GEOGRAPHY 4C6

EVOLUTION OF INTER-REGIONAL MIGRATION PATTERNS IN CANADA: 1951-1986

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TABLE OF CONTENTS

THE EVOLUTION OF INTER-REGIONAL MIGRATION PATTERNS IN CANADA;1951-1986

INTRODUCTION

With declining birth and death rates, there is an increasing importance of migration in population distribution within Canada and other developed countries. Migration is defined as the movement of one's household from an origin to a destination, across a defined boundary.(Stone, 1978, p. 15) Internal migration tends to be the main mechanism of adjustment, and therefore there is the need to know the magnitude and direction of this mobility. Migration flows have been the main source of regional differences in population growth and decline in the provinces, and therefore the principal contributor in the re-distribution and agglomeration of Canada's population. Migration, therefore, has important implications as it affects the re-distribution of population, which affects the balance of political power, or results in the over-concentration of population. Inter-regional migration also affects the demand for goods and services.

This research paper is divided into two sections. The first part, The Analysis and Description of Migration Flows In Canada, attempts to determine and understand some of the basic migrational flows within Canada through the use of simple indices. Descriptive reasons, such as the impact of political, economic and cultural factors, describing why these flows are

witnessed, are presented as well. The second part of this paper, Canadian Population Agglomeration Tendencies, focuses on the concept of population agglomeration as one possible outcome of the migration process. Specifically, it attempts to determine if the migration process results in population agglomeration or dispersal within Canada.

PART 1 ANALYSIS AND DESCRIPTION OF MIGRATION FLOWS IN CANADA

INTRODUCTION

Migration is a reaction of an individual to his or her environment. If the utility of another place is perceived as better than the present associated level of utility, then migration will most likely occur. Migration is usually a push-pull exercise. A region will push a migrant out, while another region will pull the migrant in. The reasons for the observed migrational patterns include political, economic, social and cultural factors. They all play a role to varying degrees in the migration process. As explained above, this first part will look at the principle temporal features of Canadian migration patterns, and their temporal continuity. The aim is to determine and consider these migration patterns through time in terms of inter-regional linkages and magnitude. Possible explanations as to why these flows are witnessed will be provided in an effort to understand them.

Using time series data, this paper will examine and discuss the evolution of inter-regional migration patterns in Canada between the years 1951-52 and 1985-86, using the following six regions:

i) Atlantic (ATL.)

ii) Quebec (QUE.)

iii) Ontario (ONT.)

iv) Prairies (Saskatchewan and Manitoba) (PRA.)

v) Alberta (ALTA.)

vi) British Columbia (B.C.)

The North-West Territories and the Yukon were not included, as the data available is small and insignificant. Some provinces are grouped together as they are too small to study by themselves. From this raw data, several indices of migration such as in- and out-migration can be determined.

While economic and distance factors are not measured quantitatively within this study, their effect can be determined implicitly. Therefore, greater linkages between neighbouring regions would be expected. Likewise, periods of strong economic expansion, whether nationally or regionally, will affect migration patterns. Other occurrences such as political events will similarly affect migration. From the data, it can be expected that migratory patterns have shifted within the 35 year period of the study. While the results of the first part will echo those derived by Liaw and others, it should also be seen that migrational flows have continued to change and vary through

the 1980's as the new data is considered.

LITERATURE REVIEW

The role of migration in the re-distribution and agglomeration of population is a well documented area, ranging from simple, descriptive approaches to complex models concerning migration flows. In the following pages, a brief review of some research is presented and described with the results applied to this paper. The material presented here adds weight to the reasons why the migration flows are witnessed, since many of the explanations used to explain migration by other researchers are also used in this paper. Earlier studies have shown that migration occurs generally toward areas with lower unemployment, higher income and a wider variety of jobs and, away from the areas with opposite characteristics. (Department of Manpower and Immigration, 1977, p. 45) Researchers have contributed to the understanding of migrational causes and behaviour, both within Canada and other nations. Ledent and Liaw (1985) considered migrational flows for all ten Canadian provinces for the time period 1961-62 to 1982-83. In their study, Ledent and Liaw found that departure rates exhibited similar patterns of variation across the provinces (Ledent and Liaw, 1985, p. 9). Migration was also found to vary with economic opportunities within the country. The attractiveness of various regions has changed through time, largely due to economic changes. Liaw et al.

(1985), in a separate study, found that migrants from the western provinces tended to move to one of the other three western provinces. (Liaw, 1985, p. 16) There was evidence of a 'parallel' evolution of the provincial departure rates of British Columbia and Newfoundland. These provinces showed lower rates of departure, most likely due to their geographically extreme locations. (Ledent and Liaw, 1985, p. 6) However, the present study will look at a temporally broader range of data, with data running from 1951-52 to 1985-86. This provides a more up-to-date understanding of recent regional migrational flows within Canada. The results of the first part of this research paper should augment those found by Ledent and Liaw, and other researchers who have contributed to the field of study.

For example, Engels and Healy (1981) reported on the importance of flows between neighboring states (in the United States) using an origin-destination network. Then, using an index of dissimilarity, they compared migration rates between states. These rates were related to the states themselves in terms of state size (population), linkages, proximity to other states, and economic factors. Engels and Healy found that despite changes in the economy, patterns of interstate migration remained virtually unchanged for the time period in question (1969-1978). Neighboring states received a greater portion of migrants than those further away. (Engels and Healy, 1981, p. 1345) Within this paper, it is similarly proposed that migration patterns, in general, will remain unchanged, especially

departure rates.

Courchene (1970), through the use of correlation and regression work, found a negative correlation between the rate of migration and distance moved within Canada. The distance decay effect should be seen indirectly in this research paper; migrants will be more likely to move to a neighboring region than one that is further away. (Courchene, 1970, p. 561)

Simmons (1982), used the gravity model to explain migration flows at different levels of aggregation. Simmons also used different variables to explain migration, and showed the linkages between the provinces. Simmons revealed a pattern of migration based on the size, distance and culture patterns of Canada, along with a short term economic growth pattern. Overall, economic changes played a small role in migration. (Simmons, 1982, p. 166) Migration was a response to the underlying physical and economic geography of the country. Simmons also showed that there was a stability of flows and linkages among regions over time. (Simmons, 1982, p. 177)

Vanderkamp (1968, p. 595), showed that unemployment has a negative impact on the volume of migration. That is, the number of migrants is dependent on employment opportunities in an area. Unemployment, distance and neighboring regions can be used to help explain inter-regional migration flows within Canada.

It should be noted that this study does not attempt to look at the relationship of migration to some causal factor (i.e. distance). Instead, migrational flows are calculated and then

explained on the basis of the results of previous studies such as the ones mentioned above. The first part of the research paper is an effort to understand the migrational flows and their relationship to the various regions.

PROCEDURES AND DATA USED

With the basic analysis of previous studies concluded, the actual data analysis can begin. Migrational data comes from Family Allowance Data Files, while the population estimates come from the inter-censal population estimates published by Statistics Canada. (Statistics Canada, Catalogue 91-201, Estimates of Population for Canada and the Provinces) There are some inherent deficiencies in this data that should be mentioned:

i) Migrational data covers only a portion of the Canadian population - those families with children eighteen years of age or younger. Therefore, it may not include the highly mobile young adult age group or the older portion of the Canadian population. However, it will be assumed for this study that the group of individuals used is representative of the Canadian population in general.

ii) The population data are estimates only. Censal years are accurate, but intercensal years are estimates of population. Again, they will be assumed accurate for the time periods used in this study.

Despite these assumptions, the data is reliable. The Family

Allowance data allows for short term, yearly variations and responses to economic, cultural and political shifts which cannot be seen in census data. In this respect, the data is reliable and comprehensive.

Firstly, the original 11x11 migrational matrix was aggregated to the 6x6 migrational matrix. Since intra-regional migration was not considered within this study, values of zero were assumed for these cases. See table 1.

TABLE 1
EXAMPLE MIGRATION MATRIX - 1951-1952

	ATL.	QUE.	ONT.	PRA.	ALTA.	B.C.
ATL.	0	6675	21960	1237	899	2106
QUE.	5856	0	27454	1625	1049	1484
ONT.	13095	20356	0	12874	5315	6137
PRA.	1019	1741	16205	0	14101	16169
ALTA.	752	1163	6413	9604	0	14807
B.C.	1896	1282	6612	8339	11246	0

Migration is assumed to be a free and voluntary process, and international migration is not considered. Each migrant has an area of origin and an area of destination. In this case, the origin and destination can be one of the six defined regions (Atlantic, Quebec, Ontario, Prairies, Alberta and British Columbia.). However, the migrants' origin cannot equal the migrants' destination. With this in mind, the values of in and out migration were calculated. Out-migration is the number of migrants leaving an area per year per 1000 population at the origin:

$$OUT = \frac{\text{number of out-migrants}}{\text{total pop. of province}} \times 1000$$

In-migration is defined as the number of migrants arriving at a

destination in a year per 1000 at the destination:

$$IN = \frac{\text{number of in-migrants}}{\text{total pop. of province}} \times 1000$$

From these values, the mean, standard deviation, the coefficient of variation, and net migration values can be determined for each region throughout the time period. The first three measures provide basic descriptive statistics and the latter provides a measure of the net gain or loss of population in each region. For example, for out-migration, the number of migrants leaving region i was determined, and divided by the region's population. Each time period corresponds to the year beginning June 1, year t, and ending May 31, year t+1. The values were then expressed in terms of the number of migrants per thousand. The indices allow the spatial and temporal variations of migration to be analyzed and considered. In order to gain a more qualitative understanding as to the significance of income and unemployment rates on migration, correlation was done between the in- and out-migration rates and income or unemployment rates. While this does not indicate a causal relationship, it does show whether or not the two variables are related, and in what manner.

OBSERVATIONS AND ANALYSIS

The resultant migrational indices produced some interesting results.(See figures 1 to 6) Quebec had the lowest average rate of in-migration at 6.45, with Ontario having the second lowest rate of in-migration at 13.64 (see table 2), despite their high

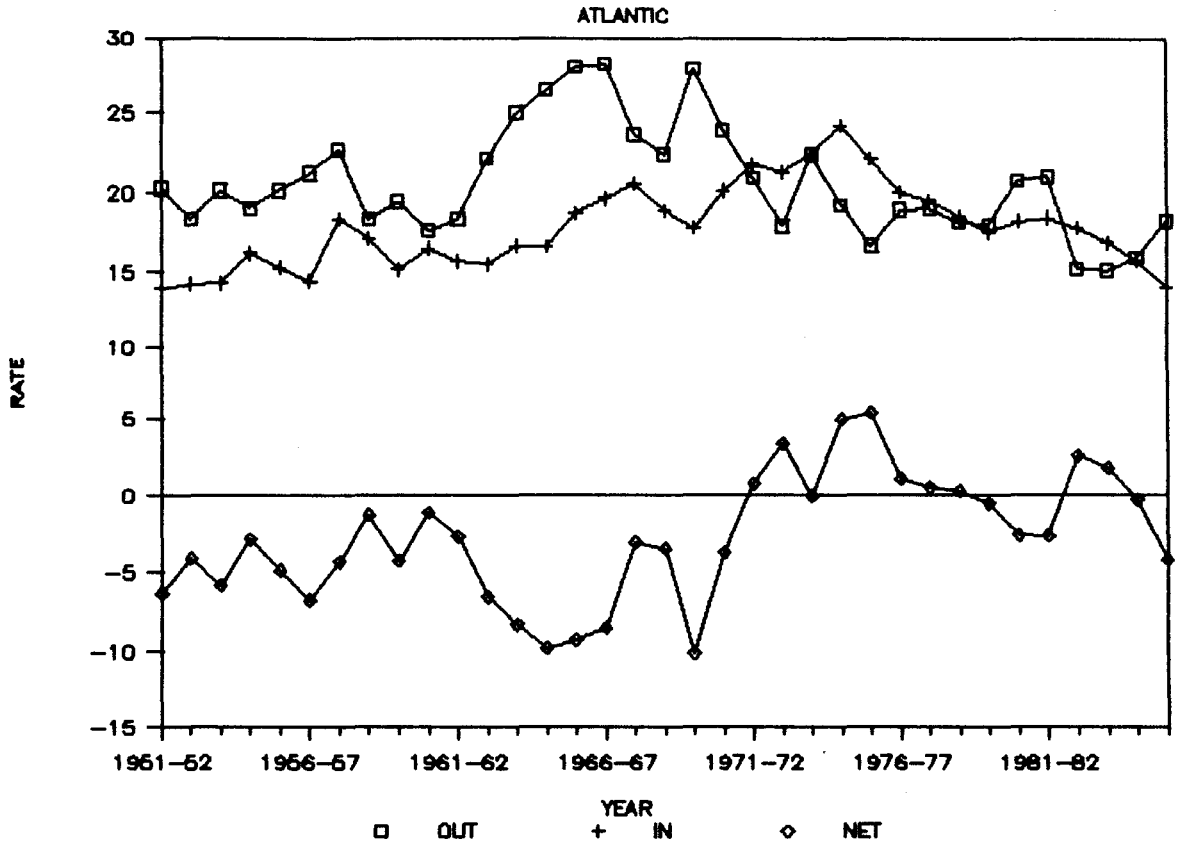

FIGURE 1

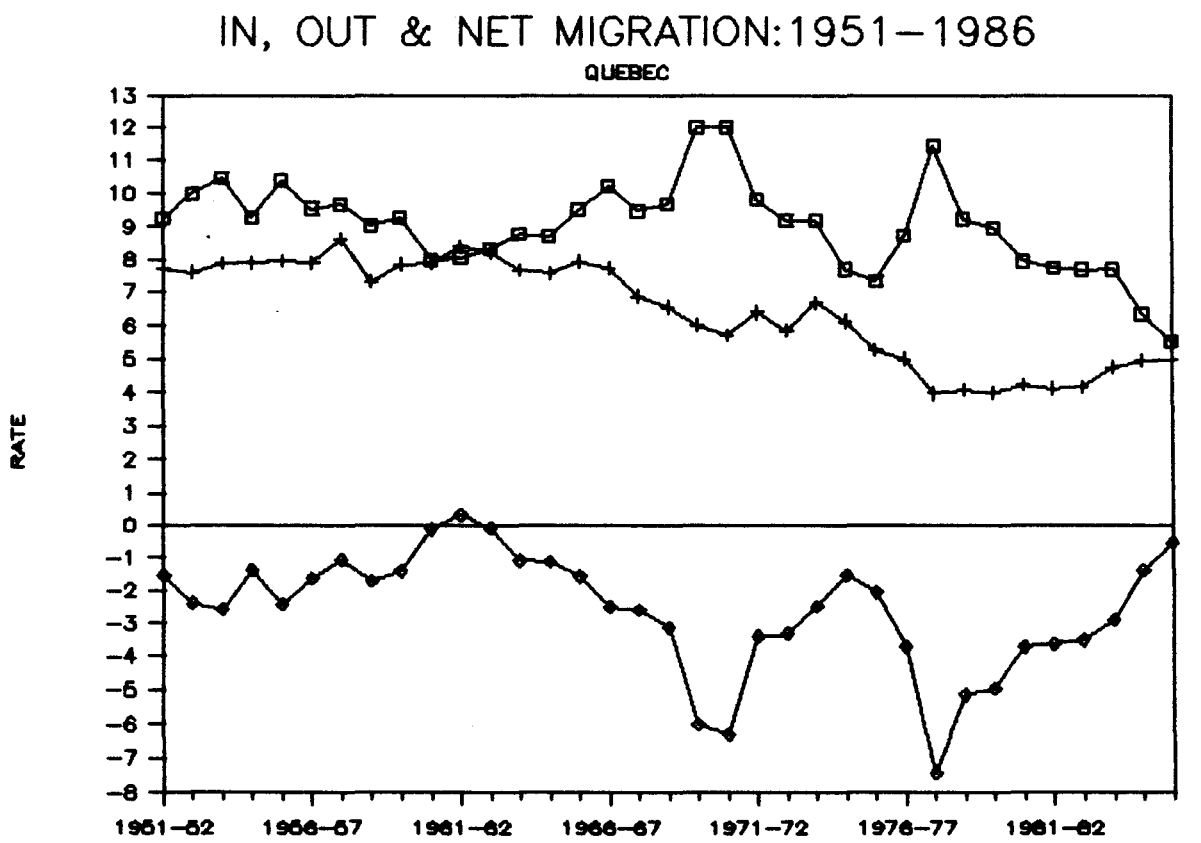

FIGURE 2

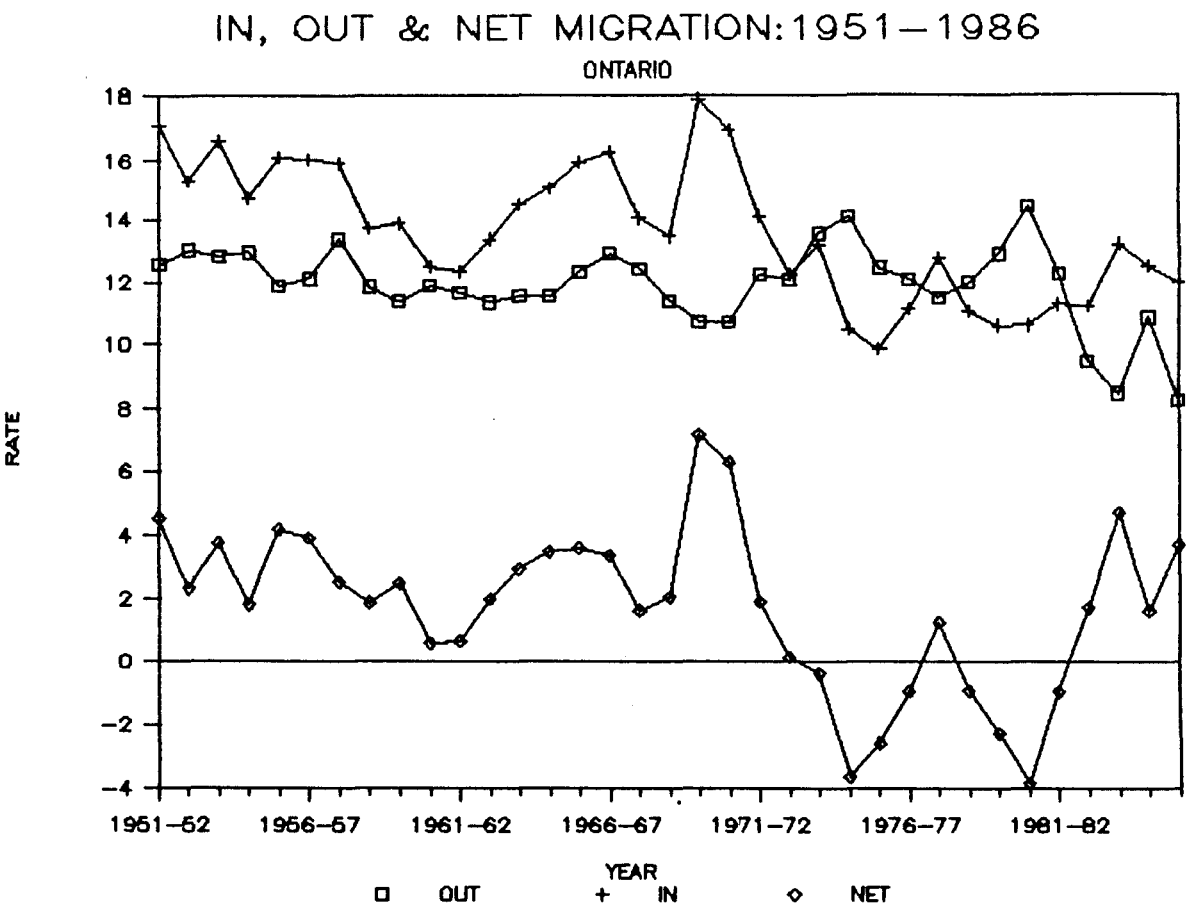

FIGURE 3

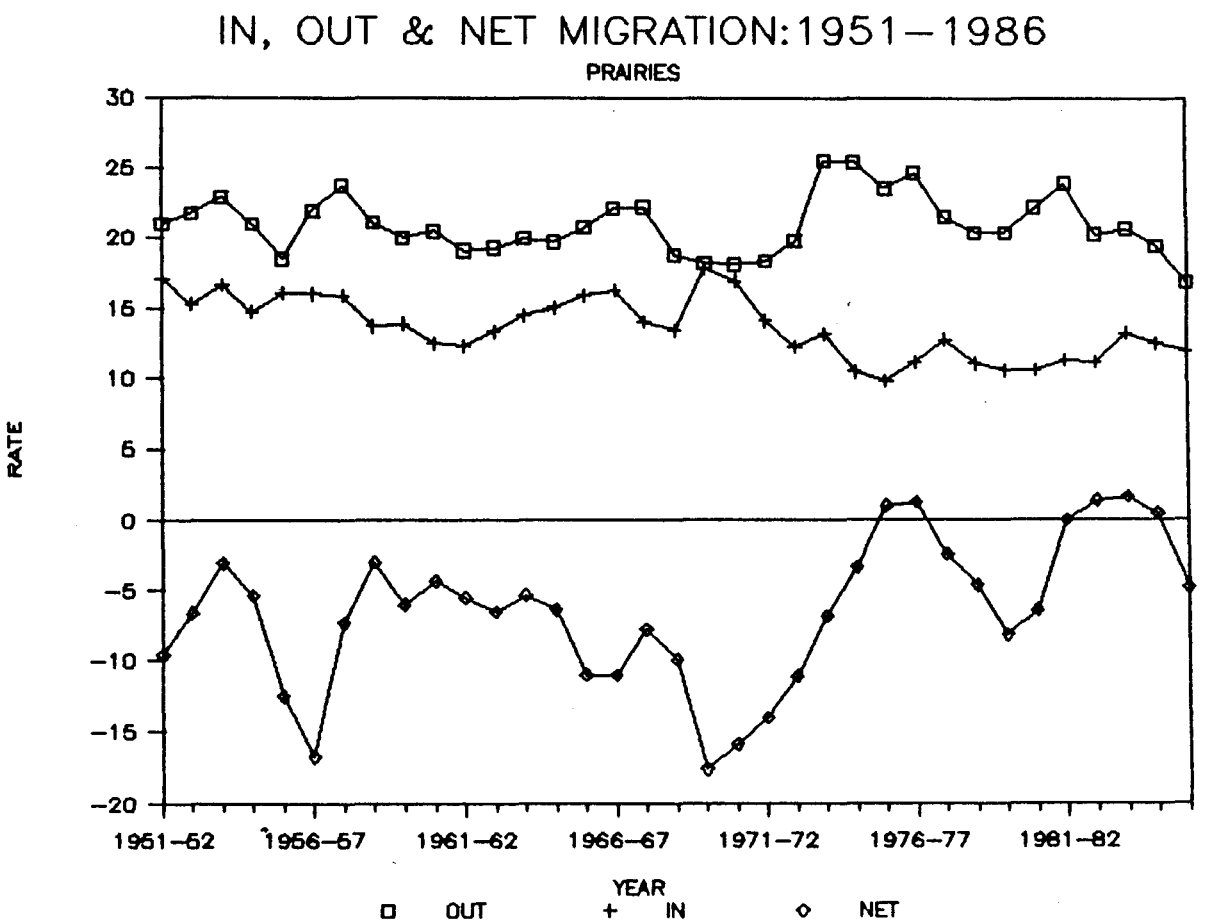

FIGURE 4

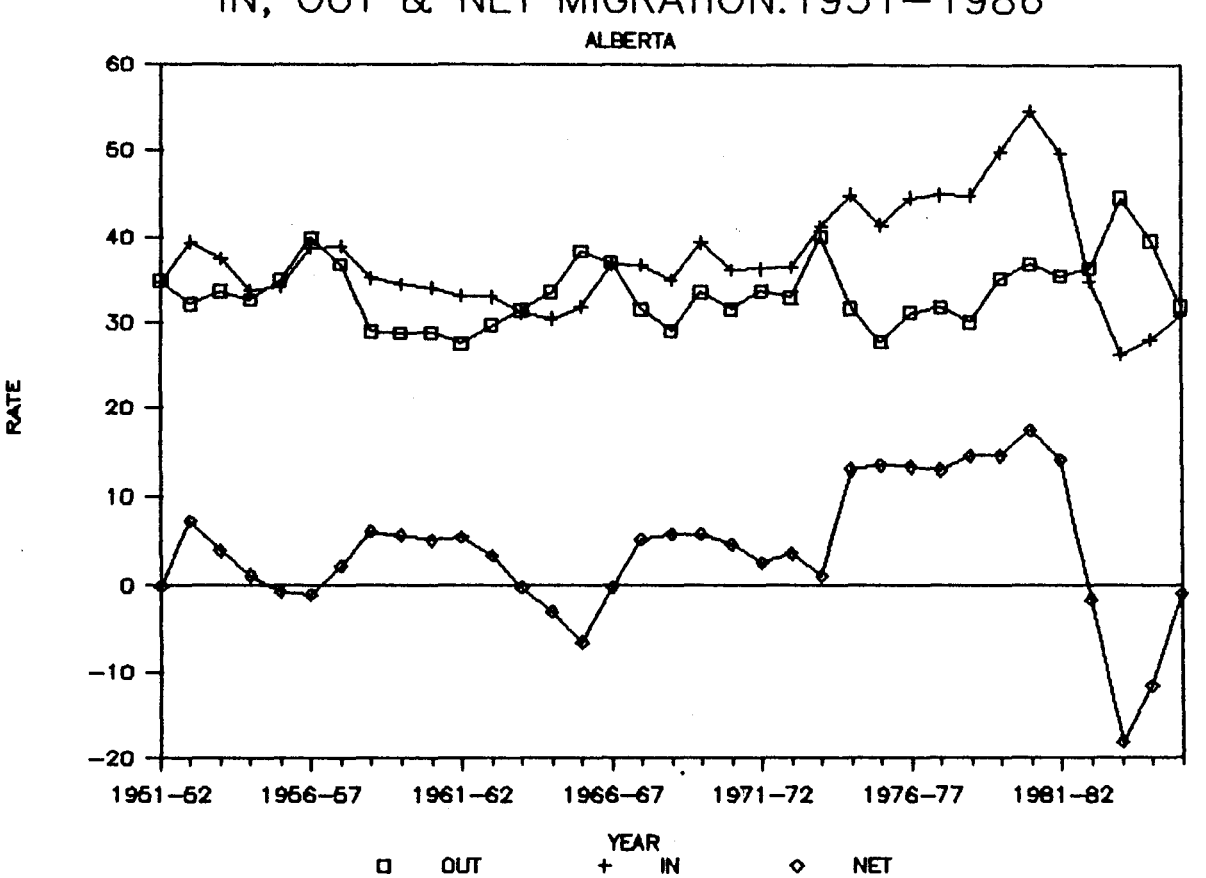

FIGURE 5

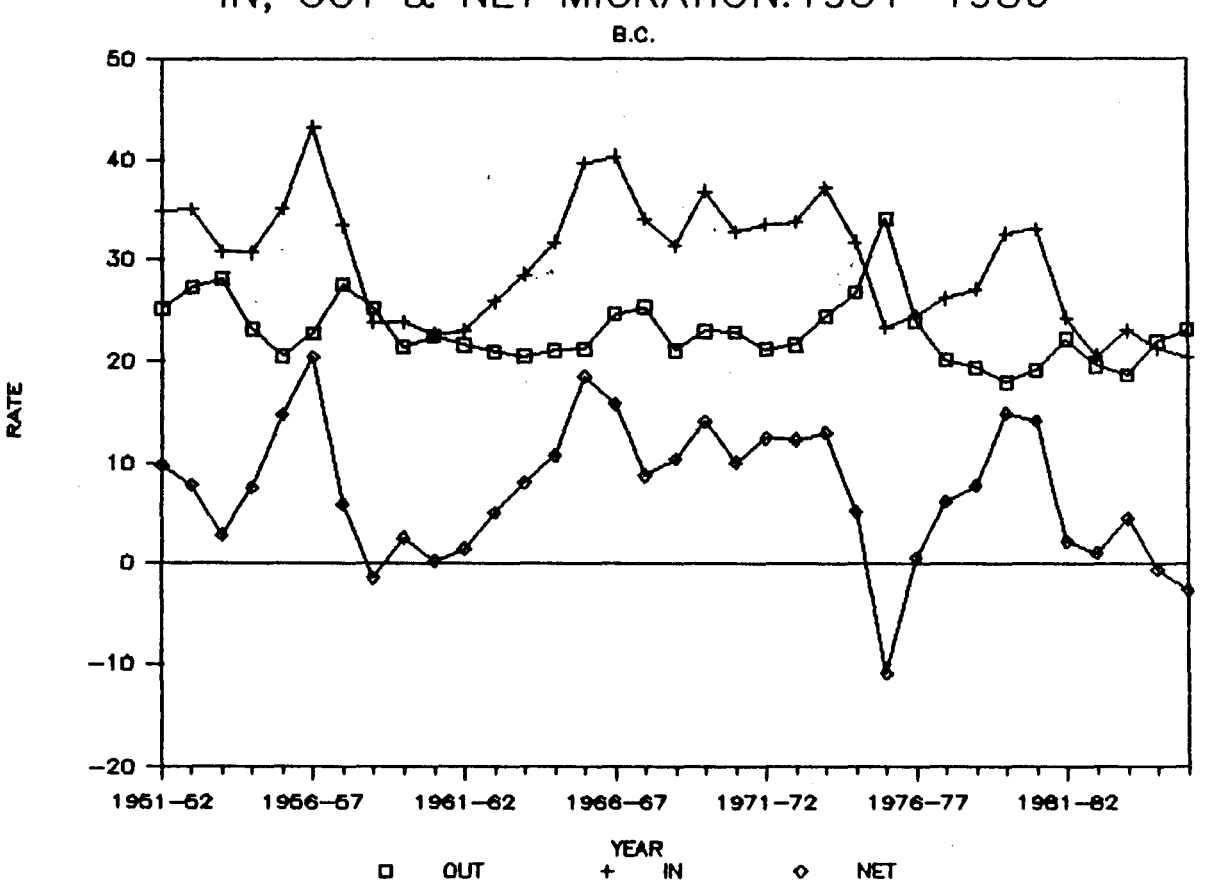

FIGURE 6

level of economic development and favorable climate. From table 3 and table 4, it was seen that there was a great degree of variance in the coefficient of variation, from 23.19% in Quebec, to 9.9% in the Prairies, while British Columbia and Alberta have a higher variance. Ontario has both low levels of unemployment and higher than average incomes.(Statistics Canada, National Income and Expenditure Accounts, Catalogue 13-201) Still, there is a large difference in the magnitude of the two rates.

TABLE 2
AVERAGE VALUES OF IN-, OUT- AND NET-MIGRATION

	IN	OUT	NET
ATL.	17.86	20.61	-2.76
QUE.	6.45	9.02	-2.57
ONT.	13.64	11.90	1.74
PRA.	20.92	27.46	-6.54
ALTA.	37.60	33.65	3.96
B.C.	29.98	22.81	7.17

TABLE 3
STANDARD DEVIATION VALUES FOR IN-, OUT-, AND NET-MIGRATION

	IN	OUT	NET
ATL.	2.59	3.41	3.99
QUE.	1.50	1.37	1.76
ONT.	2.17	1.30	2.53
PRA.	2.07	4.68	5.07
ALTA.	6.18	3.89	7.49
B.C.	6.04	3.20	6.57

TABLE 4
COEFFICIENT OF VARIATION VALUES FOR IN-, OUT-, AND NET-MIGRATION

	IN	OUT	NET
ATL.	14.52%	16.53%	-144.49%
QUE.	23.19%	15.14%	-68.43%
ONT.	15.89%	10.91%	145.54%
PRA.	9.91%	17.03%	-77.56%
ALTA.	16.45%	11.56%	189.37%
B.C.	20.14%	14.04%	91.68%

Quebec's cultural and linguistic barriers could create a barrier to in-migrants, effectively blocking many Anglophones from the region. More will be said about this later. The Atlantic and Prairies show moderate levels of average in-migration. Alberta shows the highest level of in-migration. However, this value must be tempered by the realization that Alberta experienced high migration rates for several years in the late 1970's, consequently affecting the mean value of in-migration. The high values associated with Alberta in-migration are most likely related to the positive economic conditions experienced by the province. This drew the unemployed into the region in search of employment. This problem did in fact exist in Alberta in the years subsequent to the decline in oil prices, with a resulting strain placed on the provincial welfare system. The high rates and reversals of flows seen in Alberta could be due to several reasons such as the search for jobs within the booming Alberta economy, combined with a lack of jobs elsewhere. Generally, it is assumed that the labour pool is mobile and can therefore move to locations that offer employment. Alberta experienced peak values of in-migration in 1980-81, then suffered a dramatic decline between 1981 and 1983. Despite the economic downturn, and a decreased demand for labour, the migration into Alberta continued at a high rate. The lowest value recorded during this period was 26.56, which was higher than most of the observed values of in-migration to the Prairie region. It might be concluded that a region's ability to attract migrants does not

change as rapidly as one might think. Alberta was still attractive as a destination, despite the lack of available jobs, and the downturn in its economy. This could account for the continuing high level (relatively) of migration into the province after 1981.

The discovery of oil and natural gas off some of the Atlantic provinces in the late 1970's did not have a large impact on in-migration, as was witnessed in Alberta. This could be due to two reasons:

1) The level of aggregation used. If migration rates were considered at the provincial level, an increase in in-migration may be visible for some provinces. As it is, the impact may be lost in the data.

2) The decline in world oil prices occurred shortly after the discovery, so that the full employment effect and hence, the full migration effect was not felt in the region.

In-migration to Quebec generally decreased over the thirty-five year period of the study, reaching a low during 1977-78. This coincided with the election of the Parti Quebecois on their platform of Sovereignty Association. Language reforms were instituted at the same time. The combination of these factors most likely contributed to the low value of in-migration witnessed during this time period. There has been a slight increase in the in-migration rate through the 1980's, paralleling the relaxation of the language laws by the now governing Liberals and the defeat of the Sovereignty Association platform in 1980.

Perhaps, this increased in-migration was also a result of the re-direction of the migration flow away from Alberta. Ontario, throughout the time period, experienced widely varying rates of in-migration between single years. Therefore, despite being a continuously strong province in economic terms, its attractiveness for in-migrants was highly variable.

Ontario and Quebec have the lowest out-migration rates, at 11.90 and 9.02 respectively, while the Atlantic region and British Columbia show moderate levels of out-migration. Here, there is little variation in the coefficient of variation and therefore little variability in out-migration rates. It is also seen that Ontario and Quebec have the least amount of variance in out-migration. The relatively low out-migration rate for the Atlantic region may be unexpected since it is assumed that this region loses a large proportion of its population, yet the average value is less than that of Alberta. Possibly, migrants departing the Atlantic region are restricted in their migrational patterns, for they can only move west. Another consideration is the concept of return migration. After the initial migration movement has occurred, the migrants may then return to the province of origin for one reason or another. This study does not consider return migration and its magnitude and, therefore, a large portion of the out-migration from Alberta (and other regions) may only be returning migrants. They have been dissatisfied with Alberta, and have decided to return to their original province. This observation also underscores the idea

that the volume of flows of in- and out-migration can be large, and are only relevant in terms of each other. For example, a major amount of in-migration can occur even in regions that lose population. Alberta and the Prairies exhibit the highest average levels of out-migration. Alberta's average is again most likely influenced by the high rates of out-migration experienced in the 1980's. The Atlantic region has a highly varying rate of out-migration. Ontario's and Quebec's out-migration rate has generally dropped since the late 1970's.

In most situations, the concepts of in- and out-migration must be observed in relation to each other. Therefore, the net migration rate was considered. This index may give a better picture of overall gainers and losers in terms of population. Net-migration has historically been used to define a region's attractiveness. Arguments as to its effectiveness as an indicator of the attractiveness of a region exist. (QSEP #151, p. 17). Net-migration can be 'contaminated' by the existing distribution of the population within the region. (QSEP #151, p. 19) It is also unsuitable due to the varying population sizes of Canadian regions and cities.(Liaw, p. 6) Therefore, net-migration will not be used as an indicator of the attractiveness of a region within this study. During most time periods in this study, the Atlantic, Quebec and the Prairies were net losers, while the three remaining regions (Ontario, Alberta, B.C.) were net gainers during the majority of time periods. In all cases, short term variations in the data existed. British Columbia has

the highest average at 7.17, while the Prairies have the lowest at -6.54. British Columbia is attractive in terms of employment, as well as climate. It is commonly referred to as the 'sunshine coast' and, as a result, it is an attractive environment to live in. The Prairies, on the other hand, suffer from a severe winter climate, aiding the observed negative net-migration value. As well, the Prairies have a below average income level.(Statistics Canada, National Income and Expenditure Accounts, Catalogue 13-201) Alberta experienced a low, positive level of net-migration, with the highest values recorded during 1974-1982.

Some of the largest negative net-migration values in Quebec are witnessed during the 1976 to 1980 time period. This coincides with the period of political change experienced in Quebec, as explained earlier in this paper. In many respects, Quebec is unique in terms of its migration patterns due to its cultural identity. Within Quebec, there is a reluctance of the French speaking population to leave and a corresponding reluctance of English speaking migrants to enter. This, coupled with below average income levels and higher than average unemployment, has helped to create an 'island province', thus trapping its population.

It is difficult to tell precisely if there is a parallel evolution of the Atlantic regions and British Columbia. However, the data would seem to indicate that there is no such parallel evolution. These regions' migrational tendencies are very different. To begin with, British Columbia has a positive net-

migration, while the Atlantic region has a negative net-migration. Therefore, the values of in- and out-migration differ. Out-migration values are only marginally higher in British Columbia, but in-migration rates are significantly higher for all time periods in that region. Perhaps, if each province was considered separately, then a parallel evolution between Newfoundland and British Columbia might exist.

It was suggested at the start of this paper that one of the results would indicate that there were linkages between neighbouring regions, especially between the western regions. While these linkages do most likely exist, there is no direct evidence within the data to support this idea. Short of looking at the probabilities to migrate between regions, it is difficult to tell the extent of migration between neighbouring regions. However, if linkages between neighbouring regions do exist, then the fact that the Prairies have had lower unemployment than average could indicate that migrants from the Prairies are willing to move further westward due to the draw of above average income, employment, and the climate of British Columbia.(Sitwell and Seifried, p. 160) Therefore, the higher in-migration rates of Alberta and British Columbia result. In effect, the out-migration from the Prairies would serve to reduce the unemployment rate in that region, while increasing the size of the labour pool and hence, increasing the unemployment rates in Alberta and British Columbia.

In most situations, people will wish to minimize the

uncertainty and risk of migration. Therefore, migrants will usually migrate in a situation about which he knows, as compared to migrating to unknown areas. In this case, knowledge is defined as being conscious of employment rates, income, etc. Previously, reference had been made to conditions where, for example, high rates of in-migration occurred at the same time as an economic boom. To this end, unemployment levels and income rates were correlated to migration rates in order to determine if some sort of relationship exists. That is, given a persons propensity to move, they will choose their destinations based on their knowledge of employment opportunities and income.(Gertler and Crowley, 1977, p. 77) A simple Pearson's correlation was determined between the rate of migration and the unemployment rate (or income) in order to determine if some significant linear relationship exists, and the nature of it. It should be remembered that the correlation values only indicate that some relationship exists. Undoubtedly, many other factors as discussed, influence migration.

A negative relationship was found to exist between in-migration rates and unemployment. That is, as unemployment increased in region i, in-migration into region i decreased. This negative relationship was found to be significant at the .05 level in all but the Atlantic region. In British Columbia (r=-.737), Alberta (r=-.677), Ontario (r=-.665), and Quebec (r=-.690), the results were highly significant. This relationship makes sense, - a high unemployment rate deterred migration into a

region, as would be expected.

The second observation was more interesting. It indicated that the rate of out-migration was negatively correlated with the unemployment rate. Again, as unemployment increased, out-migration decreased. This result seems rather odd, but it might give an indication of the migration mechanism that is at work here. The pull factor of low unemployment in another region may be a stronger precursor to migration than high unemployment at the origin. That is, migrants may be more keenly aware of their choices and will choose to migrate to a region where job opportunities are seen to be the best. Otherwise, they are content to remain where they are. The push factor experienced in a region may not be as strong as the pull factors of another region. In fact, it has been found that there is a strong correlation between the rate of migration out of the Atlantic region and employment rates in Ontario.(Matthews, 1981, p. 176) Again, this suggests that migration is the result of pull factors from the more developed regions. This reasoning assumes that the employment conditions of the destination were better.

When income rates were correlated with migration rates, a different picture was seen. Per capita disposable (unadjusted) income was used. A negative relationship was seen between income and out-migration, significant at the .05 level although the relationship was not that large. The Priaries had the largest r value at -.591. As income increased, out-migration decreased. This result is intuitive. If income increased in the origin

region, the individual will show a lower probability to migrate, and thus stay were they are. Alberta is an interesting exception, as it displays a positive relationship between income and out-migration. An explanation for this is the idea that workers, once they had earned some pre-set amount, migrate back to their origin region. They had made their money and then returned home. This is a common practice among the Canadian labour force.

The only significant negative correlation between income and in-migration is seen in British Columbia (r=-.483). All other relationships are very small. Some indicate that a curvilinear relationship may better describe the connections between the two variables. Again, it is seen that there is indeed some overall relationship between income and migration, but this relationship must be tempered with the fact that several factors affect the outcome.

CONCLUSIONS

Values of in-, out- and net-migration have been presented. Each index documents certain migrational conditions that exist within the province at specific time periods. Generally in- and out-migration values are of similar magnitude, i.e. high levels of in-migration correspond to high levels of out-migration. It is seen that migrational flows are not necessarily stable. Instead, flows can drastically change from one year to the next.

Only in the very long run could migrational flows be considered stable. The migrational process is a complex machine and without further research and other data sources, it is difficult, if not impossible, to explain and model migrational flows exactly. Instead, some basic ideas were used to help explain the existence of the values and the directions observed. However, through the application of causal explanations for the migration flows as presented by other researchers, the results are "fleshed out" and expanded. It may be that pull factors are stronger than push factors in inducing migration. Migration is the result of a wide range of causal factors, some of which affect certain segments of the population more than others. Individual perceptions and evaluations of destinations act as a filter in the migration decision. Likewise, migration streams are composed of many different people, each making their individual decisions to migrate under a wide variety of circumstances. Obviously, these individual reasons cannot be seen in the previous results. Instead, the aggregate result and causes of this migration process are seen.

PART TWO: CANADIAN POPULATION AGGLOMERATION TENDENCIES

INTRODUCTION

New areas of Canada were settled throughout the 1800's and the early 1900's. Many settlers pursued an agricultural existence and, as a result, the population became increasingly

dispersed as they settled in what are now recognized as peripheral areas. They struggled to earn an existence on poor farm land in isolated regions. With urbanization and industrialization, this process of peripheral settlement slowed and reversed as people migrated into the cities in search of jobs. The result was an increasing agglomeration of population, as settlement occurred at higher and higher levels of urban concentration. Now, metropolitan areas have come to dominate the Canadian landscape. Areas such as the Quebec-Windsor, Calgary-Edmonton, and Vancouver-Victoria agglomerations are the best known areas of Canadian population concentration. However, new information may point to a reversal of this agglomeration process - i.e. a dispersal of population. Countries such as the United States, West Germany and Japan have shown outflows from metropolitan areas. (Berry, p. 444) Simple Canadian urbanization statistics describe the situation. (Statistics Canada, Urban Growth in Canada, 1981) In 1971, the Canadian population was 76.1% urbanized. In 1981, it had dropped to 75.7% urbanized. These values demonstrate that Canada's population is marked by a decline in the proportion of the population classified as urban between 1971 and 1981, and suggest that further study is needed.

The second part of this paper examines this possible de-concentration of population within Canada. Agglomeration levels within Canada are considered. From this study, the process of agglomeration and disagglomeration within the Canadian context for the time period can be traced in an attempt to better

understand migrational patterns within Canada. Migrational flows have been the main source of regional differences in the growth and decline of population within the provinces of Canada. Therefore, migration is also one of the main contributors to the agglomeration or dispersal of the Canadian population. This agglomeration process will be traced at the regional level. Hence, no distinction can be made between rural/urban areas, and metropolitan/non-metropolitan areas. Specifically, the second part of the paper will attempt to determine whether spatial agglomeration continues in Canada (through migration), or if a reversal in this process has occurred. Migration has important implications and this paper will focus on some of the aspects of migration.

LITERATURE REVIEW

Using the formulas presented below, the current degree of agglomeration of the Canadian population will be looked at. The idea of population dispersal has been demonstrated by several researchers. Not all the research pertains directly to the present topic of study. For example, many studies consider the concept of population agglomeration, yet they use different techniques than will be employed within this paper. However, their material is still relevant; backing up and supporting what was originally proposed and what the results could be.

Tucker (1984) found that during the 1970's there was heavier

migration away from the central cities to both suburbs and non-metropolitan areas than in earlier years. Suburban areas continued to grow in terms of population, despite the processes of gentrification and urban renewal which were occurring in the central cities. Throughout the 1970's, there was an acceleration of the deconcentration of central cities within the U.S. Although the present study cannot differentiate between suburbs and non-metropolitan areas (as Tucker did), it should point in the direction of Tucker's results. That is , that a de-concentration of the Canadian population has occurred. This agglomeration and/or deconcentration of population will be looked at for the nation as a whole due to the aggregation level of the data. For example, there is a lower level of agglomeration currently than was present in the 1950's. Considering the process of Canadian population agglomeration using the data provided for this research paper, can provide a reference for future studies in which the data is disaggregated further, i.e. by demonstrating that the Canadian population has indeed become less concentrated.

Berry (1977) demonstrated the population increase of metropolitan areas during the 1960's, and the reversal of these flows in the 1970's. The population in non-metropolitan areas was increasing faster than that of metropolitan areas. Within this context, one might expect to see a delay in the Canadian data, since Canada historically trails the United States in terms of demographic characteristics (i.e. suburbanization). Berry

found that non-metropolitan areas adjacent to metropolitan areas experienced the greatest growth. That is, people were not moving far from the city. Again, the present study does not allow for this level of sophistication. However, Berry's study does confirm the idea that there is a movement of people away from nodal areas.

Dean (1986), showed that these counter-urbanization trends existed in other areas. Again, the shift in the migration/concentration patterns occurred in the late 1960's and early 1970's. At this time, large towns and cities within Brittany, France, were recording net-migrational deficiencies. This shows that the de-concentration of population is a widespread phenomenon, and is not relegated to the U.S. and Canada.

Simmons (1982), used a ratio for two time periods to look at the change in migration patterns in Canada and determined that all linkages from larger to smaller centers have become larger. This trend was found to be true for the whole country. (Simmons, 1982, p. 175) However, Simmons did not specify whether these smaller centers were adjacent to the larger centers (indicating a suburb or 'bedroom' community), or if they were removed from the larger centers by some distance. Likewise, Simmons could not explain this migrational shift away from larger centers.

The approaches used by Simmons, Tucker, Berry and Dean used data that was more disaggregated than that presently being used,

and they were able to involve other variables within their models. Therefore, of greater relevance to the present paper was the study completed by Vining. Vining, (1975), used measures of agglomerative tendency and the current state of agglomeration for Japan over the years 1954-1972. Vining showed that the migratory behaviour of the Japanese was more agglomerative in tendency than the actual level of agglomeration observed. That is, with modernization and industrialization, there is first a convergence to, and then a dispersal of population from a small number of regions.

This concept, along with the equations used by Vining, will be used in this research paper in an attempt to determine if Canada has undergone a similar progression. Vining's data was similar in extent and level of aggregation as will be used here. From the literature, the basic process of Canadian population agglomeration can be predicted. Through the 1950's and early 1960's, it would be expected that the Canadian population would increase its current state of agglomeration. However, by the mid 1970's, a reversal in this process should be seen as the Canadian population becomes less agglomerative at the regional level. The study will help to define the current level of agglomeration and its trends within Canada. Vining could not completely describe the shape of the D_t curve which traced the agglomeration levels. It is hypothesized that a moderate reversal in this agglomeration tendency has occurred in Canada. By looking at dispersion factors, it can be determined whether Canada's population is

continuing to become more agglomerative, or is in fact decreasing in its agglomerative tendency.

PROCEDURES AND DATA USED

In an attempt to understand the direction and implications of migration, the following formula can be used, as presented by Vining. This formula measures the degree of current agglomeration of the country. (Vining, 1975, p. 158)

$$D_t = .5 * \sum_{i=1}^{k} |x_{it} - x_{i*}|,$$

where;

k = the number of regions (6),

x_{it} = proportion of total aggregate population residing in region i at time t,

and x_{i*} = the proportion of the total population that would reside in each region if the population was equally dispersed. That is, if the region contains 30% of the national area, then that region should also contain 30% of the national population, by definition. The distance between $|x_{it} - x_{i*}|$ gives a measure of the degree of concentration of population at any time t. Low values of D_t indicate dispersal, while increasing values of D_t with time indicate increased concentration. (Vining,1975, p.159)

Therefore, D_t is the percentage of the country's total population that would need to be moved in order to achieve an even distribution of population across the regions.(Vining, 1975, p. 159) It is a measure of the degree of current agglomeration

level within the country. Low values of D_t indicate dispersal, and increasing values of D_t with time indicate increased levels of agglomeration. (Vining, p. 159)

OBSERVATIONS AND ANALYSIS

Vining suggests that D_t should increase through time as a nation develops and undergoes urbanization. Using the population estimates from 1951-1986, there is a moderate increase in D_t between 1951 and 1967, followed by a decline. A slight recovery or leveling off is seen in 1984 and subsequently.(see Figure 7) Therefore, what is seen would indicate a dispersal of Canadian population from 1967 onward. While the decline may not seem to be large (.217 to .189), there is, none-the-less, a decrease in the value of D_t. That is, less of the Canadian population would need to be moved in order to achieve a perfect distribution (0 = perfect distribution). These findings correspond to other research. For example, Dean (1985) showed that this counter-urbanization trend started in the late 1960's and early 1970's in Brittany, France.

Continued monitoring of D_t over the next ten years could confirm the exact shape and nature of D_t. Vining suggests that D_t does not attain an equilibrium point. It is difficult to conclude from this data whether or not D_t stabilizes, or continues to decrease, or even increase. Other extraneous variables could affect the agglomeration patterns of the

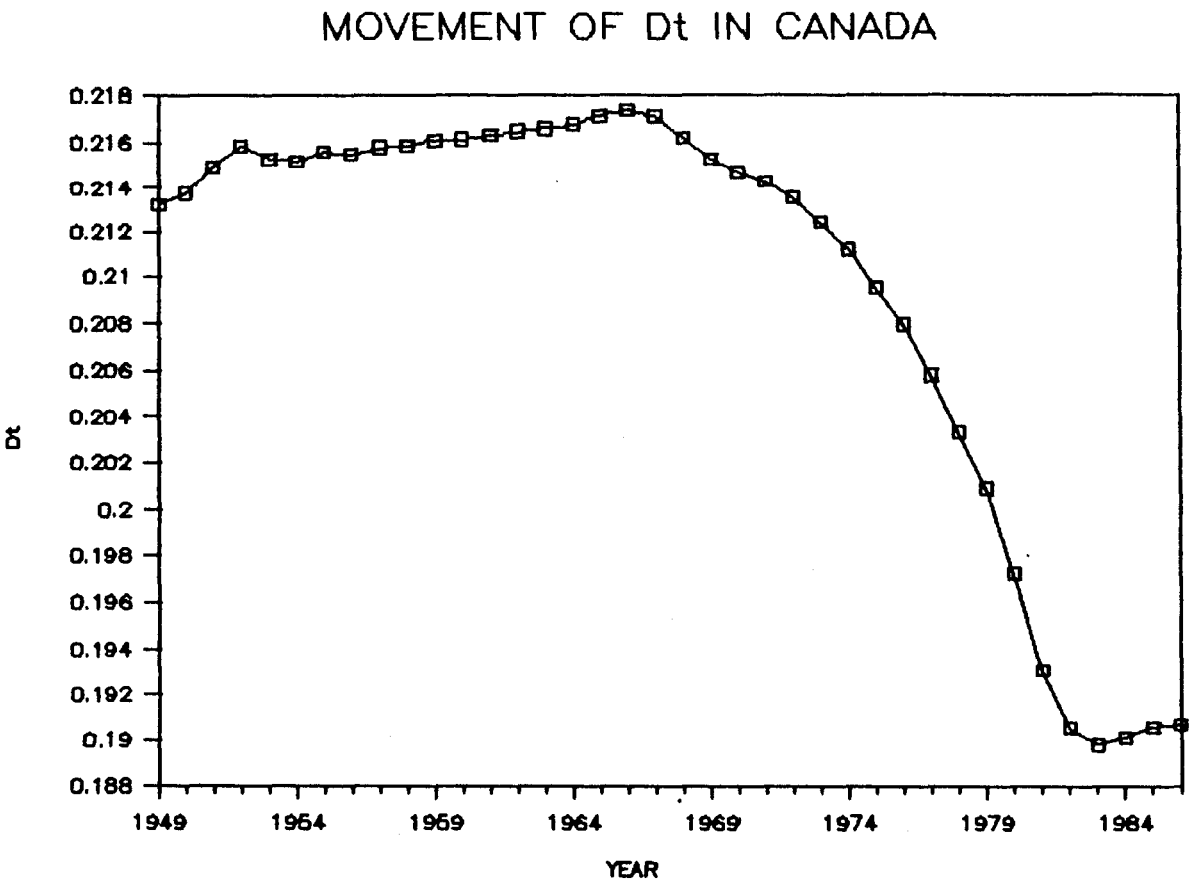

FIGURE 7

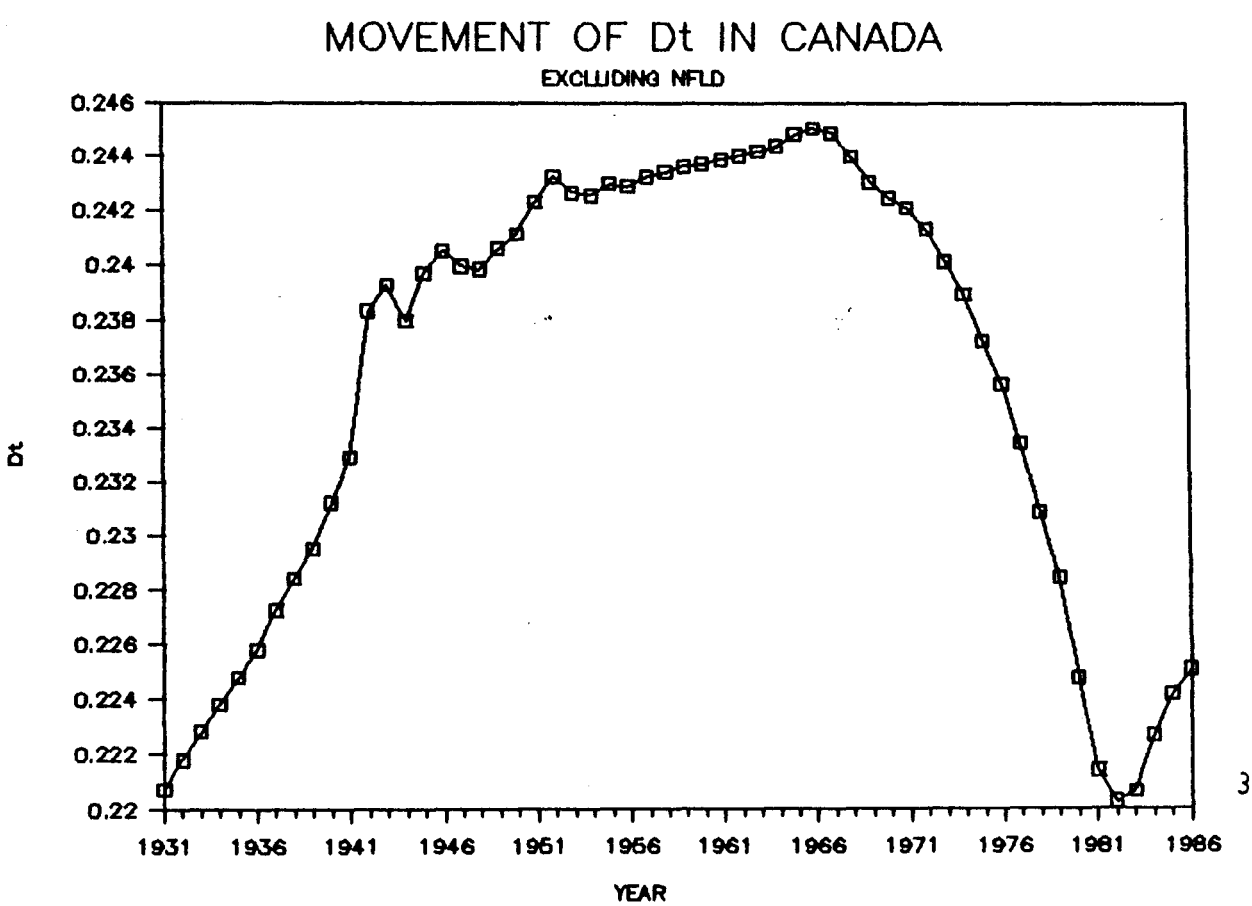

FIGURE 8

population. For example, a new oil crisis could once again promote city living in an effort to cut energy consumption. The slight increase in D_t seen since 1981 could indicate that the trend towards dispersal is slowing down or even reversing. As a result, the current state of agglomeration in Canada would be increasing.

As a further step, D_t was determined for the years prior to 1951. This poses a slight problem due to the fact that Newfoundland only joined Confederation in 1949. Yearly population data for Newfoundland is not available, and therefore the relative areas of each region in Canada (x_{i*}) are altered. Both of these factors affect the results of the D_t equation. To overcome this, the population and area of Newfoundland were excluded from this step. D_t was recalculated for the years 1931-1986.(see Figure 8) The results echo those obtained before, but they also show an increasing agglomeration of Canadian population between 1931 and 1967. One would expect the agglomeration process to be slow in the 1930's (in relative terms) due to the economic depression and the lack of jobs in the city. However, agglomeration seems to progress at a relatively fast rate. There was a large jump in D_t during 1939-41, corresponding to the start of World War Two. The outbreak of hostilities increased the opportunity offered by the city in terms of jobs, so the Canadian population became increasingly agglomerated. Other studies have shown that urbanization was spurred by a strong rural-urban migration. This increasing urbanization was the result of the

movement away from the agricultural production sector to an industrial/service based economy.

The decreasing values (indicating dispersal) of D_t observed from 1967 onward do not necessarily indicate that there is some sort of "back to the land" movement. It is difficult to accurately describe and explain the phenomenon witnessed, since the data used concerns the regional level. However, the increasing dispersion could be correlated with changing preferences, or the redistribution of industry, combined with easier communications and transportation within Canada.

It can also be asked which regions show a greater decline in agglomeration since this deconcentration process would most likely be irregular over space. Urbanization tapered off as early as the 1960's in British Columbia, Ontario and Quebec, indicating dispersal.(Gertler and Crowley, 1977, p. 47) This trend could be seen in cities such as Montreal, which showed the greatest decline in inner city population between 1971 and 1976, with a loss of 133,906 people.(Kennedy, 1983, p. 51) This loss of inner city residents is balanced by an increased proportion of the population living in the suburban and fringe areas. This same process was repeated in other large Canadian cities. Alternatively, the Prairies show a traditional net flow into urban areas, indicating agglomeration. (see table 5; Statistics Canada, 1981, Urban Growth In Canada.) In the Prairies, rural fringe growth exceeded rural growth, due partly to the fact that rural areas of Saskatchewan showed large declines. However, the

contribution to rural growth is very strong in Ontario, British Columbia, Prince Edward Island, Nova Scotia, and Newfoundland. Almost half of the rural growth between 1976 and 1981 occurred in these rural fringe areas. (Statistics Canada, 1981, Urban Growth In Canada) The cores were growing less rapidly than the rural fringe areas. When this type of data is considered at the regional level, it is concluded that some regions are continuing to agglomerate, while others are becoming more dispersed. The net result, as shown by the D_t function is the net dispersal of the Canadian population at the regional level.

TABLE 5
RURAL FRINGE POPULATION GROWTH AS A PERCENTAGE OF TOTAL RURAL POPULATION GROWTH, 1976-81

	Rural Growth		
	Total	Rural Fringe	%
Canada	480846	216825	45
Atlantic	63266	32165	57
Quebec	176435	82396	47
Ontario	84919	50173	59
Prairies	-1220	3651	--
Alberta	65628	12740	19
B.C.	89694	35700	40

Obviously, the Canadian population is not evenly distributed throughout Canada. In fact, the Canadian population is concentrated within a narrow strip adjacent to the United States border. A quick look at a map shows that this includes almost all of the major cities, with Edmonton being the exception. It is accepted that 90% of the population lies within an area no greater than 200 miles from the U.S. border.(Skoda and Robertson, 1972, p. 1) Therefore, D_t can be determined for this border strip, and partially account for any variation in it. (See figure

9 and appendix 1). Within the newly defined area, the population was assumed to be 100%. This assumption was made in order to ensure that the proportionality of the population remained the same. The proportional area of the provinces changed slightly, as the area is now a function of the length of each region's border.

Not surprisingly, the D_t curve resembled that which was obtained earlier. If the 1931-1986 graph is considered, the agglomerative level was lower for the border region than that for all of Canada. Rapid agglomeration in the war years occurred during the same time period of 1939-1941. Overall, agglomeration reached higher levels in Canada, peaking at .245 in 1966, as compared to .206 for the border strip. This observed peak also occurred at the same time during 1966. Dispersal was greatest in the border area at .178 in 1983, as compared to the low of .220 experienced in the remainder of Canada. So, what does this tell us? The lower dispersion level witnessed within the border area may indicate a greater desire by the population in this area to disperse. Because of the high population density experienced in this area, the dispersal pressures experienced by the population may be higher. As a result, the lower dispersion value is seen. Also, the lower maximum value of agglomeration (1966) may affect the results.

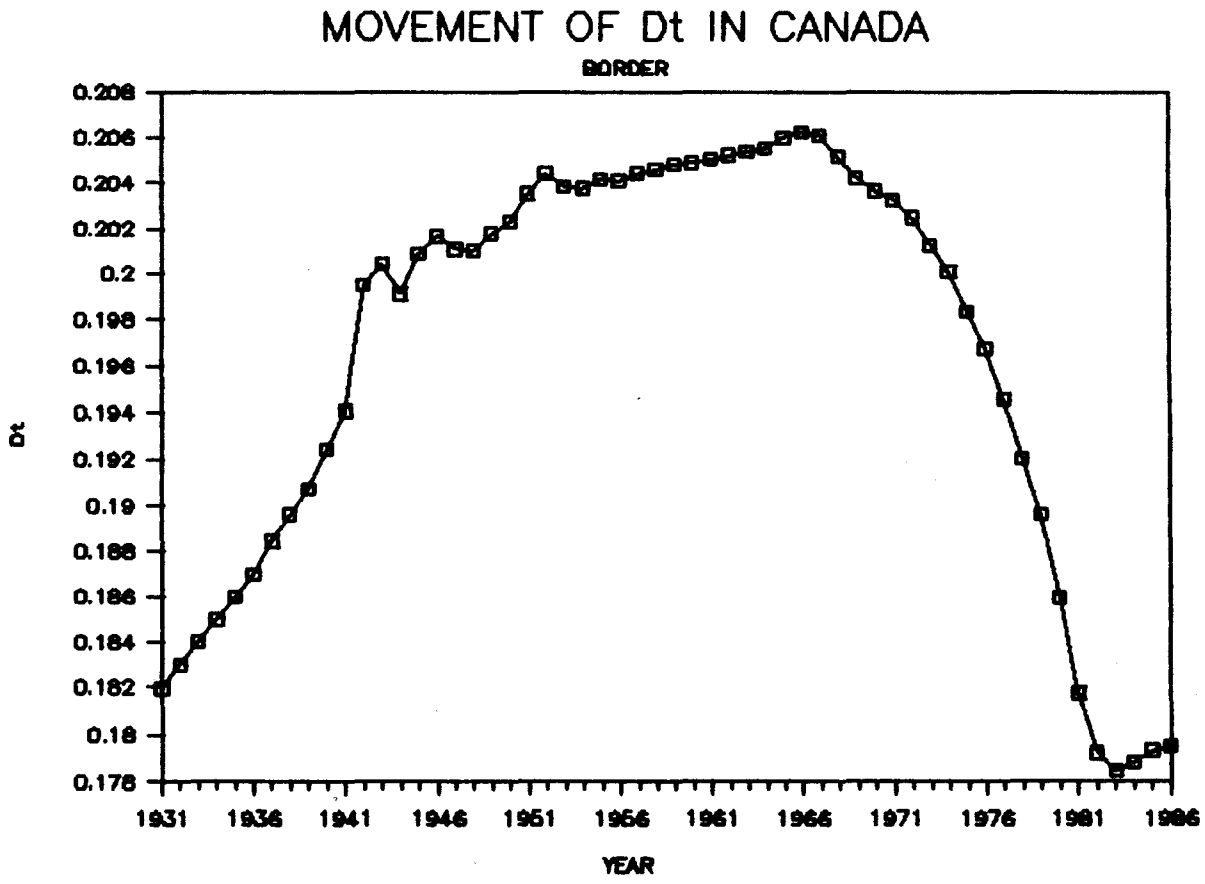
MOVEMENT OF Dt IN CANADA
BORDER
0.208
0.206
0.204
0.202
0.2
0.198
0.196
0.194
0.192
0.19
0.188
0.186
0.184
0.182
0.18
0.178
Dt
1931
1936
1941
1946
1951
1956
1961
1966
1971
1976
1981
1986
YEAR

FIGURE 9

CONCLUSIONS

What has been presented here is the concept of population agglomeration within Canada over the years 1931-1986. The Canadian population became increasingly agglomerated between 1931 and 1967. Following this, agglomeration levels decreased, with some leveling off or slight increase after 1981. This is the irreversible process of migration transactions. Firstly, there was an increase in rural-urban migration followed by a time period where urban-urban migration was the main source of population re-distribution. The disagglomeration seen in Canada may be rural-urban migration, but this cannot be documented here. It would be interesting to determine where these people are moving from. Are they ex-urbanites, discontented with the city, or are they only moving closer to the city from some other rural area? The final decision on residential location rests with the individual, and his or her residential preferences.

While this paper cannot show that a certain proportion of the destination of migration is rural (or suburban), it does show the idea that migration has resulted in a dispersal of the population. A more micro-oriented approach is needed to enhance these findings in order to look at the net gains/losses of the metropolitan areas. The findings show that the process of agglomeration and the subsequent process of dispersal within Canada occurred at approximately the same time as witnessed in

such areas as Brittany and the United States. Generally, it seems to be a trend witnessed in fully urbanized and industrialized nations. Agglomeration and dispersal factors should be compared between nations in order to gain a better understanding of the magnitude of this phenomena. It is impossible to completely show the shape of the D_t curve, due to the uncertainty of the future, and the impact of structural economic changes on it (i.e. World War Two). Many other variables affect the country's dispersion movement. However, for the time being, migration will most likely result in dispersion, or a leveling off of the process.

SUMMARY AND CONCLUSIONS

Migrational flows can be explained through the use of qualitative explanations. Rigorous testing to explain the migrational flows was not carried out, but, by observation and simple correlation techniques, there seems to be a correlation between flows and income and unemployment rates. Flows are also influenced by political, cultural, and social factors. Within industrialized/urbanized nations, migration is the major source of population re-distribution. Similarly, it seems to be those same industrialized/urbanized nations that exhibit a decentralization of their population, following a convergence of the population. Population does not seem to converge indefinitely. Specifically, within Canada, there is a

convergence and then dispersal of the population within the regions, with the year 1967 being a significant turning point in Canadian demographic patterns. It is imperative that more be learned about the causes and effects of this population redistribution, in order to change policy where needed.

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APPENDIX 1

VALUES OF D_T IN CANADA, 1931-1986

YEAR	D_t	D_t(BORDER)	D_t(EXCL. NFLD)
1931		.181954	.220747
1932		.182988	.221781
1933		.184028	.222821
1934		.185011	.223804
1935		.185998	.224791
1936		.186981	.225774
1937		.188447	.227240
1938		.189594	.228387
1939		.190719	.229512
1940		.192437	.231230
1941		.194086	.232880
1942		.199520	.238313
1943		.200453	.239247
1944		.199164	.237957
1945		.200896	.239690
1946		.201680	.240473
1947		.201126	.239919
1948		.201031	.239824
1949	.213251	.201775	.240568
1950	.213749	.202302	.241095
1951	.214974	.203504	.242297
1952	.215895	.204430	.243223
1953	.215297	.203835	.242628
1954	.215210	.207374	.242528
1955	.215625	.204153	.242946
1956	.215525	.204065	.242858
1957	.215807	.204433	.243226
1958	.215916	.204611	.243404
1959	.216108	.204827	.243620
1960	.216152	.204914	.243707
1961	.216313	.205069	.243862
1962	.216498	.205236	.244029
1963	.216636	.205388	.244181
1964	.216777	.205563	.244356
1965	.217152	.206002	.244795
1966	.217338	.206245	.245039
1967	.217127	.206075	.244868
1968	.216246	.205184	.243977
1969	.215327	.204232	.243025
1970	.214700	.203645	.242438
1971	.214298	.203252	.242045
1972	.213568	.202473	.241266
1973	.212425	.204284	.240077
1974	.211230	.200104	.238897

cont'd...

1975	.209544	.198381	.237174
1976	.208000	.196780	.235573
1977	.205816	.194600	.233394
1978	.203267	.192040	.230833
1979	.200865	.189623	.228416
1980	.197237	.185967	.224760
1981	.193080	.181771	.221385
1982	.190545	.179240	.220282
1983	.189825	.178469	.220650
1984	.190144	.178840	.222682
1985	.190594	.179345	.224162
1986	.190720	.179558	.225061
