persons employed in trade occupations

Source : Derived from Statistics Canada Publication (Cat. No. E-576)

economy of the Ottawa region. In contrast, the north's relatively low stock in skilled labour is due to the low level of industry and specialization in raw or primary resource industries. The above average percentages of skilled occupations in northern areas within 100 kms. of CMA's is misleading since it involves a relatively small number of areas.

Housing Growth (New Dwellings Since 1970)

The distribution of dwellings built since 1970 (as a percentage of total dwellings in 1986) is most evident in the suburban areas of CMA's (Table 4.12). This was especially evident in eastern (53.7 %) and central (45.1 %), and northern (42.7 %) Ontario. These trends may be explained by the rapid suburbanization which occurred in the central and eastern regions, and government-initiated resource development boom in the northern region during the 1970's. Much lower levels were observed in the suburban areas within the Windsor and London CMA's (33.2 %) in south-western Ontario. There is also a significant regional difference in the average percentages of dwellings built since 1970 with central, eastern and northern regions having averages ranging from 35.9 % to 37.9 % , while the average in south-western Ontario is only 27.9 %. In contrast to other regions, the south-western region was characterized by relatively higher percentages of dwellings built since 1970 in those areas beyond the influence of CMA's (34.9 % as compared to 26.2 % and 23.9 % in areas adjacent and within the influence of CMA's, respectively). Typically, lower percentages of

TABLE 4.12 HOUSING GROWTH[1] BY ECONOMIC REGIONS, 1986

Area Classifications	Housing Growth (Percentage New Dwellings, 1986)				
	Central	South-West	East	North	Provincial Average
CMA Cores	30.7	28.6	33.9	28.6	30.2
Rest of Metropolitan Areas (CMA)	45.1	33.2	53.7	42.7	43.5
Census Agglomeration (CA)	38.1	32.8	35.7	28.4	34.8
Adjacent to CMA or CA	37.9	26.2	32.3	37.1	33.2
Within 100 km. radius of CMA Core	33.7	23.9	36.9	24.4	30.88
Beyond 100 km. radius of CMA Core	37.1	34.9	34.0	39.0	37.3
Regional Averages	37.9	27.9	35.9	37.9	35.3

[1] Housing growth is measured as a the number of new dwellings as a percentage of total dwellings in 1986

Source : Derived from Statistics Canada University Consortium Tapes (Housing)

dwellings built since 1970 were found in non-urban and non-metropolitan areas.

Housing Quality (Dwellings with Major Repairs)

The southern regions, on average, had better quality dwellings (Table 4.13). The average percentages of dwellings needing major repairs in the north (12.7 %) and east (9.5 %) were fairly high when compared to the central (6.8 %) and south-western (6.8 %) regions. Overall, average percentages of dwellings needing major repairs were lower in the core and suburban areas of CMA's. The averages tended to increase in remoter areas, particularly in those areas beyond the influence of CMA's. This pattern was somewhat more pronounced in the east and north where the percentages of dwellings requiring major repairs ranged from 11.8 % to 12.9 %. In contrast, the averages in south-western and central Ontario were 7.0 per cent and 8.5 per cent respectively.

This section identified the patterns in population change in the case of Ontario. A variety of causal factors (which may be associated with these population trends?) were then investigated in terms of their patterns. From this descriptive analysis, one easily suspect that some of the causal factors such as employment growth, retirement migration, and government grants (among others) may be able to contribute to a better understanding of the observed population trends. To investigate whether any association between population growth and the different factors exist, a multivariate approach to the problem is recommended in order to control for the

TABLE 4.13 REGIONAL DIFFERENCES IN HOUSING QUALITY[1] BY ECONOMIC REGIONS, 1981

Area Classifications	Housing Quality (Percentage Occupied Dwellings Needing Major Repairs in 1981)				
	Central	South-West	East	North	Provincial Average
CMA Cores	5.3	4.2	4.9	6.5	5.3
Rest of Metropolitan Areas (CMA)	4.9	5.1	4.6	6.7	5.2
Census Agglomeration (CA)	6.5	5.5	6.7	10.2	7.1
Adjacent to CMA or CA	6.7	6.4	9.6	11.3	7.9
Within 100 km. radius of CMA Core	8.3	7.9	9.7	10.8	8.7
Beyond 100 km. radius of CMA Core	8.5	7.0	11.8	12.9	11.6
Regional Averages	6.8	6.8	9.5	12.7	8.8

[1] Housing Quality is measured as the number of occupied private dwellings needing major repairs (i.e., defective plumbing or wiring, structural repairs in walls, floors or ceilings, etc.)

Source : Derived from Statistics Canada Publication (Catalogue No. E-576)

different influences of many of these factors. Chapter 5 provides a multivariate analysis of population change in Ontario.

CHAPTER 5. MULTIVARIATE ANALYSIS OF POPULATION CHANGE

A multiple regression model is used to investigate the association between population change (1978-89) and different causal factors. In the following sections, there is a discussion on the variables used in the analysis and some preliminary descriptive results. The multiple regression technique is discussed in terms of its modelling specifications and assumptions. The last section provides an interpretation of the statistical results of the multiple regression analysis.

5.1 Multiple Regression Model

The relationship between population change and different causal variables was estimated using least squares multiple regression. Using the SPSS-pc statistical package, a least squares procedure was used to estimate regression coefficients and parameters which minimized the sum of the squared deviations of the observations for the dependent population growth measure from its predicted values. The general linear multiple regression model may be expressed in the following form :

$$Y_j = b_o + b_1 X_{1j} + b_2 X_{2j} + \ldots\ldots b_K X_{Kj} + e_j$$

where the notation Y_j refers to the dependent population change variable in the $_j$th observation, X_{1j} , X_{2j},$\ldots\ldots X_{Kj}$ represent the actual values of the explanatory variables of the $_j$ observation, bo is a fixed constant, b_1, b_2,$\ldots\ldots b_K$ are the linear coefficients,

and e is an error term.

The b values refer to the estimated partial slope coefficients representing the slope of the relationship between each one of the independent variables (X_{1j}, X_{2j},.....X_{Kj}) and the dependent variable (Y_j) while keeping all other independent variables constant. When the b values are transformed into standard beta weights (ß's), they are interpreted as the relative changes in the predicted value of the dependent change variable (Y_j) with one unit increase in its corresponding explanatory variable. The constant (bo), on the other hand, refers to the intercept where the value of the predicted dependent growth rate crosses the Y-axis when all of the values of the explanatory variables are set to zero. In comparison, the error term ($e_{j)}$ represents the deviation or residual between the observed and predicted values of the dependent growth variable for the $_j$th observation.

Assumptions

The main assumptions[1] of the multiple regression model are highlighted as follows :

(1) the relationship between the dependent and independent variables is linear;

(2) the residual or error terms are distributed independently of the X values, and are normally distributed with a zero mean and constant variance;

[1] The reader is referred to Berry and Feldman (1989) for a comprehensive discussion of the assumptions of multiple regression and implications of violating these assumptions.

(3) the independent variables are not interrelated with one another.

In terms of the first assumption, it is admitted that not all of the independent variables used in the regression satisfied the linearity assumption. No transformations to these variables were done because of the interpretational problems associated when only some of the variables on the explanatory side are transformed and others are not (Johnston, 1980). In this thesis, the primary objective is to derive a statistical model of the actual relationship between population change and the selected independent variables rather than a model of some transformation(s) of population change. This does not side-step, however, the importance of investigating other non-linear model specifications and functional forms in order to achieve an even better understanding of population change. Hopefully, the results from the linear regression model will provide some inspiration in terms of an initial base to investigate other models and functional forms.

Several comments on the relevance of the second assumption dealing with normality is necessary. This study makes no assumptions about the underlying distributions since it deals with a "population" of Ontario municipalities and not a sample. In cases when the entire population is involved, the necessity of inferential tests to investigate the significance of parameters or the goodness of fit in regression models may not apply (Gould, 1970). Similar multivariate studies have conformed to these strict guidelines of the sampling distribution and therefore have only

focused their interpretations on the actual relationships as estimated by the partial regression coefficients or Beta weights (see, for example, Golant (1972) on the population of urban centres in Ontario; Simmons (1980) on the population of urban-centred regions in Canada).

The literature on this issue, however, has been remarkabely divided. On the one hand, the use of the sampling distribution and inferential tests on whole populations have been justified along the lines that a population may be viewed as a sample in a particular time or for a larger population existing in other regions not considered (Gould, 1970). On the other hand, Haining (1990) has suggested that the use of the sampling distribution could be reasonably justified along the lines that the data for the population of spatial units is derived from a sample (p. 34). Therefore, inferential statements can be made about "actual" relationships among the variables rather than the spatial units. The literature on multiple regression is full of examples of studies either ignoring this important assumption or adopting a peculiar rationale to justify the use of the sampling distribution (see, Congdon and Shepherd (1986) and Beale (1977) for typical examples).

Such rationales have little merit in this study. On the one hand, it makes little sense to adopt the argument claiming that demographic trends in the 1980's among Ontario municipalities are representative of earlier time periods or the larger national settlement system. In temporal terms, the 1980's are characterized

by the presence of a range of demographic, economic processes and spatial processes (discussed earlier) which were not evident in previous decades. Similarly, the Ontario settlement system when compared to other provinces is distinctive with respect to the spatial patterns of population, economic activity and development.

On the other hand, Haining's rationale along the lines of sampled data cannot be applied to this study. This study uses a combination of variables in which some are indeed based on sampled data (i.e., 20 % 1981 census data), while other variables were derived from actual population counts and maps (in the case of geographic locations). Therefore, it would be peculiar to draw inferences about relationships in different time periods or settlement systems when the underlying causal processes are likely to be different, and there is no "real" larger population to make predictions about. The use of multiple regression in this thesis will therefore not conform to the strict guidelines of the sampling distribution. The primary objective as a result will be to assess the relative importance of the <u>associations</u> between population change and the selected independent variables.

The final assumption deals with the serious issue of multi-collinearity. A relatively high level of multi-collinearity can contribute to unrealistic estimates of the parameters which in turn create ambiguities with respect to the actual importance of the independent variables (Berry and Feldman, 1989, 40-43). In this analysis, it was assumed that the independent variables were additive and that each one represented a distinct association with

population change. To avoid any problems of multicollinearity, the inter-correlations between the independent variables were carefully screened using a simple correlation matrix and by simple bivariate regressions between each one of the independent variables. Unreasonably high correlations or levels of explanation between the independent variables (i.e., over 0.50) resulted in the elimination of those variables having strong collinearity with one or more of the other independent variables.

5.1.1 Model Specifications

A total of three different regression models are specified. An aggregate model for Ontario (excluding CMA's and CA's) was first derived to investigate the relative importance of selected variables among non-metropolitan or agglomeration areas. Two additional models were then derived to examine how well the model held up when (a) REST OF CMA AND CA areas (excluding cores) are included - metropolitan and urban effect; and (b) Northern and South-western areas are excluded - regional effect. The models were compared in terms of the changes and shifts in the parameters of the independent variables when the influences of metropolitan/urban and regional effects are controlled.

A second set of multiple regression models were derived to examine the relative importance of associations in the different area classifications. Separate regression models were estimated for the three non-CMA and non-CA area classifications : (1) adjacent areas (including areas within 50 kms. of CMA cores and those

spatially contiguous to CMA's or CA's); (2) within 50 to 100 kms. of CMA cores; and (3) beyond 100 kms. of CMA cores. In the first two models (mainly adjacent and within 100 kms. areas), the most important variables are likely to be demographic or economic "spill-over" factors from the larger urban centres (i.e., residential migration, manufacturing growth,) reflecting the high rates of metropolitan growth and expansion. The most important variables in peripheral areas, in comparison, are expected to be non-economic mostly reflecting either amenity-related migration (elderly, retirement) or influences of government policy and expenditures.

The final set of regression models were used to examine the relative importance of selected characteristics within the four economic regions. This resulted in four separate regression models which in contrast to the preceding models now accounted for regional variations in not only population change but also in the selected characteristics of the individuals areas in each region. In addition to the standard independent variables, three additional dummy values (adjacency, within 100 kms., and beyond 100 kms. (in the constant)) were used to examine the relative importance of urban spill-over and agglomeration within each regional context.

An analysis of the standardized residuals for the dependent growth variable was also undertaken. The standardized residuals represent the difference between the observed (Y_i) and predicted value ($\hat{Y}$) of the dependent variable divided by the standard error of estimate (S_E). The residuals are interpreted as the amount of

variation in the observed Y_i which is "unexplained" by the regression model. The residual terms for all of the observations were grouped into exclusive categories in terms of their signs and magnitude. Both the tables and maps of residuals were used to examine for any spatial dependence or unusual patterns which may be related to different causal processes or to deficiencies in the regression model. More sophisticated methods of examining and screening for spatial dependence in regression analysis are preferred and encouraged by the author (see, for example, Getis (1990) on tests of spatial dependence; Odland, (1987) and Goodchild (1986) on spatial autocorrelation techniques). Clearly, these issues deserve a considerably larger amount of space for analysis and discussion which regretfully the general scope of this thesis does not allow.

A brief discussion is needed on the interpretation of the categorical or dummy variables. The dummy variables were introduced into the regression models in an additive manner. For each categorical variable, the categories (N) are coded as 1 to identify the particular feature (for example, amenity) and 0 to represent those areas not having this particular feature. The additive manner allows the intercept (or constant) for the two values to vary while the slopes of the each regression line remains the same. This allows the dummy variable parameter (coded as 1) to be interpreted as the "difference" between the intercepts of the two features of the dummy variable. In the cases of additional dummy variables, the parameter estimates of each dummy variable are implicitly assumed

to be same regardless of the different characteristics described by other dummy categories, and vice versa. Similarly, the parameter estimates of continuous variables are assumed to be implicitly the same for all areas regardless of the differences in dummy variables (Wrigley, 1985, 101).

5.1.2 Variables, Hypotheses and Relationships

Independent "Causal" Variables

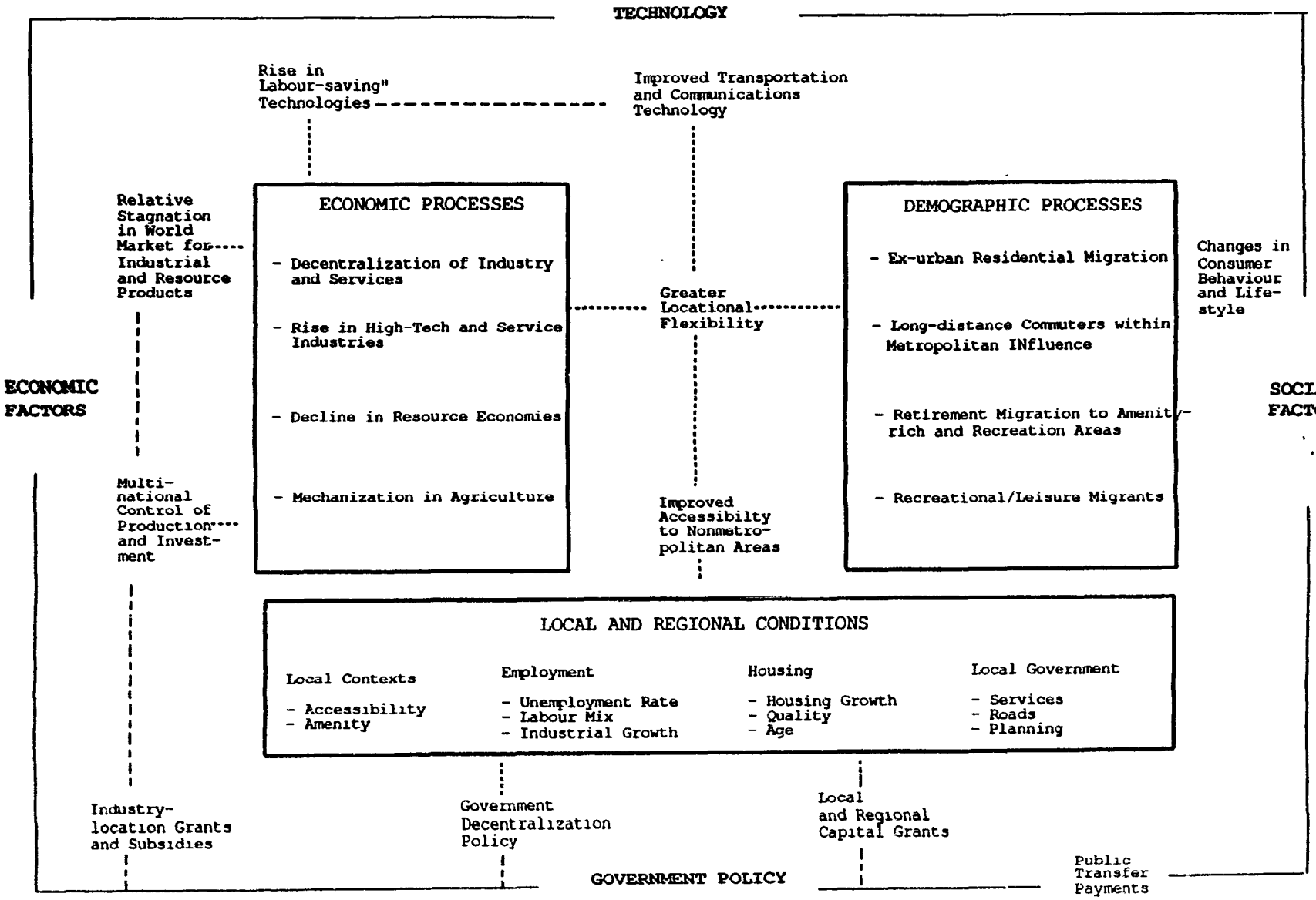
The majority of explanations and causal factors are summarized in a broader conceptual model (Figure 5.1). The main causal processes and factors examined in Chapter 4 are those in the boxes. The effects of other exogenous factors outside of the boxes for which data is not available (except for government policy) are assumed to be constant or implicitly incorporated in the various processes. Other factors such as accessibility to transportation and amenity (low density, space) are implicit in the area classifications. The following is a discussion on the independent variables used in the regression models and hypothesized relationships.

1. Local and Regional Conditions

Regional Location :

The first four variables are dummy variables describing an individual area's location in one of the four economic regions. These regional variable are used to assess the relative importance of regional differences in population change (along side other

FIGURE 5.1 A CONCEPTUAL MODEL OF EXPLANATIONS AND CAUSAL FACTORS



SOURCE : ADAPTED FROM SEVERAL EXPLANATORY FRAMEWORKS, FREY (1982), HUGG AND SNAILES (1965), AND CLOKE (1985).

factors) in the three disaggregate area classification models. It is expected the growth rates will be higher in the CENTRAL and EAST regions because of the overall growth in these regions, and the presence of extended demographic spill-overs in the form of long-distance commuters and retirement migrants (Table 5.1).

In the NORTH and SWONT, however, it anticipated that adjacent areas will have lower levels of growth mainly due to the urban and economic stagnation among the larger urban centres. Similarly, the growth rates for areas within 50 to 100 kms. of CMA's are likely to be higher in the CENTRAL AND EAST primarily because of amenity-related factors in these regions, and possibly from employment-led factors. The SWONT region, in contrast, should show much lower growth rates reflecting the historically low level of the growth and poor economic prospects characterizing many of these areas. These areas are omitted for the northern region because of a very small number of areas.

Finally, it hypothesized that the peripheral areas (beyond 100 kms. of CMA's) in the CENTRAL and SWONT regions will show higher levels of growth because of the presence of many high amenity areas which are likely to attract some households, and probably many more retirement migrants. In contrast, the peripheral areas in the EAST region are expected to have lower levels of growth because of the limited accessibility to the Ottawa region. Limited metropolitan accessibility among many northern peripheral areas should cause a relatively low level of growth.

TABLE 5.1 SUMMARY OF INDEPENDENT VARIABLES AND HYPOTHESIZED RELATIONSHIPS

Symbol	Description	Area Classifications				Economic Regions			
		Ontario	Adjacent	Within 100 km. of CMA core	Beyond 100 km. of CMA core	Central	South-West	East	North
	Local Context								
CENTRAL	Location in central region		+	+	+				
SWONT	Location in south-western region		-	c (-)	+				
EAST	Location eastern region		+	+	-				
NORTH	Location in northern region		c (-)	n.a.	c (-)				
CENT100	Central x within 100 km. of CMA core	+							
SWONT100	East x within 100 km. of CMA core	+							
EAST100	South-west x within 100 km. of CMA core	c (-)							
NORTH100	North x within 100 km. of CMA core	c (-)							
ADJAC	Adjacent (includes areas within 50 km. of CMA core and spatially contigous to CMA or CA					+	-	-	+
WITH100	Within 100 km. of CMA core					+	-	+	(in ADJAC)
BEY100	Beyond 100 km. of CMA core	c (-)				c (-)	c (+)	c (-)	c (-)
AMENITY	Non-metropolitan x Nearness to Major Park x Coastal Location	+	n.a.	+	-	+	-	+	-
ECINDEX	Index of Economic Specialization	-	-	-	-	-	-	-	-
	Demographic Processes								
MIG514	In-migration Rate of 5-14 years, 1981-86	+	+	+	-	+	-	+	-
MIG65	In-migration Rate of 55 + years, 1981-86	+	+	+	+	+	+	+	+
WCEMP	Percentage White-collar Occupations, 1981	+	+	+	+	+	+	+	+
	Economic Processes								
GROWMFG	Per Cent Growth in Manufacturing, 1981-86	+	+	+	-	+	-	-	-
GROWFIN	Per Cent Growth in Finances, 1981-86	+	+	+	-	+	-	+	-
GROWGOV	Per Cent Growth in Government, 1981-86	+	+	+	+	+	+	+	+
	Government Policy								
DEVPOP83	Per Capita Expenditures ($) on Local Infrastructure, 1983	+	+	+	-	+	-	+	-
GRT8486	Per Cent Growth in Per Capita Capital Grants ($) from Federal and Provincial Sources, 1984-86	+	-	+	+	-	+	+	+

n.a - not included in the analysis

c( ) - represents variable in the constant and hypothesized sign

Metropolitan Influence :

The next three independent variables are dummy variables of metropolitan proximity. These variables are used in the disaggregated regional models to control for the influences of commuting and extended demographic and economic spill-overs (while keeping other factors constant) within each of the regions. In the central region, it is expected that areas within metropolitan influence (adjacent and within 50 to 100kms.) are likely to have higher levels of growth than peripheral areas. This should reflect the dominance of extended demographic and economic spill-overs into these areas over predominantly amenity-related factors in the periphery. A similar pattern of spill-over dominance is expected in the eastern region. However, it may be slightly exaggerated (when compared to the central region) because of the relative decline and stagnation in many areas beyond Ottawa's influence. In comparison, areas beyond 100 kms. in the south-west and north are expected to show higher levels of growth than those within the influence of metropolitan areas. Once again, this is partially related to the overall stagnation of larger urban centres and their hinterlands in these regions.

Regional Agglomeration

An additional four dummy variables were derived to measure the probable existent of regional agglomeration patterns in the Ontario model. These variables represented the interaction between an area's location in one of the four regions and its relative

location to metropolitan CMA's (1 - if within 100 kms. of CMA core; 0 - otherwise). All four variables were included in the model in order to examine the relative importance of regional agglomerations (keeping other factors constant). The effects of those areas situated beyond 100 kms. of CMA's cores are included in the constant of the regression equation.

The Ontario model hypothesizes that the CENT100 and EAST100 variables, keeping other factors constant, will show the highest levels of growth. Both of these regions correspond to Frey's hypothesis of regional growth and agglomeration. First, each region has a dominant "command and control" centre in Toronto and Ottawa which has moved in the direction of advanced information and service employment. Secondly, there are very strong metropolitan growth tendencies within each region. In the CENT100 region, there are several emerging urban and suburban growth centres which have become specialized in advanced and high-technology manufacturing industries (i.e., Kitchener-Waterloo, Mississauga, Markham, Oshawa, Barrie). Similarly, in the EAST100 region, there is considerable advanced high-tech and manufacturing employment in some of the suburban areas (i.e., Kanata) and strong federal government support in the predominantly administrative employment structure of many areas (Steed and DeGenova, 1983). Finally, both regions are characterized by many high amenity areas within approximately 50 to 100 kms. of the Toronto and Ottawa CMA's (i.e., Georgian Bay and Peterborough region (central) and Rideau Lake (east)). It is further hypothesized that CENT100 (keeping other factors constant)

will have higher growth rates than EAST100 probably as a result of the central region's highly urbanized structure and more extensive highway road system which is likely to encourage higher levels of overall demographic and economic spill-overs.

The SWONT100 and NORTH100 regions, in comparison, are expected to show much lower levels of population growth. Chapter 4 showed the widespread population decline and economic stagnation which have characterized many of the larger urban centres and their hinterlands. Many of these areas have much lower levels of employment growth and highly specialized economies with very poor prospects. For example, the northern region suffers from a highly volatile resource industry where many of the towns rely on a single-industry or on a few large corporations. In contrast, many of the areas in the south-west are specialized in older and declining manufacturing branch plant industries or a declining agriculture base (northern part) (Walker, 1980, 146-161).

Amenity

An amenity variable (AMENITY) was derived to distinguish those areas with a relatively high recreational or amenity value. This variable is a dummy variable which measures the interaction between the presence or closeness of a provincial park or conservation area combined with a coastal location. The amenity variable is intended to be an indirect measure of the overall recreational potential and natural beauty of a non-metropolitan area's locational context. From the review, it was established that amenity or quality of life

considerations are very important factors in residential and retirement migration. It is therefore anticipated that amenity areas (as defined in this study) should show higher levels of population growth compared to non-amenity areas. A positive association between population change and AMENITY is therefore expected. It is expected that the relative importance of the amenity variable will be more pronounced (in a positive way) in the popular amenity areas in the central (Lake Simcoe, Georgian Bay, Muskokas) and eastern (Lake Rideau) regions.

Index of Economic Specialization

A high level of economic specialization in non-metropolitan areas, especially in resources and manufacturing, has been one important obstacle in attracting population. However, a variety of inter-dependent foot-loose industries (manufacturing, finance, government, construction, wholesale, transportation and communications) have in recent years been attracted to small towns and villages. As discussed in earlier sections, these trends have brought about some significant changes in the functions and local industrial structures (Dahms, 1984). The effects of these changes on local industrial structures will be measured in an index of economic specialization (ECINDEX) developed by Marshal (1975). An index of economic specialization (ES_j) was computed for each area (with 1986 employment data) using the following formula :

$$ES_j = \frac{\sum_{i=1}^{N} |X_{ij} - \bar{X}_i|}{N}$$

where $\bar{X}_i$ is the average percentage employed in industry i in the 583 areas; N represents the number of industries (N=8); and X_{ij} is the weighted[2] percentage of employment in industry i in area j. The index is interpreted as the average value of the absolute difference between the weighted employment level in a given area and that of the total number of areas (as a whole). A major advantage of this index over more conventional measures (percentage in manufacturing or resources) is that it allows one to combine different causal factors into one simple variable. For example, the index picks up the effects of high levels of specialization in resource, manufacturing, and service towns in the peripheral regions, while also accounting for major structural changes in earlier years which have resulted in economic diversity in some areas. A negative relationship between population change and ECINDEX is hypothesized. It is expected that higher levels of population growth are associated with lower levels of economic specialization. Lower levels of specialization may be a result of the presence of rural amenities in some areas or considerable employment diversity in other areas. Both of these types of areas are expected to be growth areas. Highly specialized areas, especially those dominated by resource and manufacturing employment, are likely to show lower levels of growth or decline.

---

[2] The weighting was obtained by transforming each each area's X_{ij} into standard (Z) scores and multiplying by a "size" (provincial means for each industry) and "variability" (coefficient of variation within each industry) weight. This procedure made sure that the larger and non-ubiquitous industries were more influential in the calculation of the index (Marshal, 1975, p. 38-39).

2. Demographic Processes

Retirement Migration

The variable (RETMIG) was used to measure the relationship between population change and retirement migration. This variable is defined as the rate of in-migrants 55 years and older into an area from outside of the larger county (Census Division) between 1981 and 1986. This figure excludes those migrants in this age group which moved within the larger county or regional units. The definition of this migrant group involved a lower age limit of 55 years rather than the typical 65 years age group.

There are two important reasons for using the 55+ years age grouping. First, it takes into account both pre-retirement (55-64) and actual retirement (65+) migration processes. The former reflects a rise in the tendency of more wealthy, healthy and early retirement elderly who are involved in migration in earlier stages and have particular attraction to areas with high recreational amenity value. In contrast, the latter retirement group represents a less mobile and government-assisted elderly migrant group which is likely to participate in migration in later stages and be attracted to mainly areas closer to urban centres having existing elderly services. A positive relationship between population change and rates of elderly in-migration is expected. Empirical evidence of elderly population change and migration at the county-level in Ontario confirms the presence of several rural clusters in elderly and major retirement migration destinations in central and northern amenity counties (Rosenberg et. al. 1989, 226). It is, therefore,

expected that retirement migration will be one of the more important factors in the peripheral amenity areas in the central and northern regions.

Residential or Household Migration

This migration variable examined the relative importance of residential or household migration. The variable was defined as a rate of in-migrants aged between 5 and 14 years of age into an area from outside of the larger country (Census Division) (MIG514). As in elderly migration, this figure is viewed as a measure of inter-regional migration since it excludes movements within the larger county or region. There are two important reasons for using the 5 to 14 age group as a measure of household migration. First, this variable when examined across the different area classifications and regions showed a behavioural pattern consistent to the 35 to 44 aged migrants implying a general inter-dependency between these two migrant groups. The two migrant groups were also very highly correlated (0.75). Secondly, more common migration age categories (24-35 and 35-44 years) were avoided since they reflected more or less the higher mobility levels of these younger and independent age groups rather than an underlying social or migration process. In addition, both of these age groups in contrast to the 5-14 aged migrants were highly correlated with many of the census variables which were initially investigated (housing growth, high income, high education, and white-collar occupations). The addition of these two variables would have added substantial collinearity into

the regression models.

So, therefore, it is believed that the 5-14 aged migrants is a much more refined measure of the influences of residential or household migration. It incorporates much of the theory which suggests that these household groups are likely to be involved in employment-led and residential migration (Chalmers and Greenwood, 1977); and, one of the most likely migrant group to be homeowners (Che-Alford, 1990) and commute far distances to work (Frederick, 1990). A positive association between population change and MIG514 is hypothesized. The influence of this variable will be more important in the central and Ottawa-centred region where better transportation access allows a wider separation between place of work and living. In addition, this variable will be more important in those areas closest to metropolitan regions reflecting the desire of these migrants to maintain a predominantly rural home-life combined with easy access to the high and professional urban job opportunities.

Social Status

The social status of individual areas is likely to have an important association with population change. The variable (WCEMP) represents the number of white-collar occupations (managerial, accounting, teaching, etc) as a proportion of the labour force in 1981. Generally, it is expected that high status areas attract predominantly high income and professional migrants (Congdon and Shepherd, 1986 1302). In fact, this is likely to be the case in

Ontario as indicated by the relatively high correlations between WCEMP with university education, in-migration of 35-44 years, and employment income. In context of areas beyond metropolitan influence, this variable is likely to represent small residential or commuting towns which are part of smaller employment hinterlands of small to mid-sized towns (2,500 to 5,000 people).

In the absence of a better status or occupational migration measure, WCEMP will be a surrogate indicator of high-status and professional migrant areas. A positive association between WCEMP and population change is expected in all the models. Its relative importance, however, should be more apparent in areas closer to central and eastern metropolitan areas. This can be explained by the higher levels of employment spill-over to these areas and relative close commuting distance to high paying urban occupations.

3. Economic Processes

Employment Growth

Employment growth is viewed to be an initiator of population change. The relationship between population change and growth in several foot-loose industries was examined. Earlier sections showed that much of the employment growth in non-metropolitan areas may be associated with the dispersal of manufacturing, finance, and government employment. Each process is viewed as being fairly independent of each other (i.e., near zero correlations) and reflects different locational patterns. All three variables are expected to have a positive association with population change.

However, it is expected that manufacturing and finance growth will likely be more important in areas closer to metropolitan areas, while growth in government employment should have a more sigificant influence in the more distant areas and regions.

Three standard measures of growth in total employment in each industry were derived. The first variable (GROWFIN) represents the change in total employment in finance, banking, insurance, and real estate industries between 1981 and 1986. It is likely that the migration of white-collar occupations will follow growth patterns in finance employment. As indicated from the review, it is anticipated that growth in this industry will be concentrated in areas within the central and eastern regions reflecting the importance of maintaining direct and personal communication linkages with the larger urban centres.

The second variable (GROWMFG), in contrast, represents growth in manufacturing employment between 1981 and 1986. Manufacturing is viewed as being much more mobile as a result of innovations in transportation and communication, and efficiency in production techniques. This has made the industry extremely flexible in terms of location. In contrast to most other industries, the decentralization of manufacturing from metropolitan regions should have a more dispersed pattern while influencing the migration of mostly skilled labour migrants.

The final employment growth variable refers to changes in government employment (GROWGOV). This variable represents the change in the number of people employed in various public service

sectors (legislative, judicial, finance and administrative) of the provincial and federal governments. GROWGOV is a good indicator of provincial government policies to decentralize and re-locate many of the functions of the provincial ministries to stagnating urban and non-urban areas. The variable, as a result, is hypothesized to be an important factor in population change in small to mid-sized peripheral and semi-peripheral areas. As well, GROWGOV is likely to be related to increases in some white-collar or administrative migrants.

4. Government Policy

Federal and Provincial Grants

From the literature review, it was established that the government policy can influence local population change. Two different measures of government policy were examined. The first variable (GRT8488) was used to examine the association between population change and financial assistance from upper level governments. This variable is an average value of the annual per capita capital grants ($) from provincial and federal governments to areas between 1984 and 1988. It is expected that the major recipients of these grants will be the smaller and peripheral areas which lag behind the larger areas in terms of development and general stability. A high rate of increase in per capita grants can be interpreted to imply that government in the majority of cases has targeted some declining areas to encourage growth. However, it is also possible that increases in capital grants represent an

effort by government to control or accommodate growth in those areas experiencing already high rates of growth. In either case, a positive association between population change and capital grants is expected. It is however anticipated that this variable will be more important in peripheral areas and regions. This can be partially attributed to an emphasis of provincial governments to encourage growth in declining areas (Ontario Budget, 1988, 10-11).

Local Development Expenditures

The second government expenditure variable, in comparison, measures the influences of local development policy. This variable is an indicator of local development initiatives to encourage population change (DEVPOP83). It represents local per capita expenditures ($) in 1983 on a variety of development projects, ranging from the construction and maintenance of local roadways, installation of sewage and water systems, land-use planning and zoning, and development of industrial and business parks. A positive association between population change and DEVPOP83 is expected. As a direct impact of the expenditures, there is likely to be a significant improvement in the overall quality of the infrastructure and efficiency in many of the local services. This alone may be enough to attract new migrants to the area. However, this will likely depend on whether the area has any other local attractions (i.e., amenity). Nevertheless, it is probable that over time these local improvements should attract potential businesses and investment while also indirectly creating additional job

opportunities. Population growth may eventually come about through employment-led migration to these areas. DEVPOP83 should be more important (in the positive direction) in the large areas (typically 5,000 to 10,000) closer to metropolitan areas reflecting their capability to allocate revenues to local development.

Dependent Growth Variable

The dependent variable in the regression model was a standard percentage growth rate in total population (non-institutional) between 1978 and 1989[3]. This variable was retrieved from the Ministry of Municipal Affairs Data Retrievel System (MARS). There are several reasons why this population growth variable was chosen. First, there is no accessible "net" migration variable(s) for the time period or for the spatial units used in the study. Secondly, there were no available population figures which would allow a comprehensive coverage of the 1980's. The most recent census data allows coverage to 1986. Thirdly, the MARS population figures were viewed as more reliable and consistent since they were obtained from actual population and household counts during municipal elections. The census population figures for a comparable time period, in comparison, were estimated using a 20 per cent sample in 1976 and a 100 per cent sample in 1986.

The 1978-89 growth rates did not conform exactly to the standard normal distribution. In general, the distribution of the

---

[3] Measured as $\frac{\text{Population (1989)} - \text{Population (1978)}}{\text{Population (1978)}} \times 100$

growth rate was slightly to the positive side with a somewhat higher peak than the normal distribution. The census population growth rates (1976-86), in contrast, showed an even higher level of skewness in conjunction with a higher mean. It was decided that no transformation to the dependent growth variable or weighting of individual areas would be done to possibly minimize the effects of highly skewed population growth rates. There are two main reasons for this decision. First, this would be contrary to the study's objective which is to derive a statistical model of "observed" population change rather than one for some transformation(s). Secondly, there appear to be very small differences in the parameter estimates of regression models using transformations (Congdon and Shepherd, 1986) or weighted regression (Richter, 1985) when compared to untransformed and unweighted regression models.

5.2 Some Preliminary Findings

5.2.1 Analysis of Correlations

Before the findings of the multiple regression are reported, it is useful to examine some of the main relationships between selected characteristics and the independent and dependent variables. This should provide greater insight into the underlying associations of the regression models and the interdependency which exists among a variety of variables which otherwise are implicitly included in the regression models. Therefore, the observed associations will aid in the interpretation of the regression parameters.

Dependent Variable :

There are some clear patterns in terms of the probable causal factors showing important associations with population change. The highest positive associations with population change are among the growth or change variables. These variables describe a variety of changes ranging from social and demographic changes (total households, persons under 19 years of age, persons over 65 years of age, and in-migrants 35-44 years of age), long-term housing growth (new housing since 1970 as a percentage of total dwellings in 1986), employment growth, and tax increases. In addition, several affluence measures of income, metropolitan status, and employment (likely to be correlated) are also included.

The highest negative associations with population change represent a remarkably different set of probable causal factors. Rather than illustrating changes, the variables more or less depict specific structural "problems". Most evident measures of structural problems are described by the many social, demographic and economic variables emphasizing poverty, low incomes, farm life-styles, aging, low education, and high unemployment. If this list was to be slightly extended, it would also include measures of poor housing quality and limited accessibility to major provincial highways. In terms of description, it is very likely that such problems will be found in the peripheral parts of the south-western region in areas dominated by primary industries (mainly agriculture).

Independent Variables :

Table 5.2 shows the inter-correlations between the independent variables and other selected characteristics. Starting from the top left corner, The CENT100 variable shows a clear positive association with the younger and middle-aged migrants (25-34 years and 35-44 years). An obvious relationship exists between the central region although correlation with the south-western region is less clear. The SWONT100 variable, in comparison, reflected consistent negative associations with the older age in-migration[4] variables (35-44, 45-54, 55-64 and 65 years) implying a decline in the relative attraction in the region for inter-regional migrants. Similarly, negative relationships were observed with the new dwellings variables and increases in taxes implying a generally low level of development. SWONT100's dominant agricultural or rural character is also highlighted in the positive correlation with percentage farm households and self-employment. Its negative relationship with the eastern region is not clear. The two other regional variables did not show any significant correlations with the other selected characteristics.

The migration variables (MIG514 and RETMIG) show a considerable amount of correlation with other selected characteristics. In particular, MIG514 shows a relatively strong association with the two older migrant age groups 25-34 years (61) and 35-44 years (64). This clearly shows the inter-dependency

[4] The in-migration includes in-migrants into an area from outside of the larger region or county.

TABLE 5.2 CORRELATIONS AMONG REGRESSION INDEPENDENT VARIABLES (ONTARIO MODEL) AND SELECTED CHARACTERISTICS

Selected Characteristics	CENT100	SWONT100	EAST100	NORTH100	AMENITY	MIG514	RETMIG	WCEMP	ECINDEX	GROWMFG	GROWFIN	GROWGOV	DEVPOP83	GRT8488
Geogr phy														
Central	86													
South-west	47													
East		-41												
North														
Rest of CMA														
CA														
Adjacent														
Within100 km.														
Beyond 100 km.							40						40	
Access to 400 Highways														
Economic														
Av. Male Employment Income ($)														
Av. Female Employment Income ($)														
% Self-employed		40						-42						
Employment Growth, 1981-86												43		
Unemployment Rate, 1986														
Male-Female Employment Ratio														
Demography														
						61								
In-migration 25-34, 1981-86	40					64								
In-migration 35-44, 1981-86	40	-40												
In-migration 45-55, 1981-86		-44					51							
In-migration 55-64, 1981-86		-40					94							
In-migration of 65 +, 1981-86		-40												
% Persons under 19 years, 1983							-40							
Growth under 19 years, 1983-88														
% Persons over 65 years, 1983							54						42	
Growth in 65 years, 1983-88							40							
Housing														
Average Housing Value ($)														
% Dwellings - Mjr. Repairs														
% Single-detached Dwellings														
% New Dwellings, 1970-1986		-49												
Social														
% University Education								75						
% Less than Grade 9														
% Farm Households		62					-43							
% Low Income														
Av. Household Income ($)														
Average Household Size														
Government Expenditures														
Per Capita Taxes, 1983														
Per Capita Development, 1983														
Per Capita Social, 1983													44	
Per Capita Fed./Prov., 1983														
Growth in Taxes, 1983-88		-40											48	

between these younger migrants and both young and middle-aged household groups. The retirement migration rate (RETMIG), in contrast, showed different forms of association with the demographic variables. As expected, the variable showed a positive relationship with the percentage of elderly and growth in elderly. In part, this indicates that elderly migrants are attracted to areas which already have elderly populations (and probably existing elderly services). RETMIG also shows high correlations with older migrants 44-54 years (51) and pre-elderly migrants 55-64 years (94). One explanation of this trend may be that some people are migrating in the early or pre-retirement years (mainly the wealthy). Two other negative correlations provide some insight into the locational preferences of elderly migrants as evident by the positive association with areas beyond 100 kms. of CMA Cores (+) and negative relationship in non-farm areas (-).

The variable (WCEMP) shows two important associations with the social and economic characteristics. As indicated by the education variable (Social), there is a particularly high positive association with university education (75) indicating the strong relationship between education and labour. WCEMP also shows a negative association with percentage self-employment (typical of rural farm areas and small rural employment centres). There is also an association between WCEMP and migrants 35-44 years (although its correlation was just below the .40 cut-off). This relationship is considered important since WCEMP had near correlations with the other migrants groups.

The local development expenditure variable DEVPOP83 shows several distinct associations. There was a positive relationship with other local expenditure data such as per capita social expenditures (i.e., culture, recreation) and tax increases. This would imply the importance of social infrastructures in local development, and the link of development with rising costs of living. There is also a positive relationship between DEVPOP83 and areas beyond 100kms. of CMA cores and percentage persons 65 years and over. Such associations may indicate the relative importance of local development policy in attracting retirement migrants and/or providing services for a growing elderly population.

The rest of the independent variables showed an association with at least one or none of the selected characteristics. Growth in government employment (GROWGOV) showed a positive relationship with employment growth implying that government re-location policies may be contributing (either directly or indirectly) to the creation of job opportunities in non-metropolitan areas. The associations among rest of the independent variables with the selected characteristics were fairly low insignificant and were not reported.

5.2.2 Distribution of Population Growth Rates

Area Classifications

A more regional breakdown of the pattern of growth and decline is presented in Table 5.3. When the suburban areas are examined in terms of the different regions, it is obvious that the metropolitan

TABLE 5.3 DISTRIBUTION OF AREAS BY POPULATION GROWTH RATES AND ECONOMIC REGIONS

ECONOMIC REGIONS	Population Growth Rates by Area Classifications, 1978-89					
	CMA CORE AREA	REST OF CMA	CA	ADJACENT	WITHIN 100 KM. OF CMA CORE	BEYOND 100 KM. OF CMA CORE
Central						
-15.0 or less	-	-	-	-	-	
-14.9 to -5.0	1 (10.0)	2 (6.5)	3 (15.0)	2 (4.3)	-	1 (4.8)
-4.9 to 0	5 (50.0)	3 (9.7)	1 (5.0)	4 (8.7)	2 (6.7)	3 (14.3)
0 to +4.9	1 (10.0)	1 (3.2)	5 (25.0)	5 (10.9)	8 (26.7)	2 (9.5)
+5.0 to +14.9	2 (20.0)	5 (16.1)	5 (25.0)	15 (32.6)	9 (30.0)	11 (36.7)
+15.0 or more	1 (10.0)	20 (64.5)	6 (30.0)	20 (43.5)	11 (36.7)	7 (33.3)
	10	31	20	46	30	24
South-west						
-15.0 or less	-	4 (30.8)	-	5 (14.3)	3 (6.4)	1 (4.8)
-14.9 to -5.0	-	-	3 (30.0)	5 (14.3)	12 (25.5)	3 (14.3)
-4.9 to 0	1 (50.0)	5 (38.5)	-	13 (37.1)	15 (31.9)	3 (14.3)
0 to +4.9	-	2 (15.4)	4 (40.0)	10 (28.6)	9 (19.1)	5 (23.8)
+5.0 to +14.9	1 (50.0)	4 (30.8)	-	1 (2.9)	7 (14.9)	6 (28.6)
+15.0 or more	-	2 (15.4)	1 (10.0)	-	1 (2.1)	3 (14.3)
	2	13	10	35	47	21
East						
-15.0 or less	-	-	1 (5.0)	1 (3.6)	-	1 (2.3)
-14.9 to -5.0	-	1 (11.1)	2 (10.0)	4 (14.3)	1 (2.4)	10 (23.3)
-4.9 to 0	1 (100.0)	2 (22.2)	3 (15.0)	2 (7.1)	6 (14.6)	10 (23.3)
0 to +4.9	-	-	6 (30.0)	9 (32.1)	7 (17.1)	10 (23.3)
+5.0 to +14.9	-	-	2 (10.0)	6 (21.4)	11 (26.8)	10 (23.3)
+15.0 or more	-	6 (66.7)	6 (30.0)	6 (21.4)	16 (39.0)	2 (4.7)
	1	9	20	28	41	43
North						
-15.0 or less	-	-	-	2 (11.8)	-	24 (21.1)
-14.9 to -5.0	1 (50.0)	4 (50.0)	4 (33.3)	3 (17.6)	3 (100.0)	31 (27.2)
-4.9 to 0	1 (50.0)	-	3 (25.0)	2 (11.8)	-	14 (12.3)
0 to +4.9	-	-	2 (16.7)	1 (5.9)	-	10 (13.2)
+5.0 to +14.9	-	1 (12.5)	3 (25.0)	4 (23.5)	-	15 (13.2)
+15.0 or more	-	3 (37.5)	-	5 (29.4)	-	20 (17.5)
	2	8	12	17	3	114

Chi-square Results - Central: 39.3 (.006); South-west: 31.2 (.405); East: 42.2 (017); and North: 29.2 (.254)
( ) Parentheses show percentages for column totals in each region

growth is mainly a result of trends in the central region. For instance, it can be seen that an overwhelming 84 per cent (44 of 61) of the suburban areas in the central region show positive growth rates in which 65 % of these (20 of 31) have growth rates exceeding 15.0 %). A similar trend was observed in the Ottawa CMA (east region) although involving an obviously smaller number of areas.

The patterns in the south-western and northern suburbs, in comparison, represented relative decline or stagnation. For example, an equal number of suburbs in the north and nearly 70 per cent of the suburban areas in the south-west had negative population growth rates. An analysis of growth trends across CA's reveals patterns which are again over-exaggerated by the remarkable growth experienced in the central region and to a lesser extent in the east. For example, 16 of the 20 CA's in the central region and 6 of the 9 in the east had positive growth rates. The balance in the number of growing and declining areas in the north and south-west, as expected, is more similar once again implying a general overall level of stagnation in urban growth.

An closer examination of non-CMA and non-CA areas shows a slightly different picture. Once again it is evident that any notions of metropolitan or urban spill-over are apparent in the mainly central and eastern regions. Both regions have an overwhelming number of adjacent areas (85 % in the central region and 70 % in the east) and those areas within 100 kms. of CMA cores (93 % in the central and 83 % in the east) with positive growth

rates.

For similar area types in the north and south-west, the number of growing and declining areas, as with the metropolitan and urban areas, is virtually the same with little sign of dominant growth. In more distant areas (beyond 100 kms. of CMA cores), there is some difference in the pattern of growth and decline not picked in the aggregate analysis. The dominant growth which has been observed in the central region is once again confirmed even in the more distant areas as 70 per cent of the areas had positive rates exceeding 5 per cent. Surprisingly, the south-western region, contrary to trends in earlier analyses, has shown clear growth signs among areas beyond the influence of CMA cores with nearly 70 per cent (14 of 21 areas) having positive growth rates.

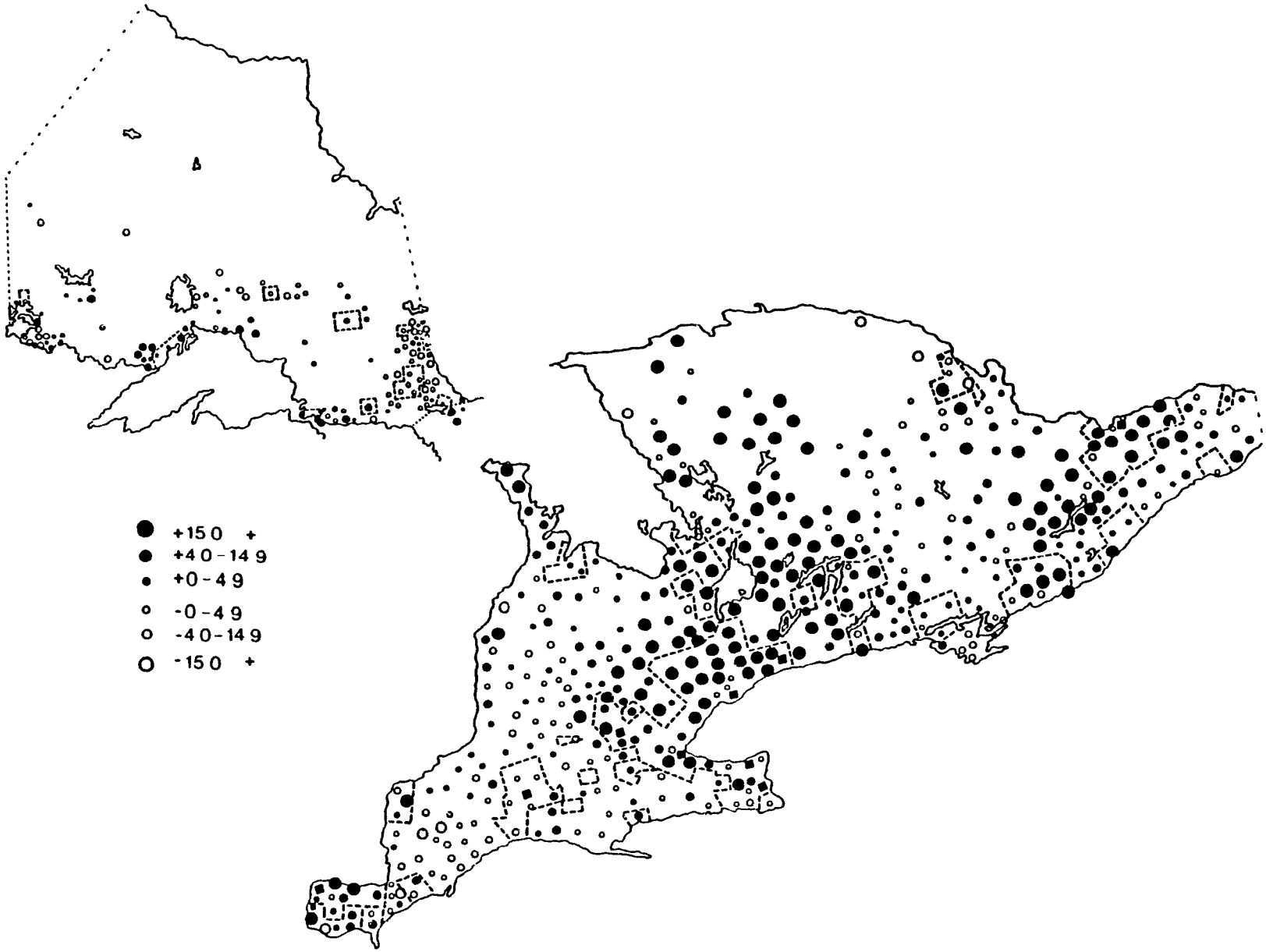
The eastern region, in contrast to the growth observed in areas closer to CMA's and CA's, did not show a similar pattern of growth. In fact, nearly half of the areas beyond 100 kms. of the Ottawa CMA had negative and positive growth rates. In the north, on the other hand, there is widespread decline among areas beyond 100 kms. of CMA cores. Although there is a larger number of areas beyond the influence of CMA's, in absolute terms, 48 per cent (55 of 114) of the areas have negative growth rates less than -5.0 per cent.

A comparison of the regional chi-square figures implies two important associations. First, the significant chi-square statistics in the central and eastern may be interpreted to imply that the relative location to metropolitan or urban areas in these

regions is more influential in terms of population change. Indeed, this has been partially confirmed by the high rates of growth in areas closest to the metropolitan and urban areas. Secondly, the insignificant association observed in the south-western and northern regions implies possibly that more localized conditions or attractions are more important as factors associated with local population change rather than relative location to metropolitan and urban areas. This finding appears to be consistent with the mixture and variability characterizing patterns of growth and decline in areas within and beyond CMA and CA areas.

Spatial Pattern of Growing and Declining Areas

A visual inspection of the spatial pattern of population growth and decline confirms earlier findings (Map 5.1). As interpreted from the tables, there is a striking cluster of high growth areas within the boundaries of the "greater" Toronto (central) and Ottawa (east) CMA's confirming the presence of suburbanization. The only other areas showing some signs of suburbanization include Windsor CMA (to some extent), Kingston CA's and Barrie CA. In terms of spill-over trends, the major clusters of high growth areas (as shown in earlier tables) have been in proximity to the "greater" Toronto and Ottawa CMA's. The importance of adjacency status in the central region is clear as seen by the nearly continuous stretch of high growth areas (+15.0 % or more) bordering the Toronto/Oshawa/Kitchener-Waterloo CMA's and other CA's. The remaining regions are not characterized by comparable



MAP 5.1 DISTRIBUTION OF POPULATION GROWTH RATES, 1978-89

patterns of growth among adjacent areas, although some evidence can be seen around the Ottawa CMA (east) and Thunder Bay CMA (north).

More extensive spill-over (50 to 100 kms. of CMA cores) is apparent in the eastern and central regions. In the east, there is an apparent cluster of high growth areas within the influence of the Ottawa CMA (around Lake Rideau). Similarly, there is also a cluster of positive growth areas within 50 to 100 kms. of CMA cores in the central region (Toronto, Oshawa, Kitchener-Waterloo). However, these growth rates are slightly more variable and less concentrated (although positive) reflecting the influences of both growing (Toronto and Oshawa) and stagnating metropolitan areas and regions (Hamilton, St. Catharines, Haldimand-Norfolk). The south-western region, in comparison, shows a fairly irregular pattern of declining areas within the influence of the Windsor and London CMA's. A similar pattern of decline has been observed around Northern CMA's although to a less extreme because of the relatively small number of areas within metropolitan influence.

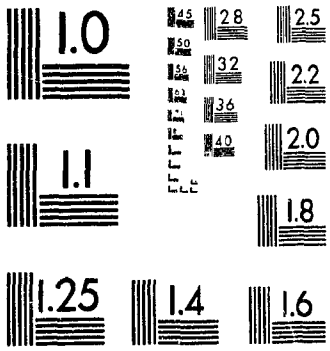
With respect to the pattern of growth and decline in areas beyond 100 kms. of CMA cores, there are two major clusters in the central region. Both clusters of high growth rates (exceeding +15.0 %) can be seen in the high amenity regions to the east of Lake Simcoe and north and east of the Peterborogh CA, and in the Haliburton region to the east of Georgian Bay. In contrast, a larger number of both low positive and negative growth rates can be seen in eastern peripheral areas, although there is no distinct spatial pattern. In the south-west, the pattern of growth rates is

more or less localized among only a few areas beyond metropolitan influence (see, for example, those growing areas at the most northern tip of the region and minor stretch along Lake Huron). In general, the south-western region is characterized by a very dominant cluster of stagnation (low positive and negative growth rates) in the central part of the region (north of London and west of Kitchener-Waterloo). Northern areas beyond 100 kms. are characterized by predominantly negative population growth rates (especially around the CA's). Most of the growth in the north has been accounted by very small areas on the two island areas (south of Sault. Ste. Marie and Manitoulin Island) (not included in the analysis).

5.3.2 Interpretation of the Statistical Results

Ontario Aggregate Models

The three regression models were compared in order investigate their sensitivity to different specifications (Table 5.4). In general, all three of the models had relatively low R^2 values (ranging from 0.43 in model 1 to 0.30 in model 3) implying a fairly low level of explanation of the geographical variations in population change. The effect of adding the suburban parts of CMA's and CA's (Model 2) was to reduce the R^2 from 0.43 (Model 1) to 0.32. This large reduction in explanation is probably attributed to the lack of metropolitan or urban-based (i.e., commuting, extended public transportation systems, taxes, congestion) and macro-level (i.e., recession, policy) causal factors absent from the model.



more or less localized among only a few areas beyond metropolitan influence (see, for example, those growing areas at the most northern tip of the region and minor stretch along Lake Huron). In general, the south-western region is characterized by a very dominant cluster of stagnation (low positive and negative growth rates) in the central part of the region (north of London and west of Kitchener-Waterloo). Northern areas beyond 100 kms. are characterized by predominantly negative population growth rates (especially around the CA's). Most of the growth in the north has been accounted by very small areas on the two island areas (south of Sault. Ste. Marie and Manitoulin Island) (not included in the analysis).

5.3.2 Interpretation of the Statistical Results

Ontario Aggregate Models

The three regression models were compared in order investigate their sensitivity to different specifications (Table 5.4). In general, all three of the models had relatively low R^2 values (ranging from 0.43 in model 1 to 0.30 in model 3) implying a fairly low level of explanation of the geographical variations in population change. The effect of adding the suburban parts of CMA's and CA's (Model 2) was to reduce the R^2 from 0.43 (Model 1) to 0.32. This large reduction in explanation is probably attributed to the lack of metropolitan or urban-based (i.e., commuting, extended public transportation systems, taxes, congestion) and macro-level (i.e., recession, policy) causal factors absent from the model.

TABLE 5.4 MULTIPLE REGRESSION OF SELECTED AREA CHARACTERISTICS ON POPULATION GROWTH RATES, 1978-89 (ONTARIO MODELS)

Variable	Ontario[1]		Ontario[2]		Ontario[3]	
	b	ß	b	ß	b	ß
CENT100	6.68	0.22 [3]	4.92	0.07	5.49	0.20 [4]
EAST100	4.45	0.14	-1.54	-0.02	3.70	0.13 [6]
SWONT100	-1.28	-0.04	-0.93	-0.01	-	-
NORTH100	-8.14	0.07	-3.31	-0.01	-	-
AMENITY	-2.29	-0.06	-0.65	-0.008	0.53	0.01
MIG514	1.61	0.18 [4]	4.93	0.25 [2]	1.78	0.21 [3]
RETMIG	1.64	0.32 [1]	1.38	0.11 [5]	1.61	0.33 [1]
WCEMP	0.81	0.15 [5]	3.51	0.36 [1]	0.69	0.14 [5]
ECINDEX	-0.80	-0.08	0.10	0.06	-0.11	-0.11
GROWMFG	0.01	0.03	0.07	0.11 [5]	0.06	0.07
GROWFIN	0.005	0.03	0.05	0.12 [4]	0.01	0.07
GROWGOV	0.05	0.25 [2]	0.07	0.13 [3]	0.05	0.24 [2]
DEVPOP83	-0.005	-0.03	0.005	0.01	-0.004	-0.02
GRT8488	0.0004	0.01	0.002	0.02	-0.0003	-0.01
CONSTANT	-11.23[a]		-54.48[b]		-9.62[c]	
R^2	0.43		0.32		0.30	
No. of Areas	335		415		139	

[1] - includes areas outside of CMA's and CA's (excluding CSD's on islands)
[2] - model includes REST OF CMA (i.e., only suburban or fringe areas) and CA's; excluding CMA cores
[3] - model same as 1 except Northern and South-western areas are excluded
b - Partial Regression Co-efficients; ß - Beta Weights
[ ] - Rank according to Beta (ß)
a, b, and c - beyond 100 km. and non-amenity (in the constant)

This finding is consistent with Cloke's (1985) argument stating that rural or non-metropolitan population change is predominantly the result of rural-based or localized factors which are likely to be operating alongside metropolitan-based factors (p. 17).

The elimination of the northern and south-western regions (Model 3) reduced the level of explanation to 0.30. Model 3 showed that the importance of regional differences and features (i.e., settlement system, prosperity, employment structure, demography) in explaining overall patterns of population growth and decline. The level of explanation in the three models appears to be standard across similar types of regression analyses (Borchert, 1991). The large unexplained residuals are likely a result from the local, historical, and temporal factors not included in the models. In addition, it is likely a result of "partial" modelling approaches where only parts of the settlement system are examined or a limited number of variables are used to represent a complex system of causal factors.

There are considerable differences in the parameter estimates in the aggregate models. Model 1 shows that higher rates of population growth are likely to be associated with the high rates of retirement (RETMIG) and household (MIG514) migration, growth in government employment (GROWGOV), white-collar occupations (WCEMP), and location in the central (CENT100) and eastern (EAST100) metropolitan regions. As interpreted from the ß values, retirement migration appears to be more important than residential or household migration as a factor related to population change. The

remaining ß values for the rest of the variables in Model 1 are close to zero indicating their relatively low importance as factors associated with population change. The signs of the parameters are as hypothesized except for local development expenditures (DEVPOP83) which had a negative association with population change. This may indicate that "natural" growth factors such as retirement or amenity-related factors may be more important as sources of demographic change in non-metropolitan areas.

The structure of parameters changes with the inclusion of CMA's and CA's in Model 2. In contrast to the first model, all three employment growth measures become important in terms of their association with population change. This would imply that employment-led growth (aside from government employment) is more important in the growth of suburban areas. This finding is also consistent with the arguments which imply that manufacturing and financial services have not decentralized to the extent of population.

Another important change can be seen in the rise in household migration (MIG514) and relative decline in retirement migration (RETMIG) as factors associated with population change. This change is supported by a similar rise in the white-collar occupation variable (WCEMP) as the most important factor. The rise in the relative importance of WCEMP and MIG514 is seen as an indicator of the desire of young professional households to move to suburban areas while still maintaining employment ties to large urban centres through daily commuting. It should be noted, however, that

retirement migration is still a relatively important factor associated with population change (despite the drop in the ß value). One reason for this is that the elderly are still likely to find high recreational amenities and elderly services in small areas within metropolitan boundaries.

The regional measures (CENT100 and EAST100), in comparison to Model 1, showed the largest drops in terms of relative importance. This change can be related to the relatively strong causal influences of metropolitan-based factors over the rather speculative causal factors implied by the two regional variables. The change in EAST100's sign from positive to negative may be explained by the influences of some stagnating CA areas which fall within the influence (100 km. radius) of the Ottawa CMA.

Once again the remaining measures of amenity, employment specialization, and the two government expenditures show relatively low importance as factors associated with population change. However, there was a reversal in the signs in the employment index (ECINDEX) and local development expenditures (DEVPOP83) from negative to positive. These changes imply that higher levels of population change are associated with initially high expenditures on local infrastructure and relatively high employment specialization (i.e., suburban/ fringe manufacturing or services centres). The opposite seems to be true for non-metropolitan areas (see Model 1).

The exclusion of the south-western and northern regions from the initial model in Model 3 have slightly different effects on the

individual parameters. There is virtually no difference in the relative importance of the individual variables between Model's 1 and 2. The top six causal factors identified in Model 1 (RETMIG, GROWGOV, MIG514, CENT100, and EAST100) all appear in similar order with positive signs in Model 2. This may imply that the retirement and household migration, and government employment growth (even when controlling for regional effects) are causal factors which are likely to be common (in varying degrees) in the different regions.

There are, however, some important changes from the initial model. First, there is a rise in the manufacturing growth as a relative important factor associated with population change (ß value rose from 0.03 to 0.11). This implies that manufacturing growth is likely to be a regional growth trend (paralleling Ray's (1965) economic shadow) which may now be focused entirely on the central region (and perhaps around the Ottawa CMA). A smaller increase was observed in the financial services growth.

A second change involves an upward shift in the relative importance in the negative relationship between employment specialization (ECINDEX) and population change. One can attribute this change to the effects of removing the high levels of resource specialization in many south-western and northern communities. The preservation of a negative relationship in the model indicates the importance of employment diversity (typical of central Ontario) or non-economic factors in influencing population change. This latter argument is partially supported by the switch in AMENITY's sign from negative in Model 1 to positive (although less important) in

Model 3. The only other difference was the reversal in the relationship between provincial and federal capital grants (GRT8488) and population change from positive to negative. This reversal in sign is an indication of the efforts of government policy to assistance mainly peripheral and declining regions. However, the association between GRT8488 (as interpreted from the very low ß value) would indicate a weak influence in population change (keeping other factors constant).

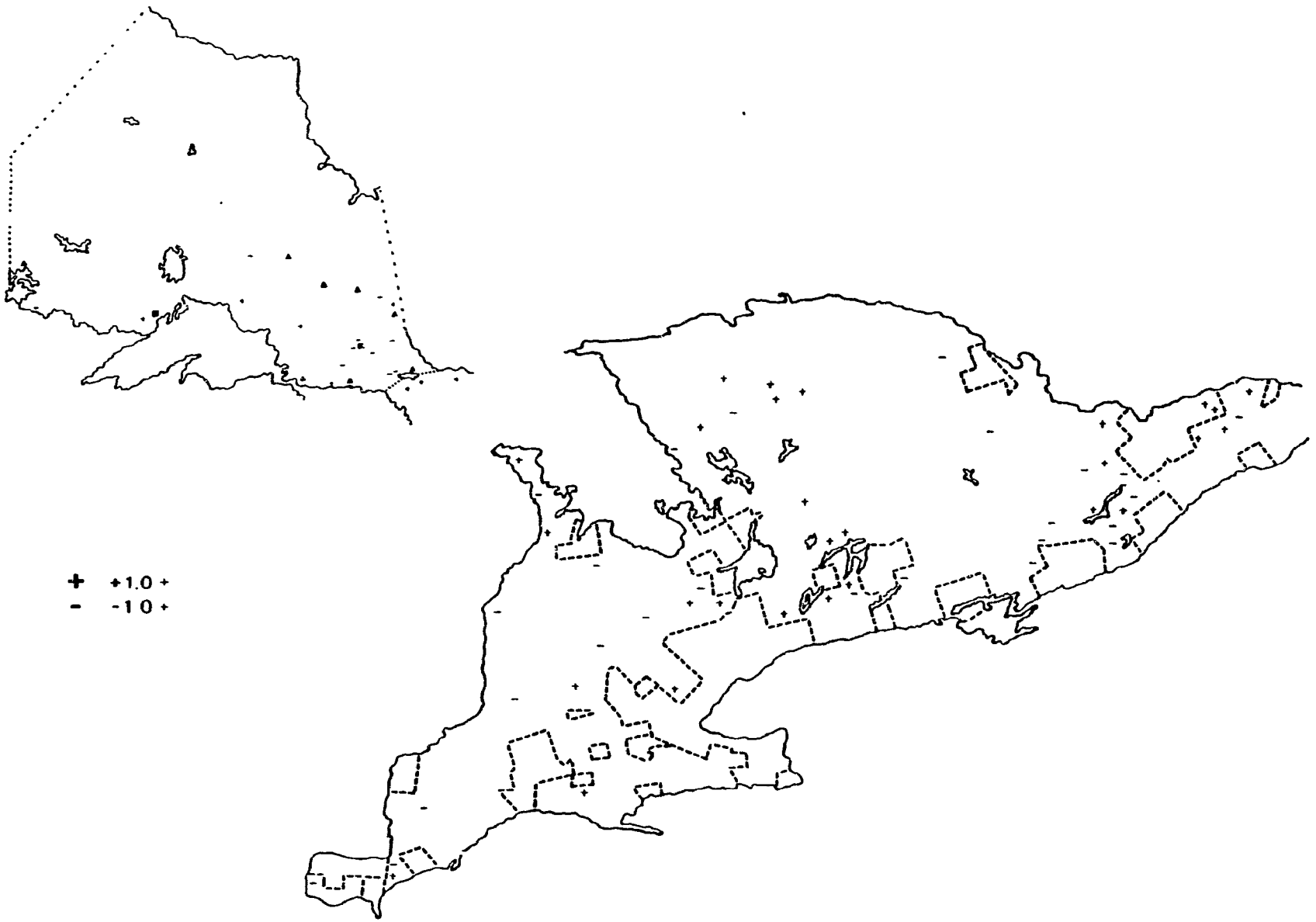
Residual Analysis

There were variations in the overall accuracy (based on the distribution of standardized residuals) of the three aggregate models in predicting population changes. Model 1 (including only non-CMA and non-CA areas) showed a high concentration of residual values toward the centre of the distribution (i.e., near zero residuals). Although, the distribution was slightly more skewed toward the positive side reflecting the presence of several cases in which population growth were under-predicted. The distribution of standardized residuals in Model 2, in contrast, was even more concentrated toward the centre. The inclusion of metropolitan and urban areas improved the overall predictive accuracy of the model because of the widespread nature of metropolitan growth and presence of two important causal factors (migration and white-collar occupations). In the third model (excluding the north and south-west regions), the distribution of standardized residuals resembled a form as Model 1 indicating the relative stability of

non-metropolitan based factors.

Focusing on the non-CMA and non-CA in Model 1, there were several patterns in the distribution of the standardized residuals. A total of 55 individual areas have standardized residuals exceeding the selected ± 1.00 cut-off. There are 28 areas having negative residuals where population growth rates are over-predicted. Another 27 areas have positive residuals in which population growth rates are under-predicted. The highest positive residual was 4.82 (Russell (5,773) -- adjacent to Ottawa CMA), while highest negative residual was -2.98 (Rolph Buchanan et. al. (7,848) -- adjacent to Pembrook CA) (Map 5.2).

There were three small clusters of positive residuals in the amenity regions east of Georgian Bay, north of Peterborough, south of North Bay showing that population growth rates in several of these areas have been under-predicted. This is probably due to the limitation of the amenity variable (coastal x major park) which does not pick up the influences of other non-coastal amenity factors (recreational services, restaurants, motels, cottages). The remaining positive residuals were predominantly in those areas adjacent to CMA's or CA's. A closer look at other characteristics in these areas revealed that many of them were characterized by relatively high levels of employment growth. This supports earlier theoretical arguments on the importance of employment-led population growth. In the absence of a "total" employment growth measure, population growth in these areas was under-predicted. Similarly, there were other adjacent areas (several of which were



MAP 5.2 HIGHEST POSITIVE AND NEGATIVE RESIDUALS (ONTARIO MODEL)

within 50 to 100 kms. of CMA's) where population growth rates were over-predicted (negative residuals). Typically, these areas were characterized by little change or actual losses in total employment. These over-predictions in population growth rates are a result of the diversity of causal forces which are implicitly captured in measures of relative metropolitan location (demographic or employment spill-overs, commuting) in which some cases they are not valid. This is probably best illustrated in those areas around the Sudbury metropolitan area in the north. However, the limited over-predictions is indication of the importance between relative metropolitan location and population growth.

Regional Disaggregated Models

A total of four regression models were specified in the different economic regions (Table 5.5). Similar independent variables were used as in the Ontario models with the expectation of the three area classification variables which were used to control for the influences of metropolitan and urban spill-overs. In terms of the overall level of explanation in the separate regression models, the central and eastern models had considerably higher R^2 (0.49 and 0.53 respectively) than the south-west (0.30) and northern (0.29) models. One reason for this sizeable difference in the R^2 values may be that the causal factors portrayed in the independent variables have a geographical bias in terms of the central and eastern regions (i.e., stronger metropolitan influence, manufacturing growth, white-collar occupations). At the same time,

TABLE 5.5 MULTIPLE REGRESSION OF SELECTED AREA CHARACTERISTICS ON POPULATION CHANGE, 1978-89 (ECONOMIC REGION[1] MODELS)

	Economic Regions							
	Central		South-West		East		North	
Variable	b	β	b	β	b	β	b	β
ADJACENT	2.93	0.12 [5]	0.39	0.02	6.39	0.21 [5]	0.09	0.002
WITH100	-3.31	-0.12 [5]	-1.97	-0.12 [5]	15.22	0.53 [2]	in ADJACENCY[2]	
AMENITY	-2.46	-0.07	-3.93	-0.19 [2]	10.83	0.27 [3]	16.03	0.16 [3]
MIG514	1.37	0.19 [4]	1.01	0.15 [3]	6.02	0.54 [1]	0.45	0.04
RETMIG	1.67	0.44 [1]	1.63	0.44 [1]	-1.25	-0.15	4.24	0.42 [1]
WCEMP	0.38	0.08	0.41	0.11	0.06	0.01	0.55	0.07
ECINDEX	-0.28	-0.33 [2]	-0.06	-0.12 [5]	0.03	0.03	0.07	0.06
GROWMFG	0.04	0.07	-0.01	-0.06	0.07	0.14	0.03	0.13 [4]
GROWFIN	-0.006	-0.02	-0.002	-0.02	0.03	0 22 [4]	0.02	0.07
GROWGOV	0.06	0.32 [3]	0.02	0.13 [4]	0.01	0.05	0.06	0.26 [2]
DEVPOP83	-0.007	-0.05	0.002	0.02	-0.03	-0.11	-	-
GRT8488	-0.0009	-0.04	0.003	0.03	0.0003	0.01	-	-
CONSTANT	7.13[a]		-8.18[b]		-19.68[c]		-22.03[d]	
R^2	0.49		0.30		0.53		0.29	
No. of Areas	79		91		93		130	

1 - includes areas outside of CMA's and CA's (excluding CSDs on islands)

2 - three areas within 100 km. combined with adjacency variable

b - Partial Regression Co-efficients; β - Beta Weights

n.a. - not applicable in the analysis; [ ] - Rank according to Beta Weight (β)

a to d - beyond 100 km. and non-amenity

other causal factors more relevant to the growth experiences of south-western and northern areas have not been properly represented (i.e., resource decline, world resource markets, government policy).

Central Ontario

The most important causal factors in the central region include retirement migration (RETMIG), employment specialization (ECINDEX), government employment growth (GROWGOV), household migration (MIG514), and the two area classification variables (ADJACENT and WITH100). All of the parameters have signs as hypothesized. As in the Ontario model (1), retirement migration appears to be more important as a factor influencing population change than household migration (as interpreted by the large difference in ß values). In contrast to the Ontario model (1), the employment index (ECINDEX) rises to be become an important factor associated with population change. This implies that higher levels of population growth, at least in the central region, are related to lower levels of employment specialization (typical of areas specialized in recreation or predominantly residential/commuting towns).

The rise of non-employment factors may partially explain the relatively low importance of employment growth in the two "foot-loose" industries (GROWMFG and GROWFIN). In fact, GROWFIN shows a negative relationship with population change which is contrary to what was expected. This confirms earlier descriptive analyses which

showed the highest rates of growth in financial services to be located in metropolitan rather than non-metropolitan areas. However, it should be noted that GROWMFG was slightly more important in the central region compared to the Ontario model (1). Similar to the Ontario model (1), the growth in government employment (GROWGOV) measure is one of the most important causal factors associated with population growth.

The rest of the variables show relatively low levels of importance. The AMENITY measure maintains its negative sign and similar importance as in the Ontario model (1). The government policy measures remain less important and maintain the same signs (in the negative direction) as in the Ontario model (3) which excluded the south-western and northern regions. The white-collar occupations (WCEMP) maintains its positive sign but becomes less important than in the Ontario model (1).

South-western Ontario

The patterns of economic stagnation are clear in the south-western region model. As in the central region, the largest ß values are once found in high rates of retirement (RETMIG) and household (MIG514), growth in government employment (GROWGOV), and low employment specialization (EMPINDEX). However, in contrast to the central region, AMENITY, describing the interaction between coastal areas and major parks, becomes one of the most important factors associated with population decline. The negative sign in AMENITY is opposite to what was expected (at least in theory).

However, the negative relationship with population change is consistent with the patterns of relatively low and negative growth rates observed in many of the coastal areas.

In contrast to the central regions, ADJACENT areas have higher growth rates than areas beyond metropolitan influence. As well, areas within the influence of south-western CMA's have higher rates of growth than those beyond metropolitan influence but generally these levels are relatively low. The lowest rates of population growth are among those areas at the periphery of the south-western region. The negative sign in the WITH100 (which is a fairly important variable associated with population decline) is consistent with the population losses observed in many areas within the influence of the Windsor and London CMA's. Overall, all area types are characterized by relatively low levels of population change as indicated by the low positive and high negative regression co-efficients.

There are some distinct trends in the south-western model. As in the central model, the employment growth measures are less important as causal factors related to population growth. In fact, both growth in manufacturing and financial services are negative with low ß values. This finding confirms earlier clues which have implied a pattern of economic stagnation in this region. The two government policy measures, in contrast to the central model, become positive in sign but with no real change in the relative importance. This indicates that population growth in south-western areas may be partially influenced by higher levels of local

development expenditures and capital grants. However, the relatively low regression co-efficients and ß values indicate that government expenditures (as independent causal factors) are not likely to influence direct population growth. The WCEMP measure maintains its positive sign indicating the relative importance of social status in influencing population change.

Eastern Ontario

The relative importance of independent causal factors is very different in the eastern region. In contrast, to other regions, higher rates of household migration (MIG514) show the most important association with population growth. In comparison, the relationship between population change and retirement migration (RETMIG) changes from positive to negative. However, RETMIG maintains a relatively important role in terms of its ß value indicating that high rates of population growth are associated with lower rates of retirement migration.

These patterns are supported by the importance of the spill-over measures (WITH100 and to a lesser extent ADJACENT) which imply that areas closer to the Ottawa CMA (including areas adjacent to CA's) have higher population growth rates than areas beyond metropolitan influence. Both of these measures have relatively large ß values indicating the relative importance of metropolitan and urban influence as factors related to population growth. The AMENITY measure, on the other hand, is positive and important (in terms of its large ß value) indicating the important relationship

between coastal location and closeness to major parks and population growth. This describes those amenity areas near Lake Rideau and River which happen to be close to Ottawa. The findings coincide with the rapid ex-urbanization of young professional families to smaller amenity towns in the greater Ottawa area (McRae, 1980).

In addition to the importance of demographic factors (mainly household migration), there is an indication that employment spill-over is an important causal process associated with population growth. Both growth in financial services (GROWFIN) and manufacturing (GROWMFG) have important positive associations with population growth. The relationship between population growth and growth in government employment (GROWGOV), although still positive, becomes less important in terms of the ß values (compared with GROWFIN and GROWMFG). The employment index (ECINDEX), in comparison, takes on a positive value implying that population growth is likely to be occurring in small manufacturing or service areas in proximity to Ottawa. The white-collar occupation measure (WCEMP) had a positive relationship with population growth. However, this relationship was less important in the eastern region compared to the other regions. This finding may imply that houshold migration from the Ottawa CMA may be a fairly recent trend and/or that is associated with other factors besides residential considerations (i.e., employment-led, amenity-related).

In terms of the government expenditures, the local development expenditures (DEVPOP83) measure took on a negative sign (as in the

central region) and became more important in the eastern region. This may imply the presence of an already existing infrastructure in some communities or the influences of demographic and economic growth-inducing processes which are occuring independently of local government policy. Federal and provincial capital grants (GRT8488), in contrast, has a positive sign with population change (opposite of central ontario). The positive sign may be an effect of greater government assistance in areas beyond the influence of the Ottawa CMA.

Northern Ontario

In the north, retirement migration (RETMIG) emerges once again as one of the most important causal factors associated with population growth. In contrast to the other regions, household migration (MIG514) has almost no influence on rates of population growth (as indicated by relatively low regression co-efficient and ß value). As in the east, the AMENITY areas have higher growth rates than non-amenity areas. All three employment growth variables have a positive association with population growth. However, growth in government (GROWGOV) and suprisingly manufacturing (GROWMFG) employment have more stronger associations with population growth.

The rest of the independent variables show weaker levels of association with population growth. ADJACENT areas have higher rates of population growth than non-adjacent areas. As indicated by the near zero regression co-efficient and high standard error, the adjacency variable (as in the south-west) does not imply any major

urban spill-over from the mostly stagnating metropolitan and urban areas in the north. The sign of the employment index (ECINDEX) was as expected. Although, the positive sign is consistent with earlier results emphasizing the importance of non-employment areas specializing in amenity and retirement. As in the other regions, the white-collar occupation (WCEMP) measure has a positive association with population growth. The government policy were regretfully discarded from the northern model because of an insufficient number of valid cases for smaller communities beyond 100 kms. of CMA cores.

Area Classification Models

Three separate regression models were specified to examine the relative importance of the independent variables across the different area classifications (Table 5.6). The overall explanation of the variability in population change, in comparison to the regional models, was improved in the area models. The R^2 value ranged from 0.54 in model 1 (adjacent areas) to 0.62 in model 3 (beyond 100 kms. of CMA cores). A slightly higher level of explanation in the area classification models can be attributed to less variability in population growth rates in each area classification.

Model 1 (Adjacent Areas)

The adjacency model shows the dominance of demographic factors

TABLE 5.6 MULTIPLE REGRESSION OF SELECTED AREA CHARACTERISTICSON POPULATION GROWTH RATES, 1978-89 (AREA CLASSIFICATION[1] MODELS)

	Area Classifications					
	Adjacent		Within 100 km. of CMA core		Beyond 100 km. of CMA core	
Variable	b	β	b	β	b	β
CENTRAL	2.41	0.09	7.67	0.24 [3]	3.62	0.12
EAST	-5.07	-0.16 [5]	10.17	0.35 [1]	-9.61	-0.24 [5]
SOUTH-WEST	-6.49	-0.24 [2]	-	-	-2.56	-0.08
AMENITY	n.a.	n.a.	0.06	0.002	-11.50	-0.30 [4]
MIG514	1.94	0.20 [4]	1.57	0.19 [4]	1.24	0.10
RETMIG	2.06	0.37 [1]	0.07	0.01	1.52	0.38 [2]
WCEMP	0.54	0.11	1.13	0.19 [4]	1.72	0.33 [3]
ECINDEX	-0.21	-0.21 [3]	-0.02	-0.03	-0.04	-0.05
GROWMFG	0.03	0.04	0.05	0.11	-0.02	-0.09
GROWFIN	0.009	0.05	0.03	0.17 [5]	-0.008	-0.05
GROWGOV	0.002	0.009	0.07	0.32 [2]	0.07	0.46 [1]
DEVPOP83	0.006	0.03	-0.01	-0.06	-0.004	-0.03
GRT8488	-0.002	-0.08	0.002	0.06	0.0008	0.02
CONSTANT	-1.87[a]		-13.89[b]		-16.39[c]	
R^2	0.54		0.52		0.62	
No. of Areas	100		97		140	

1 - includes areas outside of CMA's and CA's (excluding CSDs on islands)
b - Partial Regression Co-efficients; β - Beta Weights;
n.a. - not applicable in the analysis; [ ] - Rank according to Beta Weight (β)
a - north; b - south-west and non-amenity; and
c - north and non-amenity (in the constant)

and regional measures. Both retirement (RETMIG) and household (MIG514) migration have as expected positive and strong associations with population growth. The ß value for the retirement migration (RETMIG) is slightly larger than for household migration (MIG514). Also as expected, the employment index (ECINDEX) has a negative association with population change. This relationship can be interpreted to imply that higher levels of population growth (either through retirement or residential migration) may be related to non-employment factors such as housing quality and costs, access to metropolitan employment centres, availability of land, etc. The importance of low employment specialization as a factor in population change is partially supported by the poor performance of the employment growth measures, especially GROWGOV which had been an important causal factor in the regional models. In fact, the employment growth factors showed the weakest associations with population growth.

The relative growth in adjacent areas is influenced by their regional location. Adjacent areas situated in the CENTRAL region have higher growth rates than in the north, while EAST and SWONT adjacent areas show lower rates of growth than in the north. The relatively low growth in adjacent areas in the east is a result of the relative stagnation (less spill-over) around many of the areas adjacent to eastern CA's. This causes the relatively high growth rates around the Ottawa CMA to be off-set by other declining areas. The northern growth rates, in contrast, may be somewhat exaggerated due to the smaller number of adjacent areas and the highly skewed

growth rates in fewer areas.

The rest of the causal variables were related to population change in the hypothesized manner. The white-collar occupations (WCEMP) measure showed a positive association with population growth. Of the two government expenditure measures, only federal and provincial capital grants (GRT8488) showed a relatively important and negative association. Typically, adjacent areas having high rates of population growth are those with low levels of capital grants from federal and provincial sources. Local development expenditures (DEVPOP83), on the other hand, had a positive association with population growth

Model 2 (Within 50 to 100 kms.)

This model, in contrast to Model 1 (adjacent areas), emphasizes the importance of regional and employment growth factors. It can be seen that areas within the influence of Ottawa (EAST) and other CMA's (most likely Toronto) in the CENTRAL region have higher growth rates than in the south-west. The three employment growth measures (especially GROWGOV AND GROWFIN) have relatively large and positive ß values indicating their strong relationship with population growth. One may interpret this to mean an extended form of economic spill-over into smaller areas within influence of the metropolitan areas. The household migration (MIG514) has a much stronger positive association with population growth than retirement migration (RETMIG). In fact, the retirement migration has a near zero regression co-efficient and ß value

confirming its weak association with population growth in areas located within 50 to 100 kms. of CMA's. The white-collar occupation (WCEMP) variable maintains its positive relationship with population growth. It becomes a more important causal factor than in Model 1 to highlight the importance of high status or professional areas as destinations for metropolitan-origin migrants.

The remaining variables show relatively weak associations with population growth. AMENITY has a positive association with population growth but it is not very important probably because the amenity-factors represented in CENTRAL and EAST. The two government expenditure measures, on the other hand, are opposite to what was observed among the adjacent areas. In other words, higher levels of population growth are associated with low local development expenditures measure (DEVPOP83) and high federal and provincial grants (GRT8488). Both measures have fairly low ß values implying that their association with population growth (in relative terms) is weak.

Model 3 (Beyond 100 kms.)

There is an emphasize on different types of causal factors in areas beyond 100 kms. of CMA cores. These areas have higher population growth rates in the CENTRAL region as compared to the north. Similarly, the levels of growth in the EAST and SWONT (although low) are slightly higher than in the north. The relative importance of the negative EAST variable confirms the declining

status of areas beyond Ottawa's influence. The most important variable is the government employment variable (GROWGOV) suggesting that government re-location policies may indeed work to encourage population growth in peripheral areas. The other two employment measures (GROWFIN and GROWMFG), in comparison, have a negative association with population growth.

High rates of retirement migration (RETMIG) once again emerges as an important causal factor related to population growth. Household migration (MIG514), on the other hand, although still relatively important and positive, has a much lower ß value than RETMIG. The AMENITY measure emerges as an important causal factor associated with lower rates of population growth. This relationship is mainly an effect of the clusters of coastal areas close to major parks in the south-west which are experiencing population decline. The white-collar occupation (WCEMP) variable, in comparison to the other models, suprisingly became a much more important factor. WCEMP's importance may be an indication of the rise in professional migrant areas which serve as predominantly residential purpose for a smaller scale system of rural employment centres. The sign and relative importance of the employment index (ECINDEX), local development expenditures (DEVPOP83), and capital grants (GRT8488) was the same as in Model 2 (within 100 kms.).

6. SUMMARY AND CONCLUSIONS

6.1 Summary and Conclusions

The first part of the analysis identified several prominent changes in the patterns of population growth and decline. First, there was clear evidence of metropolitan growth in Ontario. This was characterized by mainly dominant growth achieved in the Toronto metropolitan region. The central region,in particular, has become the major growth region of the province. Three different forms of growth processes were observed to be taking place in this region. First, there was rapid suburbanization throughout the metropolitan and urban areas in this region. Secondly, there was evidence of extensive demographic and to a lesser extent employment spill-over into smaller areas within the influence of the metropolitan area. Thirdly, there was considerable evidence of population growth in areas well beyond metropolitan influence. A closer examination of migration figures showed that much of this growth can be related to amenity-related factors.

In the eastern region, the growth trends were mainly focused on the greater Ottawa metropolitan region. As in the central region, there was evidence of demographic and employment spill-over into areas close to the Ottawa CMA. However, the growth patterns were were less apparent in areas beyond metropolitan influence mainly because much of this region's growth remains strongly tied to Ottawa. As well, the eastern region is not characterized by comparable amenities in areas beyond metropolitan influence. As a

whole, the region suffers from many structural problems typical in other peripheral regions, mainly urban stagnation.

The pattern of population stagnation in the south-western region was fairly wide-spread. There was a discernable pattern of near zero population growth and decline in many of the larger urban centres. These patterns in population decline were even more pronounced in many of the smaller areas within and beyond the influence of the major metropolitan centres. A disturbing feature of this pattern in population decline was the fact that most of it has occured into the 1980's implying the presence of probable "new" causal factors.

The northern region, in contrast, has continued to lose population. The largest metropolitan and urban regions have not shown any new growth or re-surgence into the 1980's. Many of the same stagnating trends observed in the 1970's have prevailed in the 1980's. An important effect of this has been the stagnating effects in smaller surrounding areas. Those areas which are beyond 100 kms. of CMA cores, which make up the bulk of areas, have shown little consistent growth reflecting the highly variable nature of population in resource communities.

A series of multiple regression models was specified in order to evaluate the association between population change and selected causal factors. This was done in different regional and spatial contexts in order to assess spatial differences in the causal factors. There appeared to be some consistencies in the relative importance of these various causal factors. As well, for the most

part the performance of the variables reflected the theory of the underlying the statistical models.

The demographic variables were very consistent in terms of conforming to the theory. Retirement migration proved to be an important process which is associated with population growth. In particular, retirement migration was seen as a process prevalent in the central, south-west, and northern regions. More importantly, there were two distinct patterns of retirement migration. One pattern of retirement migration was evident in areas beyond the influence of metropolitan areas. The other pattern of retirememt migration was in adjacent areas. An important implication of these patterns is that they may likely involve two different types of elderly migrants in which the former group may involve mostly wealthy, younger and recreation-led migrants while the latter elderly are likely to be those more dependent on urban services or unable to afford long-distance moves.

Household migration showed a similar pattern of association with population growth. Typically, the houshold migration (although still a relatively important causal factor) was over-shadowed by the retirement migration as a major causal factor related to population growth. However, household migration did emerge as the most important causal factor in the Ontario (including CMA's and CA's) model, and in the disaggregated models for areas in eastern Ontario and those within 50 to 100 kms. of CMA's. However, it should be noted that one or more of the employment growth measures were important in these models as well. This would imply that there

may be a very close link between the employment-led and consumer-led explanations of non-metropolitan growth.

The employment growth measures in general were seen to be important causal factors associated with population growth. In particular, the measure of government employment growth was probably the most consistent in terms of sign and hypothesized associations. It showed up to be most important in the peripheral regions and in areas more distant from metropolitan areas. The positive sign and strong association with population growth confirmed the effectiveness of government re-location policies or public job creation as major factors in encouraging population growth in peripheral areas. The manufacturing and financial services growth measures varied in terms of their sign and relative importance. Both measures were positive and most important in metropolitan areas and in those within the influence of metropolitan areas. This supports the theoretical and empirical evidence stating that these industries have remained tied to areas close to metropolitan and urban locations.

The regional and area classification models served the purpose of summarizing the patterns of population change but in the context of other causal factors. For the most part, the signs and relative importance of the measures were consistent with observed patterns. However, it should be noted that in some cases the parameters of these variables were misleading resulting from sizeable differences in the number of individual areas in each regional or area classification.

The white-collar occupation variable also portrayed the underlying theory. As a measure of high status migrant areas this variable performed as hypothesized, it did not really tell us much about the underlying changes and processes influencing these areas. However, it did prove to have a very strong positive association with population growth within metropolitan areas (probably describing professional migrant and commuting areas) and those areas beyond 100 kms. (possibly reflecting small scale commuter towns of rural employment centres).

The amenity variable (as defined) is perhaps one of the poorest measures of the theory. For example, it did show a positive association with population growth in the eastern and northern regions highlighting the growth of some perceived amenity areas. In contrast, the amenity variable also took on strong negative associations with population change in the models for south-western Ontario and areas beyond 100 kms. of CMA's. This apparent contradiction in the relationships is a result of the narrow definition (purely physical features) given to the amenity measure. More appropriate features, given available data, should include other amenity features such as recreation expenditures, motels, services, or leisure activities.

The employment specialization measure was one of the more consistent measures. It maintained a negative sign in most cases as hypothesized indicating the relationship between population growth and low employment specialization (typical of amenity, recreation or retirement areas). This relationship was observed in the models

for the different area classifications and in the central and south-western region models. However, the variable changed signs to a positive sign in the models for Ontario (including CMA's and CA's), and the eastern and northern regions. It these cases population growth was associated with employment specialization such as manufacturing, services (metropolitan and eastern region) and resources (north).

The government expenditure measures (indicators of local and regional policy) showed consistent relatively weak associations with population change. The associations also varied in terms of the sign of the association with population growth indicating that policy decisions may have some spatial order. For example, provincial and federal capital grants had a positive sign in the context of peripheral areas and regions,. In contrast, local development expenditures showed a negative relationship with population change except in the case of the models for adjacent areas and south-western region where it was positive. This may imply a dual interpretation in which local development expenditures in adjacent areas are used to control growth, while in the south-western region they have the purpose of encouraging growth.

Ontario appears to be experiencing a process of both population concentration and deconcentration. From a regional perspective, there is a definite pattern of regional agglomeration into the central and eastern metropolitan regions. It may be possible to interpret the discernable patterns of population losses in the south-west and north as partially reflecting the dominant

economic and employment pull of the highly urbanized regions. The regions have comparative advantages in nearly all social, income, employment, and housing features. More importantly, the regions (especially the central metropolitan region) are characterized by vast and extensive transportation systems which allow a more dispersed pattern of growth in smaller settlements within influence of metropolitan regions. The growth in these regions is probably also related to considerable migration from outside of the province as Ontario has re-emerged once again as a major growth province. However, there is no way of confirming this hypothesis without more detailed migration data.

From a metropolitan-nonmetropolitan pespective, it can be concluded that the dominant demographic pattern being observed is one of decentralization rather than deconcentration. Population deconcentration as defined in earlier chapters is related to growth trends outside of the influence of metropolitan areas. This latter perspective can not be supported in any of the regions, except possibly in the high amenity regions in the central region. Overall, the major growth patterns which were observed are mainly tied to the major metropolitan regions. There are three major reasons for this pattern. First, metropolitan regions continue to maintain relatively strong domination on a wide variety of growth-inducing factors ranging from accessibility, employment growth, low unemployment, high incomes, new housing, and so on. Secondly, metropolitan areas are still the main recipients of employment (both manufacturing and financial services) decentralizing from the

older cores. There has been no change in the determinants of employment location to favour peripheral areas except may be in the selective role of government relocation policy. Thirdly, some of the metropolitan areas have expanded tremendously (Toronto and Ottawa are good examples) and now have broader functional influences in many more smaller areas beyond their physical boundaries. The impacts of these trends has lead to extended forms of urbanization into many of these smaller areas. This was shown in the growth trends of the adjacency and within 100 kms. area classifications (especially in the central and eastern regions.

There was only one exception to the dominant metropolitan growth and spill-over growth. This included the growth observed in the high amenity areas beyond 100 kms. in central Ontario. It was shown that this may be linked to retirement migration and to a lesser extent government employment re-locations. To imply that this was mainly from metropolitan deconcentration of the elderly would be misleading since the origins of these migrants may be numerous. Clearly, this trend was not as evident in the other regions and therefore can not be labeled as a widespread phenomenon but rather a regional causal trend.

6.2 Recommendations for Future Research

This thesis has opened up several areas of new research. One important area of research deals with the implications of regionalism. A valuable finding from this thesis has been the verification of the relative importance of regions (both standard

and functional) as important factors associated with population change. They are useful in two important ways. First, they represent the growing structural disparities within the province (i.e., employment, incomes, housing migration losses, etc.). Secondly, they highlight the influences of different causal processes and factors having varying effects on the growth experiences of individual areas.

These important elements of the region have three main implications for future research approaches. First, there is a need to recognize the differences between growing (metropolitan central and east) and declining regions (south-west and north). The research issues within each regional context will be very different and deserve equally important attention. In the growing regions, for example, there is a desparate need for research on matters of the environment in terms of the implications of regionally concentrated and decentralized growth. The topics range from degradation of agriculture lands to the pollution impacts of increased car use in rural areas. An important research objective(s) in these regions should be one which seeks to investigate ways in which growth can be managed or controlled while minimizing the effects on the environment and other regions.

The declining regions, in contrast, are characterized by problems of demographic and economic stagnation. In these regions, the research topics need to consider issues concerning sustainable development. In terms of sustainable development, this should be interpreted in the broadest sense to include ways of encouraging

growth in these regions and sustaining it so that it is internalized and spread throughout lower levels of the regional settlement system. A major research topic for these regions should concentrate on exploring the association between government policies and growth. The types of policies needing more research should be those which seek to encourage demographic changes (i.e., job re-locations) and economic development (i.e., resource industry subsidies). An assessment of the broader spatial and temporal impacts of these policies is needed.

A second implication relates to the need to expand on individual hypotheses within the different regions. The regression analysis provided a good overview of important associations between population change and selected causal factors. There are two important avenues which need to be further investigated. First, there is a need to examine more closely the individual regions with a richer database. For example, it should be a priority to go into the central metropolitan, amenity, and rural south-west regions to examine what is actually happening in these regions. A data set should be established based on micro level variables including individual and household migration matrices, records of business location and closures, etc. The key is to identify and assess different processes and see whether they are consistent with the aggregate patterns observed in the thesis.

Secondly, there is a need to carefully expand on the definitions and specifications of the individual hypotheses proposed in this paper. It is admitted that many of the independent

variables used in the analyses were limited. On the one hand, some of the variables were surrogate measures of broader processes. For instance, the regional re-structuring model was conceptualized by looking at the relative changes in manufacturing and financial services employment. A proper assessment of this hypothesis is likely to involve employment-based explanatory or descriptive models. This by itself is an important area of research. On the other hand, some of the variables were limited in terms of their definitions. For example, the role of amenity was crudely interpreted in a purely physical way. The definition needs to incorporate other independent aspects of amenity such as related expenditures, recreational opportunities, specific scenery, aesthetics, etc. The implications of amenities on population change, as a result, could then be considered in a broader and more precise manner. These limitations can be easily extended to the other variables.

A third research implication concerns notions of metropolitan spill-over. The descriptive analyses of population and the performance of the area classifications in the regression models illustrated that demographic and economic spill-overs are important causal factors associated with population growth. However, a number of questions remain unanswered about the interpretation and implications of spill-overs. First, a more precise definition of spill-over is required. Such a definition must clearly differentiate between the different types of spill-overs (i.e., commuting, employment, residential migration, leisure, recreation,

public service, congestion, urban disposal sites, etc.). Clearly, urban spill-overs should viewed in the broadest terms to be able to assess their implications on the environment and development. Secondly, there is a need to identify the primary explanations of each one of these spill-overs. For instance, are they a result of predominantly metropolitan-origin or rural-based factors. This will establish whether some of these spill-overs can be controlled through different types of policies. More importantly, this may provide direction of how to encourage some spill-overs in an effort to reduce large urban agglomerations.

The use of the regression model also has several implications for future modelling of population change. First, a natural extension of the regression models would be to incorporate the effects of spatial structures and processes. An important element of the descriptive analyses was to highlight the importance of the regional classifications and spatial patterns as truly independent causal factors (i.e., metropolitan influence) as well as measures of other processes (i.e., commuting, spill-overs). In this thesis's initial attempt to model population change, these spatial effects were isolated in the form of dummy regional variables. There are more sophisticated approaches (i.e., spatially lagged regression models) to account for spatial effects and dependence which need to be investigated.

The multiple regression could be improved by introducing a "spatial weighting" system into the regression models. A weighting system would allow more precise modelling of the actual processes

underlying population deconcentration, mainly the notions of local and regional spill-overs and hierarchical shifts in population. This could be done in several ways. First, individual areas could be weighted in terms of their spatial relations with other areas (i.e., contiguous or non-contiguous). This will allow an assessment of whether growth is associated with primarly spatial processes (nearness to growth or declining areas) or from other independent, possibly non-spatial, causal factors. Similarly, a weighting system could also be used to identify spatial differences in causal processes. For example, the central adjacent areas would receive more weight in analyses than south-western adjacent areas because of the expectation that the spillover effects may be more pronounced around the Toronto CMA. Finally, it may be possible to weight areas in terms of their provincial and regional hierarchies with the expectation that smaller areas are likely to be the major recipients of growth. In this respect, the smaller areas would receive more weight in the analyses to pick up the effects of hierarchical shifts in popualtion to lower levels.

A second implication for future modelling focuses on the use of "systems or econometric" models. In the regression models, the causal factors were assumed be constant when interpreting a specific independent variable. In reality, however, the causal factors are inter-dependent in terms of influencing each other, and constantly changing in importance over space and time. More importantly, these causal factors are linked to broader exogenous which are typically avoided through endless assumptions. This

thesis has provided a good initial framework with respect to the identification of different causal factors and demographic patterns. What is needed now is an extention of the time period in conjunction with other additional variables (wages, housing, unemployment, investment, etc.). In order to truly understand the underlying complexity of population change (perhaps in search of explanations), one needs to incorporate these inter-dependent structures of causal factors into more dynamic and integrated systems models. A large body of literature on this topic already exists (Bolton, 1985). The objective is to think about theoretical frameworks of how non-metropolitan or regional population change can be modelled amongst a much larger set of inter-dependent causal factors.

REFERENCES

Adamchak, D.J., (1987), "Further Evidence on Economic and Noneconomic Reasons for Turnaround Migration", Rural Sociology, Vol. 52(1), pp. 108-118.

Anderson, W.P. and Papageorgiou, Y.Y., (1989), Metropolitan and Nonmetropolitan Population Trends in Canada 1966-82 : 1. Net Migration, Program for Quantitative Studies in Economics and Population (QSEP).

Barkley, D.L., (1988), "The Decentralization of High-Technology Manufacturing to Nonmetropolitan Areas", Growth and Change, Vol. 19(1), pp. 13-25.

Bathelt, H. and Hecht, A., (1990), "Key Technology Industries in the Waterloo Region: Canada's Technology Triangle (CTT)", The Canadian Geographer, Vol. 34 (3), pp. 225-234.

Beale, C.L., (1977), "The Recent Shift of United States Population to Nonmetropolitan Areas, 1970-75", International Regional Science Review, Vol. 2(2), pp. 113-122.

Beale, C., (1975), The Rivival of Population Growth in Nonmetropolitan America, ERS-605, Economic Research Service, United States Department of Agriculture, Washington, D.C.

Beauegard, R.A., (1989), "Space, Time and Economic Restructuring", in Beauegard, R.A. (ed.), Economic Restructuring and Political Response, Urban Affairs Annual Reviews, Vol. 34, Sage Publications, London, pp. 209-240.

Berry, B.J.L., (1989), "Migration Reversals in Perspective : The Long-wave Evidence", International Journal of Regional Science, Vol. 11 (3), pp. 245-251.

Berry, B.J.L., (1976), "The Counterurbanizatin Process: Urban America Since 1970", in Urbanization and Counterurbanization, Urban Affairs Annual Review, 17, Sage.

Berry, W. and Feldman, S., (1985), Multiple Regression in Practise, Series : Quantitative Applications in the Social Sciences.

Biggs, B. and Bollman, R., (1991), "Urbanization in Canada", Canadian Social Trends, Summer 1991, pp. 22-27.

Blackwood, L.G. and Carpenter, E.H., (1978), "The importamnce of anti-urbanism in determining residential preferences and migration patterns" , Rural Sociology, Vol 43, pp. 31-47.

Bolton, R., (1985),"Regional Econometric Models", Journal of Regional Science, Vol. 25 (4), pp. 495-520.

Bourne, L.S., (1982), "Regioanl Policy in Canada : An Urban System Perspective", The Canadian Journal of Regional Science, Vol. 2, 283-290.

Bourne, L.S. and Simmons, J.W., (1982), Defining the Area of Interest: Definitions of the City, Metropolitan Areas, and Extended Urban Regions", in Bourne, L.S. (ed.), Internal Structure of the City: Readings on UrbanForm, Growth, and Policy, Second Edition, Oxford University Press, New York, pp. 57-72.

Bourne, L.S., (1980), "Alternative Perspectives on Urban Decline and Population Deconcentration", Urban Geography, Vol. 1(1), pp. 39-52.

Bourne, L.S. and Simmons, J.W., (1979), Canadian Settlement Patterns: An Examination of the Spatial Pattern 1971-76, Departmental Report No. 15, Department of Geography, University of Toronto.

Bourne, L.S. and Logan, M.I., (1976), "Changing Urbanization Paterns at the Margin: the Examples of Australia Canada", in Berry, B.J.L., (ed.), Urbanization and Counterurbanization, Sage Publications, pp. 111-143.

Borchert, J.R., (1991), Review in Progress in Human Geography, Frey, W.H. and Speare, A., Jr., (1988), Regional and Metropolitan Growth and Decline in the United States, Russel Sage Foundation.

Briggs, R. and Rees, J., (1982), "Control Factors in the Economic Development of Nonmetropolitan America", Environment and Planning, A, Vol. 14, pp. 1645-1666.

Britton, J.N.H., (1988), "Economic Change and the Regional Question", Canadian Journal of Regional Science, Vol. XI(1), pp. 167-179.

Brunet, Y., (1980), "L'Exode Urbain, Essai De Classication De La Population Exurbaine Des Cantons De L'est", Canadian Geographer, Vol. XXIV (4), pp. 385-405.

Bunce, M.F. and Troughton, M.J., (1984), The Pressures of Change in Rural Canada, York University, Geographical Monograph No. 14.

Bureau of Municipal Research, (1982), Industrial Development: The Municipal Role, Ottawa.

Castells, M., (1985), "High Technology, Economic Restructuring, and the Urban-Regional Process in the United States" in Castells, M., (ed.), High Technology, Space, and Society, Urban Affirs Annual Reviews, Sage Publications, Vol. 28.

Champion, A.G. (ed.), (1989), Counterurbanization : The Changing Pace and Nature of Population Deconcentration, Edward Arnold.

Champion, A.G., (1987), "Recent Changes in the Pace of Population Deconcentration in Britain", Geoforum, Vol. 18(4), pp. 379- 401.

Che-Alford, Janet, (1990), "Home Ownership", Canadian Social Trends, Statistics Canada, Spring, pp. 2-5.

Cloke, P., (1985), "Counterurbanisation: A Rural Pespective", Geography, Vol. ??.

Cochraine, S.G. and Vining, D.R., (1989), "Recent Trends in Migration Between Core and Peripheral Regions in Developed and Advanced Developing Countries", International Regional Science Review, Vol. 11., pp. 215-243.

Coffey, W.J. and Polese, M., (1988), "Locational Shifts in Canadian Employment, 1971-1981: Decentralization v. Decongestion", Canadian Geographer, Vol. 32(3), pp. 248-256.

Coffey, W.J. and Polese, M., (1987), Still Living Together : Recent Trends and Future in Canadian Regional Development, The Institute for Research on Public Policy, Quebec.

Coffey, W.J. and Polese, M., (eds.), (1984), "The Concept of Local Development: A Stages Model of Endogenous Regional Growth", Papers of the Regional Science Association, Vol. 55, pp. 1-11.

Collins, L., (1972), Industrial Migration in Ontario: Forcasting Aspects of Industrial Activity through Markov Chains, Statistics Canada, Ottawa.

Congdon, P. and Shepherd, J., (1986), "Modelling Population Changes in small English urban areas", Environment and Planning, A, Vol. 18, pp. 1297-1322.

Cook-Kirschner, Annabel, (1987), "Nonmetropolitan Migration: The Influence of Neglected Variables", Rural Sociology, Vol. 52(3), pp. 409-418.

Coombes, M., Longo, R.D. and Raybould, S., (1989), "Counterurbansation in Britain and Italy: A Comparative Critque of the Concept, Causation and Evidence", Progress in Planning, Vol 32, pp. 1-70.

Coppack, P.M., Russwurm, L.H., and Bryant, C.R., (1988), Essays on Canadian Urban Process and Form III - The Urban Field, Department of Geography Publications Series No. 30, University of Waterloo.

Coppack, P.M., (1988), "The Role of Amenity", in Coppack, P.M., Russwurm, L.H., and Bryant, C.R., (1988), Essays on Canadian Urban Process and Form III - The Urban Field, Department of Geography Publications Series No. 30, University of Waterloo.

Dahms, F.A., (1986), "Diversity, Complexity, and Change: Characteristics of some Ontario Towns and Villages", Canadian Geographer, Vol. 30(1), pp. 158-165.

Dahms, F.A., (1984), "Demetropolitanization or the Urbanization of the Countryside?-- The Changing Functions of Small Rural Settlements in Ontario", Ontario Geography, No. 24, pp. 14-24.

Dahms, F.A., (1980), "Small Town and Village Ontario", Ontario Geography, Vol. 16, pp. 19-32.

Darwent, D.F., (1969), "Growth Poles and Growth Centres in Regional Planning - A Review", Enviornment and Planning, Vol. 1, pp. 5-32.

Davies, S. and Yeates, M., (1991), "Exurbanization as a Component of Migration : A Case Study in Oxford County, Ontario", The Canadian Geographer, Vol. 35(2), pp. 177-186.

Dean, K.G., Brown, B.J.H., Perry, R.W. and Shaw, D.P., (1984a), "The Conceptualisation of Counterurbanization", Area, Vol. 16(1), pp. 9-14.

Dean, K.G., Shaw, D.P., Brown, B.J.H., Perry, R.W. and Thorneycroft, W.T., (1984b) "Counterurbanisation and the Characteristics of Persons Migrating to West Cornwall", Geoforum, Vol. 15(2), pp. 117-190.

Engels, R. and Healy, M.K., (1979), "Rural Renaissance Reconsidered American Demographics, Vol. 1 (5), pp. 16-20.

Estall, R.C., (1983), "The Decentralization of Manufacturing Industry: Recent American Experience in Perspective", Geoforum, Vol. 14 (2), pp. 133-147.

Field, N.C., (1988), Migration Through the Rural-Urban Hiearchy", Canadian Journal of Regional Science, Vol. XI(1), pp. 33-56.

Fielding, A., (1986), "Counterurbanisations", in Pacione, M., Population Geography: Progress and Prospects, Croom Helm, London.

Fielding, A.J., (1982), "Counterurbanization in Western Europe", Progress in Planning, Vol. 17(1), pp. 1-52.

Foot, D.K, (1982), Canada's Population Outlook, Toronto, James Lorimer.

Forstal, R. and Engels, R., (1984), Growth in Nonmetropolitan Areas Slows", United States Bureau of the Census, Washington.

Frederick, J., (1990), "Commuting Time", Canadian Social Trends, Statistics Canada, Winter, pp. 29-30.

Frey, W.H., (1989), "The Re-emergence of Core Region Growth: A Return to the Metropolis?", International Regional Science Science Review, Vol. 11, pp. 261-267.

Frey, W.H., (1987), "Migration and Depopulation of the Metropolis: Regional Restructuring or Rural Renaissance?", American Sociological Review, Vol. 52, pp. 240-257.

Fuguitt, G.V, Heaton, T.B. and Lichter, D.T., (1988), "Monitoring the Metropolitanization Process", Demography, Vol. 25(1), pp. 115-128.

Gentilcore, L., Studies in Canadian Geography- Ontario, University of Toronto Press, Toronto, 1972.

Gera, S. and Paproski, D., (1980), "Impact of Age on Commuter Mobility", Canadian Studies in Population, Vol. 7, pp. 57-66.

Getis, A., (1990), "Screening for Spatial Dependence in Regression Analysis", Papers of the Regional Science Association, Vol. 69 pp. 69-81.

Gillespie, A.E. and Green, A.E., (1987), "The Changing Geography of Producer Services Employment in Britain", Regional Studies, Vol. 21 (5), pp. 397-411.

Glasson, J., (1978), An Introduction to Regional Planning, Built Environment Series, Second Edition, Hutchinson, London

Golant, S.M., (1972), "Regression Models of Urban Growth in Ontario and Quebec", in in Bourne, L.S. and Mackinnon, R.D., (1972), Urban Systems Development in Central Canada - Selected Papers, University of Toronto Press, pp. 132-145.

Goldberg, M.A. and Webster, D.B., (1979), "The Atlantic Provinces Canada's Amenity Region", Contact, Vol. 11 (2), Summer/Fall, pp. 91-111.

Goodchild, M.F., (1986), Spatial Autocorrelation, Concepts and Techniques in Modern Geography, Catmog 47.

Gordon, P., (1979), "Deconcentration without a clean break", Environment and Planning A, Volume 11, pp. 281-290.

Gould, P., (1970), "Is Statistix Inferens the Geographical Name for a Wild Goose?", Economic Geography, Vol. 46, pp. 439-448.

Grafton, D.J., (1982), "Net migration, outmigration and remote rural areas: a cuationary note", Area, Vol. 14(4), pp. 313-318.

Haining, R., (1990), Spatial Data Analysis in the Social and Environmental Sciences, Cambridge University Press.

Hall, P. and Hay, D., (1980), Growth Centres in the European Urban System, University of California Press.

Harrison, B., (1982), "Reassessing Policies for Reducing Regional Disparities in North America : The (Misplaced) Emphasis on Government Subsidies to Private Industry", The Canadian Journal of Regional Science, Vol. 2, pp. 251-255.

Harvey, D., (1979), "The Urban Process under Capialism: a framework for analysis", International Journal of Urban and Regional Research, Vol. 2, pp. 101-131.

Higgins, B., (1983), "From Growth Poles to Systems of Interactions in Space", Growth and Change, Vol. ?, pp. 4-11.

Hodge, G.D., (1983), Canadian Small Town Renaissance: Implications for Settlement Systems Concepts, Regional Studies, Vol. 17(1), pp. 19-28.

Hodgson, M.J., (1972), "Variability in the Growth of Small Urban Areas", in Bourne, L.S. and Mackinnon, R.D., (1972), Urban Systems Development in Central Canada - Selected Papers, University of Toronto Press, pp. 132-145.

Hugo, G.L. and Smailes, P.J., (1985), "Urban-Rural Migration in Australia: a Process View of the Turnaround", Journal of Rural Studies, Vol. 1(1), pp. 11-30.

Hvento, T.W. and Luloff, A.E., (1982), "Anti-urbanism and nonmetropolitan growth: a re-evaluation", Rural Sociology, Vol. 47, pp. 220-233.

Johnson, K.M., (1989), "Recent Population Redistribution Trends in Nonmetropolitan America", Rural Sociology, Vol. 54(3), pp. 301-326.

Johnston, R.J., (1978), Multivariate Statistical Analysis in Geography, Longman.

Joseph, A.E., Keddie, P.D. and Smit, B., (1988), "Unravelling the Population Turnaround in Rural Canada", Canadian Geographer, Vol. 32(1), pp. 17-30.

Joseph, A.E. and Smit, B., (1981), "Implications of Exurban Residential Development: a review", Canadian Journal of Regional Science, Vol. 4, pp. 207-224.

Kim, J., (1983), "Factors Affecting Urban-to-Rural Migration", Growth and Change, Vol. 14(3), pp. 38-43.

Kontuly, T. and Bierens, H., (1989), "Testing the Recession Theory as an Explanation for the Migration Turnaround", Environment and Planning A, Vol. 88(1).

Kontuly, T. and Vogelsang, R., (1988), "Explanations for the Intensification of Counterurbanization in the Federal Republic of Germany", The Professional Geographer, Vol. 40(1), pp. 42-54.

Kontuly, T., Wiard, S. and Vogelsang, R., (1986), "Counterurbanization in the Federal Republic of Germany", Professional Geographer, Vol. 38(2), pp. 170-181.

Lichter, D.T., Fuguitt, G.V. and Heaton, T.B., (1985), "Components of Nonmetropolitan Population Change: The Contribution ofRural Areas", Rural Sociology, Vol. 50(1), pp. 88-98.

Lichter, D.T. and Fuguitt, G.V., (1982), "The Transition to Nonmetropolitan Population Deconcentration", Demography, Vol. 19(2), pp. 211-221.

Long, L. and DeAre, D., (1986), "Repopulating the Countryside: A 1980 Census Trend", Science, 217, pp. 1111-1116.

Lloyd, P.E. and Dicken, P., (1977), Location in Space- A Theoretical Approach to Economic Geography, Second Edition, Harper & Row Publishers, pp. 386-448.

Marshal, J.U., (1975), "City Size, Economic Diversity, and Functional Type", Economic Geography, Vol. 51, pp. 37-49.

McCarthy, K.F. and Morrison, P.A., (1977), "The Changing Demographic and Economic Structure of Nonmetropolitan Areas in the United States", International Regional Science Review, Vol. 2(2), pp. 123-142.

McRae, J.D., (1981), The Impact of Exurbanite Settlement in Rural Areas A Case Study of the Ottawa-Montreal Axis, Working Paper No. 22, Lands Directorate, Environment Canada.

McVey Jr., W.W., (1978), "Migration and the Smaller Community", Canadian Studies in Population, Vol. 5, pp. 13-23.

Mera, K., (1988), "The Emergence of Migration Cycles?", International Regional Science Review, Vol. 11 (3), pp. 269-275.

Mera, K., (1973), "On the Urban Agglomeration and Economic Efficiency", Economic Development and Cultural Change, Vol. 21 (2), pp. 309-337.

Mitchell, R., Canada's Population from Ocean to Ocean, Statistics Canada, 1986 Focus on Canada Series.

Mikalak, W.Z. and Fairbairn, K.J., (1988), "Producer Services in a Peripheral Economy", Canadian Journal of Regional Science, Vol. XI (3), pp. 353-372.

Morrision, P.A. and Wheeler, J.P., (1977), "Rural Renaissance in America? The Revival of Population Growth in Remote Areas", Population Reference Bureau, Vol. 31, No. 3, pp. 3-26.

Moseley, M.J., (1984), "The Revival of Rural Areas in Advanced Economies: a Review of some Causes and Consequences", Geoforum, Vol. 15(3), pp. 447-456.

Odland, J., (1988), Spatial Autocorrelation, Scientific Geography Series, Vol. 9.

OECD (Organization for Economic Cooperation and Developmen), (198?), Managing Urban Change -- Vol. II The Role of Government, No. 42621, OECD Publications, Paris, France, pp. 59-114.

Ontario, (1988), Ontario Budget, Ministry of Treasury and Economics, Toronto.

Ontario, (1978), Northwestern Ontario: A Strategy for Development, Ministry of Treasury and Economics, Regional Planning Branch.

Ontario, (1976), Design for Development: Ontario's Future Needs and Options, Ministry of Treasury and Economics, Toronto.

Ontario, (1970), Design for Development: The Toronto-Centred Region, Ministry of Treasury and Economics, Toronto.

Parson, H., (1984), "Marginal Agriculture on the Canadian Shield", in Bunce, M.F. and Troughton, M.J., (1984), The Pressures of Change in Rural Canada, Geographical Monographs, No. 14. pp. 73-91).

Perry, R., Dean, K. and Brown, B., (1986), Counterurbanisation: International Case Studies of Socio-Economic Change in Rural Areas, Geo Books, Norwich, United Kingdom.

Plane, D.A., (1989), "Population Migration and Economic Restructuring in the United States", International Regional Science Review, Vol. 12(3), pp. 263-280.

Ray, M. and Roberge, R., (1981), "The Pattern of Post-war Urban Growth : Multinationals as City and Regional Planners", City Magazine, Vol. V (1), pp. 14-24.

Ray, M., (1965), Market Potential and Economic Shadow, Department of Geography, University of Chicago.

Richter, K., (1985), "Nonmetropolitan Growth in the Late 1970's: the End of the Turnaround?", Demography, Vol. 22 (2), pp. 245-263.

Robert, S. and Randolph, W.G., (1983), "Beyond Decentralization: the Evolution of Population Distribution in England and Wales, 1961-1981", Geoforum, Vol. 14(1), pp. 75-102.

Robinson, I.M., (1981), Canadian Urban Growth Trends : Implications for a National Settlement Policy, Centre for Human Settlements, Human Settlement Issues 5, University of British Columbia Press.

Rosenberg, M.W., Moore, E.G., and Ball, S.B., (1989), "Components of Change in the Spatial Distribution of the Elderly Population in Ontario, 1976-1986", The Canadian Geographer, Vol. 33(3), pp. 218-229.

Roseman, C.C. and Williams, J.D., (1980), "Metropolitan to Nonmetropolitan Migration: A Decision-Making Perspective", Urban Geograpahy, Vol. 1(4), pp. 283-294.

Rudzitis, G., (1991), "Migration, Sense of Place, and Non-metropolitan Vitality", Urban Geography, Vol. 12 (1), pp. 80-88.

Ryval, M., (1987), "Sucked in by Ontario", Small Business, July/August, pp. 23-29.

Shaw, P.R., (1985), Inter-metropolitan Migration in Canada, Ministry of Supply and Government Services, Cat. No. 89-504-E.

Shaw, P.R., (1975), Migration Theory and Fact : A Review and Bibliography of Current Literature, Regional Science Research Institute, Bibliography Series, No. 5.

SoFranko, A.J. and Fliegel, F.C., (1983), "Rural-to-Rural Migrants: The Neglected Component of Rural Population Growth", Growth and Change, Vol. 14(2), pp. 42-49.

Spelt, J., (1972), Urban Development in South-central Ontario, McClelland and Stewart, Toronto.

Statistics Canada, (1987), The Daily, (Highlights of Census of Population), Cat. No. 11-011E.

Shepherd, J. and Congdon, P., (1990), "Small Town England: Population Change Among Small to Medium Sized Urban Areas, 1971-1981", Progress in Planning, Vol. 33, pp. 1-111.

Simmons, J.W., (1980), "Changing Migration Patterns in Canada: 1966-1971 to 1971-1976", Canadian Journal of Regional Science, Vol. III (2), pp. 139-162.

Stabler, J.C., (1987), "Non-metropolitan Population Growth and the Evolution of Rural Service Centres in the Canadian Praire Region", Regional Studies, Vol. 21 (1), pp. 43-53.

Steed, G.P.F. and Degenova, D., (1983), "Ottawa's Technology-oriented Complex", The Canadian Geographer, Vol. 27, pp. 263-78.

Termotte, M.G., (1987), "The Growth and Distribution of the Canadian Population", in Coffey, W. and Polese, M. (eds.), Still Living Together: Recent Trends and Prospects in Canadian Regional Policy, Canadian Institute of Public Policy.

Thrift, N., (1988), The Geography of International Economic Disorder", in Massey, D. and Allen, J., (1988), Uneven Re-development: Cities and Regions in Transition, Open University, pp. 4-46.

Todd, D., (1983), "Observations on the Relevance of the Industrial-Urban Hypothesis for Rural Development", Geoforum, Vol. 14(1), pp. 45-54.

United States, Bureau of the Census, (1974), "Mobility of the Populat-ion of the United States: March 1970 to March 1974", Current Population Reports, Series P-20, No. 273, Washington.

Vertiainen, P., (1989), "Counterurbanisation: a Challenge for Socio-theoretical Geography", Journal of Rural Studies, Vol. 5, pp. 217-225.

Vining, D.R. and Pallone, R., (1982), "Migration Between Core and Peripheral Regions: A Description and Tentative Explanation of of Patterns of 22 Countries", Geoforum, Vol. 13, pp. 339-410.

Vining, D.R. and Kontuly, T., (1978), "Population Dispersal from Major Metropolitan Regions: An International Comparison", International Regional Science Review, Vol. 3(1), pp. 49-73.

Vining D.R. and Strauss, A., (1977), "A demonstration that the current deconcentration of population in the United States is a clean break with the past", Environment and Planning A, Vol. 9, pp.751-758.

Walker, D.F., (1980), Canada's Industrial Space-Economy, John Wiley & Sons Limited, Toronto, pp. 131-169.

Wardwell, J.M., (1980), "Toward a Theory of Urban-Rural Migration in the Developed World", in Brown, D.L. and Wardwell, J.M.(ed.), (1980), New Directions in Urban-Rural Migration: The Population Turnaround in Rural America, Academic Press, New York, pp. 71-114.

Wardwell, J.M., (1977), "Equilibrium and Change in Nonmetropolitan Growth", Rural Sociology, Vol. 42(2), pp. 156-179.

White, D.A., (1967), Business Cycles in Canada, Economic Council of Canada, Staff Study No. 17.

Williams, J.D., (1981), "The Nonchanging Determinants of Nonmetropolitan Migration", Rural Sociology, Vol. 16(2), pp. 183-202.

Williams, J.D. and McMillen, D.B., (1980), "Migration Decision Making among Nonmetropolitan-Bound Migrants", in Brown, D.L. and Wardwell, J.M.(ed.), (1980), New Directions in Urban-Rural Migration: The Population Turnaround in Rural America, Academic Press, New York, pp. 189-211.

Williams, J.D. and Sofranko, A.J., (1979), "Motivations for the Immigration Component of Population Turnaround in non-metropolitan areas", Demography, Vol. 16, pp. 239-255.

Wrigley, N., (1985), Categorical Data Analysis, Longman, London.

Yeates, M.H., (1985), "The Core-Periphery Model and Urban Development in Central Canada", Urban Geography, Vol. 6(2), pp. 101-121.

Yeates, M.H., (1984), Urbanization in the Windsor-Quebec City Axis, 1921-1981, Urban Geography, Vol. 5(1), pp. 2-24.

Yeates, M.H., (1980), North American Urban Patterns, John Wiley and Sons, New York.

Yeates, M.H., (1975), Main Steet: The Windsor-Quebec Corridor, MacMillan of Canada, Toronto.

Zuiches, J. J., (1981), "Residential preferences in the United States", in Hawley, A.H. andf Mills-Mazie, S.(eds.), Nonmetropolotan America in Transition, North Carolina Press, Chapel Hill, pp. 72-115.