A CHANGING SOCIAL GEOGRAPHY OF HAMILTON, ONTARIO; 1961-2006

By:

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A Thesis Submitted to the School of Graduate Studies In Partial Fulfillment of the Requirements For The Degree Master of Arts

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MASTER OF ARTS (2009) (Geography) McMaster University Hamilton, Ontario

TITLE:A Changing Social Geography of Hamilton, Ontario; 1961-
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NUMBER OF PAGES: x, 135

ABSTRACT

The pattern of socio-economic status has changed over a forty-five year time period within the Hamilton Census Metropolitan Area. The grouping of census tracts into one of three categories based on its neighbourhood change, between 1961 and 2006, serves as the primary organizing framework for this thesis. This study uses average individual income in order to define the CMA's "Three Cities", extending from research by J. David Hulchanski of Toronto (2007). Census tracts belonging to Ancaster, Dundas, Flamborough and Grimsby comprise City 1, whose average individual income increased by 10% or more compared to the Hamilton CMA average individual income between 1961 and 2006. Census tracts of Burlington, Glanbrook and West Hamilton consist of City 2, within which the average individual income relative to the CMA either increased or decreased by no more than 10%. East Hamilton, the Hamilton Mountain and Stoney Creek encompass City 3, which has seen a decrease in the average individual income compared to the CMA by 10% or more. Using census data for 1961, 1971, 1981, 1991, 2001 and 2006 at the census tract level allows for the examining of the "Three Cities" at each period of time. Census variables include those related to: size and population, income, housing and tenure, education, immigration, households, and occupations. Distinct characteristics emerged between the "Three Cities" related to each of these variables. A contrasting divide exists between suburban communities and those of East Hamilton, the Hamilton Mountain and Stoney Creek. Results from this study add to the growing body of literature on social polarization, and offer a methodological contribution in that the grouping of the "Three Cities" characterize the CMA's census tracts over the forty-five year time period.

ACKNOWLEDGEMENTS

I would like to thank my supervisor, Dr. Walter Peace, for supporting me throughout the process of writing this thesis. I appreciate all of your support, freedom and advice during the various stages of the thesis journey. It was extremely enjoyable to work with you on this project, and would not have been nearly as much fun without all of your assistance and input. The committee members, Dr. Richard Harris, Dr. Michael Mercier, and Dr. Luc Bernier, deserve a special thank you for their time, comments and support offered towards the bettering of my thesis. Map Library staff members, Cathy Moulder and Gord Beck, along with Eva Lam who was the GIS specialist were instrumental in helping me retrieve the relevant census data and the mapping of this data.

Thank you to all of my office-mates throughout my time in graduate school for providing me with lots of support. I will always remember the various conversations and social outings that we had together.

Lastly, I would like to thank my family for their role in allowing me to pursue this degree. My parents have given me every opportunity to succeed in life, and especially by encouraging me to apply into the graduate studies program in The School of Geography and Earth Sciences at McMaster University. You guys have always believed in me, and supported me through the ups and downs. I would also like to thank my girlfriend who has had to listen to me rant daily about my new developments related to my thesis. You have been amazing throughout this process.

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CHAPTER 1 INTRODUCTION

1.1 Background and Research Problem

Since the 1970s developed nations have continued to change from industrial to post-industrial societies, and the emerging effects of global economics have resulted in its cities experiencing social polarization. Social polarization can be defined as the growing inequalities between high income and low income groups, and the subsequent disappearing of the middle income population (Knox and Pinch, 2006). This polarization among neighbourhoods is an emerging phenomenon of considerable interest to urban social geographers. While cities have always contained areas of both wealth and poverty, the census tracts of the Hamilton Census Metropolitan have changed dramatically in a short period of time.

The "Three Cities" model, developed by J. David Hulchanski, will serve as the primary framework in order to investigate the changing social landscape of the Hamilton CMA between 1961 and 2006. The Hamilton CMA, located in south-west Ontario, can be found outlined in Figure 1.1. Hulchanski (2007) found that each of Toronto's census tracts fit into one of three cities, based on the neighbourhood change over the period 1970 to 2000. It was determined that each of the three cities exhibited very different population characteristics based on the socio-economic and demographic census variables selected during this time period. Hulchanski (2007) concluded that no longer is Toronto a city of neighbourhoods, but rather a city of disparities. The fact that three distinctly

consolidated cities emerged within Toronto and in a persistent fashion demonstrates that these trends are not temporary.



Figure 1.1 Location of Hamilton CMA within Canada

Source: Statistics Canada, 2009

While some studies have focused on the social polarization of Canadian CMAs, very few have made an attempt to use several census variables to portray this change of a CMA over a period of time. The majority of studies along these lines are based on the large Canadian metropolitan areas, such as Toronto, Montreal and Vancouver. This study serves to create an understanding of the changing social geography of the Hamilton CMA between 1961 and 2006. The purpose of this research is to examine the characteristics of each of the "Three Cities" in the CMA, while simultaneously observing its changes through time.

1.2 Context of Research

The focus of this study takes place within the Hamilton CMA. The CMA is composed of the City of Burlington, City of Hamilton and Town of Grimsby. Each of the CMA's census tracts were grouped into one of ten geographic areas, seen in Figure 1.2, and then placed into one of "Three Cities". The communities which have witnessed a

10% or more increase in its average individual income relative to the Hamilton CMA between 1961 and 2006 comprise City 1, which consists of the census tracts belonging to: Ancaster, Dundas, Flamborough, and Grimsby. City 2, comprising census tracts of Burlington, West Hamilton and Glanbrook, has experienced an income that has increased or decreased by no more than 10%, i.e., it has remained relatively constant over the time period. Census tracts of East Hamilton, the Hamilton Mountain and Stoney Creek belong to City 3, where its income has decreased by 10% or more between 1961 and 2006.





Using census data for each of the study years at the census tract level it was possible to determine the socio-economic and demographic characteristics of each of these "Three Cities" over the course of the forty-five year time period. Variables related to population characteristics, income, housing and tenure, education, immigration, households, and occupations were used to determine the changing social landscape of the Hamilton CMA.

1.3 Objectives

The research addresses the following question: how has the pattern of socioeconomic status changed over a forty-five year time period in the Hamilton CMA from 1961 to 2006? The research has used an innovative way of viewing the census tracts of the Hamilton CMA, and documented the dramatic changes that have resulted. This quantitative study first classifies each of the CMA's census tracts into one of the "Three Cities". Secondly, using census tract data it establishes detailed features associated with the three categories for each time period. Lastly, mapping the variables allows for a visual representation of the changing CMA.

This research will provide a theoretical contribution to academia and develop an interest in spatial and temporal studies related to the social landscape of Canadian CMAs. The current body of literature which examines the social polarization of cities tends to focus on the larger Census Metropolitan Areas of Canada, and does so using census data for a short period of time, usually between ten and twenty years. Additionally, previous studies typically use one particular census variable to describe its changes. These studies lack both the comprehensiveness of census variables and the duration of the study period. This study differs in that social polarization is examined for a smaller Canadian CMA,

and uses a wide variety of census data variables to illustrate its changing social geography over forty-five years. The research also documents the wide disparities that exist between each of the "Three Cities". While this research evaluates characteristics of census tracts individually, it generalizes these results by classifying them into one of "Three Cities".

Chapter 2 discusses the evolution of studies in social geography over the course of the past century. Both the scope and research methods have changed significantly during this time period. This chapter begins with a description of the Chicago School of Sociology and its influence on qualitative studies taken place in Chicago. Critics of the Chicago School of Sociology's argue that economic determinism as a way to explain residential differentiation is far too narrow. Symbolism and sentiment, central to the emerging social values approach, should be considered when explaining spatial patterns. During the 1950s and 1960s a quantitative revolution changed the way studies were conducted in social geography. A discussion of social area analysis and factorial ecology demonstrates the scientific approach of using census data as a way to characterize the social differentiation of areas. Recent research has focused on the spatial and temporal patterns of immigrant, ethnic, and economic segregation. This literature provides a foundation for the various changes in the types of studies in social geography.

Chapter 3 provides a brief history of the Canadian census as well as a discussion related to Census Metropolitan Areas and census tracts. The study area is described with regards to its changing boundaries and the design of its geographic areas. The information found in the census data has changed between the years of the study period, therefore a discussion related to its changes is present in this chapter. Additionally,

specific consideration is given to the data collection, and the way in which the data has been mapped, using ArcGIS 9.0. The way in which base maps were created for the census years prior to 1991 is explained. Finally the importance of the use of the Bank of Canada Calculator for the study, and the overall study's limitations are considered.

In Chapter 4, the main results are revealed. Each of the "Three Cities" exhibit distinct characteristics from census variables related to size and population, income, housing and tenure, education, immigration, households, and occupations. These results can be found from both a spatial and temporal perspective for each of the "Three Cities". Important findings are shown in the form of figures and tables.

Lastly, Chapter 5 provides a discussion of the results and conclusions from this study related to the census variables examined. This chapter concludes by demonstrating contributions, and future directions for research.

CHAPTER 2 REVIEW OF LITERATURE

2.0 Introduction

A true understanding of the city requires a cross-disciplinary approach, taking into consideration social, economic and political factors that shape urban environments. While cities need to be seen as complete entities, i.e., as part of a social and economic system, they also consist of a mixture of individual neighbourhoods. A geographer's ability to identify broad environmental, social and economic characteristics and amalgamate them to various districts of a city is critically important to theory and practice in urban studies (Knox and Pinch, 2000).

Studies have focused on a number of variables including race, ethnicity, religion, socio-economic status, and age, illustrating various forms of residential differentiation (Timms, 1976). A range of research methods has also contributed towards examining the spatial structure of cities. The Chicago School of Sociology first initiated studies in social geography, and used a qualitative approach to determine the residential structure of cities. In the 1950s and 1960s, a quantitative revolution dominated studies in geography, providing a more scientific approach, using social area analysis and factorial ecology, in explaining the significance of census data variables. The economic restructuring of western nations during the 1970s and 1980s has radically altered the spatial arrangement of cities. More recent studies have focused on immigration and ethnic minorities and their use of space. Income polarization is another significant aspect of urban change, and is a direct result of the economic restructuring. This inequality has also had a drastic

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effect on cities and where people tend to live. Much has changed since the early 20th century in terms of the types of studies in urban social geography, beginning with the Chicago School.

2.1 The Chicago School of Sociology

The University of Chicago, founded in 1892, provided an opportunity for the Chicago School of Sociology to flourish during the latter decades of the nineteenth century. The Chicago School of Sociology's success hinged on the fact that it was highly integrated, with a strong network that consisted of both teachers and graduate students who conducted extensive research in the city of Chicago. Studies were focused on common problems of the city such as ethnic and racial mixing, social problems, urban form and local communities (Bulmer, 1984). Few institutions have had such a significant impact on urban studies as the Chicago School.

William Rainey Harper, the University of Chicago's first president, ensured that his institution promoted basic research and graduate training by saying "...it is proposed in this institution to make the work of investigation primary, the work of giving instruction secondary." (Bulmer, 1984, 15). Harper made sure the university was wellknown from a national and international perspective and did so by promoting the importance of research. In order for the university to be considered "the best", and to be "great", it needed to be strongly associated with achievements in research (Bulmer, 1984). Each department was persuaded to establish an academic journal or departmental series, whereby results of the research conducted by its members would be published (Bulmer, 1984). The localization of research studies conducted by Robert E. Park, one of

the School of Sociology's leading figures, and his students during the 1920s was influenced by the University of Chicago. The philosophy towards the teaching staff was to "...understand what was happening in the city around them." (Bulmer, 1984, 22). Harper believed that by examining Chicago, it would contribute towards solving the various social problems of the city (Bulmer, 1984).

The Chicago School of Sociology was able to combine research and theory into an organized discipline. The department was committed to offering its scholars diverse sociological and methodological perspectives, a major strength in its success (Bulmer, 1984). According to Faris (1980, 14), "In the 1920s there was at Chicago no doctrine with a name ending in 'ism'; rather there was a deliberate effort to avoid creating such a thing. Knowledge was being created, but was far from ready to be forced into a doctrine or to be given any short label." Sociologists' integration of empirical data with theory tends to have a more significant and lasting impression than work that merely focuses on empirical research (Bulmer, 1984). This twofold approach was developed early in the twentieth century as a way of testing propositions in a scientific form. A significant role of the Chicago School to the development of research methods in sociology was its varied use of research techniques. Rather than restrict themselves to official documents, Park pushed his students to pursue other sources like: letters, personal documents, newspaper articles, intensive field work, social mapping, ecological analysis and open-ended interviews with people (Golledge and Stimson, 1997). These various methods enabled researchers to understand the processes and outcomes associated with how cities have evolved and their social characteristics and problems (Golledge and Stimson, 1997).

2.1.1 Human Ecology

The Chicago School of Sociology became famous for its original work in ecology during the 1920s. Park developed a theoretical foundation for researching Chicago by applying basic principles of plant ecology to human society. Human ecology associates the city, or society, with an organism, with individual behaviour and social organization being regulated by a 'struggle for existence.' (Knox and Pinch, 2006, 161). Central to this theory is the idea of the "web of life" where all living organisms are brought together in a large system of interlinked and interdependent lives (Park, 1952). Its biological analogy was considered a major strength in that it seemed simple and logical, while similarities to the natural world could be observed, measured and recorded (Herbert, 1973). Individual segments could be fit into its relevant place within the overall broad framework.

2.1.2 The 'Natural Area'

Classical human ecologists derived a framework of urban sociology based on the idea of the 'natural area'. Zorbaugh (1961, 46) describes the natural area as "...a geographical area characterized both by a physical individuality and by the cultural characteristics of the people who live in it." Geographical regions are mutually adapted, and become adapted to the area, just like plant communities (Zorbaugh, 1961). Natural area studies often took the form of monographs which present a rich and detailed description of urban life. The best known monographs from the Chicago School were *The Ghetto*, by Louis Wirth, and *The Gold Coast and The Slum*, by Harvey Zorbaugh. These two works demonstrated a way of objectively understanding the city. Under Park's

supervision, many studies were conducted focusing on population groups, their environment, and the conditions in which people lived. The Ghetto concentrates on the evolution of Jewish residential enclaves in several European cities and also the Jewish area of Chicago. Wirth described the importance of these communities to their people in order to preserve a religion and its role in family ties (Herbert, 1973). He identified the ghetto in Chicago as a territory that was separated by street-car lines and railway tracks (Herbert, 1973). Despite this isolated region, there was a socially organized neighbourhood that was able to successfully preserve its distinct culture. Another empirical study of a region was documented in The Gold Coast and The Slum. Zorbaugh contrasted two districts in Chicago's near North Side: the upper income enclave called the Gold Coast, and the adjacent low status area which contained the rooming-house districts, ethnic quarters and the slum (Herbert, 1973). He describes 'The Slum' as "...constant comings and goings, of dull routine and little romance, a world of unsatisfied longings." (Zorbaugh, 1929, 8-9). The Gold Coast and The Slum presents an example of the process called succession. Both Wirth and Zorbaugh use an intimate knowledge of the city as a way to describe these natural areas. Burgess was so impressed by the results of the school's ecologists that at a Chicago City Council meeting it was decided that future Chicago census data should be made available based on the community areas which the Chicago School had mapped out.

Natural areas provide a sense of organization in the grouping of its populations and institutions. Therefore, the city can be seen as a collection of natural areas, each with its own distinct characteristics, and each contributing towards the urban economy (Park,

1952). The metropolis as a whole, acts as a sifting and sorting mechanism, whereby it selects the population that is best suited to reside in a location (Park, 1952). The process of sifting is necessary in order to reduce the potential of conflict and moral breakdown within a city. As the city grows larger in population, and regions develop certain characteristics through selection and segregation, every person finds a home, "...eventually, either the place where he can, or the place where he must, live." (Park, 1952, 79). According to the Chicago School, the segregation of the population across natural areas occurs as a result of their inability to handle the impersonal competition – typically in the form of wealth (Timms, 1971). Therefore, economic segregation is the primary mechanism of residential differentiation. However, other mechanisms exist, including language, race, and culture, usually operating in combination with other influences.

2.1.3 Role of Competition

Competition is the primary organizing principle in the plant community, however, its role is not as important in the human community. Within the plant community, competition produces an orderly distribution of the population and the separation of species within its environment (Park, 1952). These principles also exist for human communities as well. The fundamental form of competition is for a place in the community. Zorbaugh (1961) claimed that an impersonal competition exists where individuals of a city are in competition with each other, and is impersonal because the individual does not know his competitors. The market determines the most favourable locations and sorts people according to their ability to meet the location costs, both rent

and transportation (Timms, 1976). Classical ecologists utilize the notion of economic competition based on the earlier work of the Darwinian model of the struggle for existence (Timms, 1976). Within communities there is a struggle for advantageous positions and those individuals who are able to obtain the most desirable locations are considered the dominant group (Timms, 1971). Therefore, dominance is ultimately the result of invasion and succession.

2.1.4 Invasion/Succession

Invasion, defined as the process of group displacement, signifies a shifting equilibrium to a natural area (McKenzie, 1926). Invasion occurs when the pressure of a population on the natural resources of its environment reaches a specific level of intensity (Timms, 1971). The invasion usually results in a quick advance of a new population complemented by a decline of the initial population, and change is always evident. Succession can be explained as the process where a different social group begins to dominate a residential area after invasion (Knox and Pinch, 2006). Succession is the orderly sequence of changes that a biotic community goes through, during a period of instability to a more permanent stage (Park, 1952). Most importantly, not only do individual units within the habitat grow, but the entire community as a whole, and the system of relations among the various species that is engaged in the systematic process (Park, 1952). The invasion and succession process is cyclical in nature and goes through a number of stages involving major changes. A stable equilibrium can only be attained once succession is completed. Most commonly, these terms are applied to situations describing the residential patterns of immigrants. Typically immigrants settle in the

centre of cities, and gradually through time, move in stages towards the periphery of the city (Park, 1952). The end result is a move from a less stable area of the city, to a more established location, usually the suburbs. Due to the physical limits of the terrain and other natural features, the theory of dominance influences the ecological pattern of the city, and the subsequent relations between the different areas (Park, 1952).

2.1.5 Dominance

In every community, there is at least one dominant group. Using plant life to describe dominance, it is those species that obtain the most amount of light that will survive and become the most dominant. As Park describes, "Light being the main necessity of plants, the dominant plant of a community is the tallest member, which can spread its green energy-trap above the heads of the others." (Park, 1952, 151). This theory can be applied to human communities, as the dominant area of any community is typically the one with the highest values (Park, 1952). The central business district is the location with the highest land value. Due to its location at the centre of the city, and the relative accessibility, it is able to generate a high demand. Demand is a direct function of land value, suggesting that the higher the demand for a location, the higher the land values will be (Timms, 1971). Land values help determine and shape where businesses and social institutions are located (Park, 1952). These values decline immediately outside of the central business district, while gradually falling toward the periphery. The dominance and succession principles became the foundation for one of the Chicago School's most famous sociologists, Ernest Burgess, and his Concentric Zone Model.

2.1.6 Concentric Zone Model

Residential differentiation occurs as a result of sifting and sorting of populations and locations. Certain types of people occupy specific areas in a city and relationships develop between geographical space and the social space (Timms, 1971). It is natural for patterns to emerge as a city becomes more developed. Classical ecologists were most interested in applying the concepts of dominance and succession to the patterns of development and the structure of human settlements. Observations based on the location and size of specific communities allowed Burgess to identify an urban spatial structure which hinges on five concentric zones, seen in Figure 2.1.

The Concentric Zone Model demonstrates the tendency of each inner zone to extend its area as a result of the invasion of the next outer zone (Burgess, 1967). While Burgess states that the model does not apply to all cities, it can be useful in explaining how many North American cities are structurally arranged (Hebert, 1973). The various zones represent the economic power of different groups living within a city. Within each zone, the further segregation of groups is seen to be a reflection of differences in language, culture and race (Knox and Pinch, 2006). As a result, different zones have varying degrees of mobility of its population (Park, 1952).



Figure 2.1 Burgess' Concentric Zone Model

Source: Gieryn, 2006

2.1.7 Description of Zones

The first zone is classified as the Central Business District. The CBD is the smallest zone, and is the host for the commercial, social and cultural life of the city. Land values are the highest in this area, and correspondingly, only those business activities which generate enough profit are able to establish themselves in the core (Timms, 1971). The inner-most zone is highly accessible because the primary transport terminals are situated in the area, and each day people move in and out of the city centre. Towards the periphery of the CBD, pockets of residences exist and are home to a small transient population. The second zone, located just beyond the CBD is called the zone in transition. High density, low-income slums, ethnic ghettos and rooming houses are commonly found in this area. Older housing structures dominate the zone, as a result of the former wealthier residents fleeing the area during early periods of peripheral development (Fellmann et al., 2007). The zone in transition is occupied by first-generation immigrants as well as other social outcasts (Timms, 1971). Slowly invading

Zone II is business and light industry from the CBD. The area is characterized by a heterogeneous population, consisting of many different ethnic groups, immigrants, and remnants of the area's original inhabitants (Timms, 1971). Once individuals and those raising a family establish themselves, they often relocate into the third zone, the zone of independent workingmen's homes. The population most commonly found in Zone III is that of families of factory workers who have obtained sufficient resources to move away from the zone in transition, but still require easy access to their place of work in or near the city centre. Typically second-generation immigrants, those considered to be the 'respectable working class' occupy older homes on small lots (Timms, 1971). Factories and families take up the bulk of the land in this zone. Extending further towards the periphery of the city is Zone IV, 'the residential zone'. This area is home to the middleclass population who live in private single family homes, or high rent apartments. This population is able to choose its housing locations and are willing to endure a longer commute to the CBD in order to situate themselves in higher quality housing (Fellmann et al., 2007). Within Zone IV are subsidiary shopping centres which have reproduced some of the CBD's service amenities. The outermost area is Zone V, the commuter zone. A commute of thirty to sixty minutes to the CBD is common from the suburbs, and single family dwellings dominate this zone. According to Burgess (1929, 130), "...the communities in this...zone are probably the most highly segregated of any in the entire metropolitan region...". While urban communities are generally much more complex than this model suggests, it provides a pattern for how communities tend to conform (Park, 1952).

2.1.8 Criticisms of Human Ecology Approach

Ecological research was dismissed during the 1940s and 1950s as a result of both theoretical and empirical critiques. General structural concepts such as the natural area and the concentric zoning of a city have been scrutinized for their limited assumptions (Knox and Pinch, 2006). During the 1940s, the Chicago School came under attack by sociologists for overemphasizing the natural, and organic processes while at the same time minimizing the importance of social and cultural dimensions of urban life (Soja, 2000).

According to critics, the natural area concept is one that is ambiguous. Even Chicago ecologists have had differing views on what exactly defines a natural area. Zorbaugh views it as a physical phenomenon, whereas McKenzie sees the natural area for the characteristics of its population such as race, language, income and occupation (Timms, 1971). Park (1952) identifies natural areas as distinct environments which contribute a specific function towards the urban economy. Based on the varied descriptions, the definition of a natural area remains unclear. When conducting research, natural areas tend to be biased toward the inner core of the city, where the lifestyle is explicit (Ley, 1983). Monographs written about natural areas focus primarily on ethnic groups, not on the native-born population, or those who reside in the suburbs (Ley, 1983). The failure to research the outer areas of the city prevents a more comprehensive understanding of natural areas as they apply to the entire metropolis.

As more recent critics suggest, there is a level of artificiality with Burgess' map of 75 communities in Chicago (Ley, 1983). It seems likely that Burgess was trying to

maintain a sense of consistency by drawing boundaries of areas with the same characteristics. In fact, there may be a distinct heterogeneity in natural areas (Hatt, 1946). Hatt conducted a study, one of the first to use an ecological variable to determine social areas, which mapped the rental values in an area of downtown Seattle. He used only one variable, rental value, as opposed to relying on observation techniques which the Chicago School sociologists had previously undertaken (Hebert, 1973). Hatt (1946) found that one variable was sufficient to illustrate different areas of the city, and concluded that natural areas, and their boundaries, provide researchers with a method for statistical analysis.

By the late 1930s, the Concentric Zone Model came under attack. Burgess considered each of the five zones in his model to be relatively homogeneous, when in fact, there were several different land use types and populations throughout Zone I and II (Timms, 1971). According to Burgess, Zone V contained a number of smaller communities which differed substantially in income (Timms, 1971). Empirical studies concerning the homogeneity of Burgess' zones have since yielded different results (Davie, 1961). Another limitation is the fact that he collected his data, and developed the model based only on the results from Chicago (Timms, 1971). Therefore the Concentric Zone Model is most successful when applying it to large, rapidly expanding cities with a heterogeneous population that contains commerce and industry in North America (Timms, 1976). Smaller, or non-industrial cities may not conform to the model. Schnore (1956) found that the opposite was true in smaller cities, whereby the inner city area tends to be occupied by residents of higher income, while the suburban periphery by those of

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lower income. Another limitation of the Concentric Zone Model is that it is a product of its time. The technological advances that have occurred over the second half of the 20th century have completely altered the way cities are developed and occupied by residents. The 1920s represented a time period where a city's population relied on public transportation to get themselves to and from work. A city's expansion involved the reconversion of land uses. The emergence of the automobile and the suburban growth have drastically changed the residential structure of cities and the way they are organized.

Classical ecologists attempted to explain residential differentiation mainly in terms of impersonal competition, while failing to consider the non-economic, cultural factors. According to Timms (1971), the theory of residential differentiation embedded in the work of classical ecologists relies mainly on economic determinism. Individual households are sorted only by wealth in this theory. While this is one important factor, other characteristics of populations emerge that influence residential differentiation (Timms, 1971). Features such as; socio-economic status, family, ethnicity and mobility need to be taken into account to have a more comprehensive understanding of residential differentiation.

2.2 Emerging Social Values Approach

As a response to the criticism, Chicago School sociologists developed a social values approach which was seen as a different way to explain residential differentiation. Firey, (1945) when analyzing patterns of land use in Boston, stated that classical ecologists relied too heavily on the idea that land use values organize human behaviour. Instead, symbolism and sentiment were important considerations when dealing with

human matters. Firey (1945, 254) notes: "locational activities are not only economizing agents but may also bear sentiments which can significantly influence the locational process.". His case-studies examined areas of Boston which appeared to deviate from the classical ecology approach. The wealthy residential district of Beacon Hill, a five minute walk from the primary shopping area in Boston, had avoided the traditional concentric land value gradient concept, due to its significant symbolic value (Timms, 1971). Firey made note of the fact that families, who were responsible for the saving of the Beacon Hill neighbourhood from the potential encroachment of commercial activites and lowerincome groups, did so in order to preserve the historic sentiments associated with this area (Herbert, 1973). Boston Common was another area of interest for Firey, as he maintained that alternate land uses could have yielded much greater profits, but its symbolic representation for the community had prevented this area from being redeveloped. These two case-studies reveal that the social values approach can only be understood ecologically if "values are made central to ecological theory." (Firey, 1947, 93).

The social values approach is also significant in helping to explain the spatial patterning of ethnic minority groups throughout a city. The way in which ethnic minorities establish themselves residentially, depends on a number of factors such as the preferred family formation, religious and political issues, and the degree to which the group is accepted by the charter community (Lieberson, 1963). Myers' (1954) study of the residential and occupational distribution of Italians in New Haven concludes that human beings are motivated by cultural values which regulate the competitive process.

2.2.1 Criticisms of Social Values Approach

It must be understood that the social values approach also has its own limitations. It is very difficult to operationalize what exactly defines a value (Timms, 1971). A number of studies use the term 'value' subjectively, and therefore it becomes challenging to identify the social values approach as a primary method for explaining residential differentiation. This approach appears to have been created as a way of filling the period of time in which the economic approach was deemed unsuccessful (Timms, 1971). However, this method has given urban ecology a new perspective in terms of emphasizing the importance that human motivation has on residential differentiation, yet by itself, it cannot be considered a logical theory to explain the separation of individuals and groups in a city (Timms, 1971). This theory can be best understood if it were to be used in conjunction with the economic model of the Chicago School. Socio-cultural factors do have an important role in shaping the nature of economic competition, and the role of sentiment and symbolism can provide additional reasoning as to the motives behind where people choose to locate (Timms, 1971). Both models are useful in discovering general ecological principles, but lack an explanation of the characteristics of residential differentiation. In order to better explain residential differentiation, factors which underlie this phenomenon must be examined.

2.3 Social Area Analysis

Early ecological classifications of social areas depended only on a few variables. The lack of a strong theoretical foundation to justify the use of these variables led to a different way of thinking about residential differentiation (Ley, 1983). During the 1950s,

a new technique emerged in the study of the social structure of the city. West-coast sociologists, Eshref Shevky and Wendell Bell, developed a theoretical and methodological framework to describe and analyze urban social space (Golledge and Stimson, 1997). While the Chicago School focused on the spatial differentiation, social area analysis concentrated on the social differentiation. According to Shevky and Bell (1955), social area analysis was necessary because the city could not be understood in isolation from the society at large. It assumed that social differentiation in residential areas could be explained by three broad trends in urban areas, thus yielding three elements of social differentiation in cities (Ley, 1983). The first trend was the changing occupational structure, resulting in increased specialization and a reduction in the proportion of manual labourers (Ley, 1983). The second was the changing way of life, creating diverse family patterns. The third trend was the changing composition of the population through the redistribution of ethnic and religious groups across space (Golledge and Stimson, 1997). The three themes were classified under one of three constructs: social rank (economic status), urbanization (family status), and ethnicity (segregation) (Davies and Murdie, 1993).

One of the earliest studies of social analysis study involved Shevky and Marilyn Williams (1949), and their attempt to investigate the urban phenomena of Los Angeles as a community. They analyzed and classified the more than 570 census tracts of Los Angeles according to social rank, urbanization, and segregation. The census tracts which yielded similar descriptions on the three constructs were grouped together into social areas. Shevky and Williams (1949) used 1940 census data for their study of Los Angeles

since it was the most recently completed census of the population. They chose to analyze seven variables. Three variables related in the index of social rank included occupational status, educational status, and income (Shevky and Williams, 1949). Three variables related in the index of urbanization included fertility, women in the labour force and the physical characteristics of neighbourhoods (Shevky and Williams, 1949). The last variable used in the index of segregation was the number of people in highly isolated population groups relative to the total population (Shevky and Williams, 1949). This index was defined as the residential concentration of the members of a particular group with other members of the same group (Shevky and Bell, 1955). An index of 0 equals no segregation, while an index of 1.0 equals complete segregation. In order to achieve a composite index for the social rank and urbanization constructs, values for each variable were converted to percentile scores. The mean percentile score of the variables represents the index for each construct. The index of segregation was determined, as either high or low, by whether or not the average proportion in the populations of neighbourhoods where they live were equal to three or more times their respective proportions in the population of the country (Shevky and Williams, 1949).

Plotting the census tracts in a three-dimensional attribute space is necessary in order to generate social areas, as shown in Figure 2.2. The base of the attribute space represents the index of social rank, while the vertical axis corresponds to the index of urbanization. The third dimension, segregation, was added to the typology by determining the level of segregation, and whether this index was high or low.



Figure 2.2 The Social Areas of the San Francisco Bay Region

Source: Bell, 1953

This social space is divided into nine sections, with each of the two indexes having categories of low, average and high. Each census tract of Los Angeles in 1940 fit into one of the nine cells. Most of the population fit into the middle range of social rank and urbanization (Cell V).

Shortly after the study of Los Angeles by Shevky and Williams (1949), Wendell Bell used the same three indexes and applied them to census tracts in San Francisco, using data from the 1940 census. Bell found that similar social areas applied to San Francisco's census tracts (Abrahamson, 1976). The total population figures were much larger for Los Angeles (2,785,458) than San Francisco (1,119,493), and the population was also distributed differently within the nine social areas (Bell, 1953). A larger percent of the population in the San Francisco Bay Region (47%) lived in highly urbanized social
areas than that of Los Angeles (19%) (Bell, 1953). However, the highly segregated areas in both regions were linked to areas with low social rank, those tracts containing several craftsmen, operatives, and labourers, many people who have completed only grade school, and low rent housing (Bell, 1953). The population that had a high social rank only contained 1% of the highly segregated citizens (Bell, 1953). Los Angeles did contain a higher extent of segregation (Bell, 1953). While these two studies revealed similar trends, a more thorough model for the study was necessary.

In 1955, Shevky and Bell teamed up to study the census tracts in the San Francisco Bay Region. They modified the construct formation in an attempt to understand the wider system of relationships found in large urban aggregations (Shevky and Bell, 1955). As a result, this work has been one of the most influential studies using social area analysis. Similar to the Shevky and Williams (1949) study, in order to locate the social areas in a city, a grid was required. Four intervals (scores ranked from 0-24, 25-49, 50-74, and 75-100) for the social rank construct are found on the horizontal axis, and four intervals for the urbanization construct found on the vertical axis, give 16 different cells in which social areas are developed (Shevky and Bell, 1955). The 16 cells allow for a greater number of heterogeneous social areas. Especially in a large city such as Los Angeles, it was important to widen the defining limits of these social areas. Shevky and Bell came to some general conclusions despite the large number of categories. They found that high economic-status areas tended to spread out on the hill locations away from the industrial areas and the harbour (Ley, 1983). Nuclear-families were generally found to reside in areas away from the built-up core of San Francisco and

Oakland, while distinct ethnic areas were commonly found in the downtown core and close to the industrial waterfront region (Ley, 1983).

Herbert (1973) applied social area analysis to a Canadian city, Winnipeg, and found similar results that reflect North American cities. He used 1961 census data, specifically focusing on six variables; occupation, education, fertility, women at work, single-family dwellings and ethnicity (Herbert, 1973). He discovered that 63% of the census tracts were within the two highest social rank categories, indicating a small number of craftsmen, operatives and labourers, and few individuals who had obtained no more than grade school, education (Herbert, 1973). Twenty-five percent of census tracts fell into the two highly urbanized categories, while only 8 of 31 segregated tracts were found to be part of the high social rank group (Herbert, 1973).

Shevky and Bell (1955) claimed that differentiation was multidimensional in that the three constructs were reasonably independent of each other (Abrahamson, 1976). Herbert's study revealed that the occupation and education variables (both under the index of social rank) were positively correlated. However, the three variables associated with the index of urbanization, were not all positively correlated. The women-at-work ratio was inversely related to the fertility and single-family dwellings variables (Herbert, 1973). One anomaly existed between occupation and fertility ratios, as they had a higher correlation than anticipated for a North American city. This indicated that these constructs were less independent than what the social area analysis hypothesis would suggest (Herbert, 1973).

2.3.1 Criticisms of Social Area Analysis

While social area analysis represented a promising framework with which to analyze urban residential differentiation, it was subject to significant criticism from several authors. Despite the fact that the Chicago School had some weaknesses in its theoretical approach, Duncan et al., (2000) argues that at least Robert E. Park was concerned with the spatial distribution *and* social differentiation of a city. Park's work demonstrated that the way in which populations were organized was dependent on the interaction between differentiated attributes of the population and the spatial distribution (Sampson and Morenoff, 1997). However, social area analysts, Shevky and Bell, tended to focus almost exclusively on the social space of cities, and completely ignored the ecological structure (Sampson and Morenoff, 1997). Another criticism involves Hawley and Duncan questioning the rationale behind the choices of variables by Shevky and Bell (Herbert, 1973). It was argued that the theoretical structure and its three constructs were designed to be applied to a much larger society. Instead, these were tested on small urban census tracts (Baldwin, 1974). Therefore, the variables selected for analysis were arbitrary in that Shevky and Bell's theoretical framework was derived retrospectively (Baldwin, 1974). Empirical studies have demonstrated that social areas differ from the predictions of Shevky and Bell. Van Arsdol Jr, Camilleri, and Schmid (1958) found that four of ten American cities did not coincide with the proposed structure. In two of the cities examined, the fertility variable was found to have a stronger correlation with social rank than under its urbanization construct (Van Arsdol et al., 1958). However, as Timms (1971) concluded, as long as it is considered that social areas are operational, rather than

a real item, social area analysis is a technique that "appears to fit the structure of the modern city well." (209). Social area analysis has proven to be an effective way to develop a typology, and get an initial idea of how different characteristics sort the population into various social areas.

2.4 Factorial Ecology

Since the mid 1960s, factor analysis has remained one of the most commonly used techniques in social research. Factor analysis was originally created by psychologists as a way to reduce the large number of variables to a small number of factors (Comrey, 1973). While social area analysis uses deductive reasoning in identifying social changes in society, and then transforming them into constructs, followed by selecting census variables to characterise them, factor analysis uses inductive reasoning by developing factors from a wide range of variables (Herbert, 1973). Factorial ecology refers to the application of factor analysis to the study of residential patterns of cities (Knox and Pinch, 2006). This is the preferred approach in order to deal with measuring the urban sociospatial differentiation. The quantitative revolution in geography during the 1970s produced a plethora of studies using factorial ecology. Extensive research has focused on a number of cities resulting in reliable generalizations about the urban spatial structure of western nations (Knox and Pinch, 2006).

This method constructs a number of general factors that offer a description of a very long list of diagnostic variables from the census (Ley, 1983). Census tracts are scored on these organized factors, which leads to a general classification. Factor analysis ensures that the tracts are measured on a small number of factors, as opposed to social

area analysis where census tracts are evaluated based on a wide range of individual variables (Ley, 1983). A large data matrix summarizes the factors that materialize from a factorial ecology. Typically between 4 and 10 factors explain up to about 80% of the total variance in the data matrix (Golledge and Stimson. 1997). Factorial ecology studies tend to reveal a dominant socio-economic status dimension, followed by a family status or life-cycle dimension, and lastly by an ethnic status dimension. These major dimensions are the same constructs that Shevky and Bell identified as critical to the analysis of American cities a decade earlier (Knox and Pinch, 2006).

A factorial ecology study of Chicago, performed by Rees (1970) examined 12 variables across 1324 census tracts of the metropolitan area. The 12 variables consisted of measures related to education, occupation, income, age, family size, race, housing age and housing quality (Rees, 1970). The results show that education, income employment and housing variables all produced high factor scores for the socio-economic status dimension, while family size and age variables generated high factor scores for the family status dimension, and percent of African American population had a high factor score for the ethnic status dimension (Rees, 1970). The twelve variables were able to explain 78.9 percent of the variation (Rees, 1970).

Taylor's (1987) study of factorial ecology on the City of Hamilton between 1961 and 1981 aimed to determine the social and geographic characteristics which were responsible for change. The same twelve variables were utilized over the study period to keep the results as consistent as possible. The 1961 analysis yielded three factors: economic status, family status, and ethnic status. However, the 1971 analysis produced

four factors, with the additional factor being gender status. The 1981 study also reported a fourth factor, but this time it was labelled occupational status. Between 1961, 1971 and 1981, the three dimensions remained critical in the explanation of the socio-spatial structure of Hamilton (Taylor, 1987). It was discovered that there was a high correlation in the composition of each factor over this time period.

2.4.1 Spatial Patterns

There seems to be a consistent pattern in the spatial manifestation of these dimensions across different cities and time periods. Socio-economic status, family status and ethnicity can all be considered important dimensions of social space, and when these are superimposed onto the physical space of an urban area, they create an urban mosaic (Cadwallader, 1985). The socio-economic status factor tends to form a sectoral pattern, where high status areas are located away from neighbourhoods of low environmental quality (Taylor, 1987). This arrangement is visible in the study of Hamilton's social geography between 1961 and 1981. The lower socio-economic status individuals tend to occupy Hamilton's industrial areas in the north-east section of the city. Those of higher status reside in census tracts located furthest from the industrial area, typically on the south mountain, or in West Hamilton (Taylor, 1987). Taylor suggests that the escarpment provides a barrier, distancing the affluent citizens living on the mountain from those of lower status residing in the north-east region. It should be noted that while Taylor (1987) does not explicitly reveal levels of income polarization, one of the variables, median family income, used in the study does illustrate trends of where high and low socioeconomic status areas are found.

The family status dimension is often distributed according to zones. In most factorial ecology studies, the older, inner-city areas house the older populations and young families, or single-person families (Cadwallader, 1985). As one moves towards the periphery of the city, there becomes a progressively larger number of younger families. Taylor (1987) discovered that Hamilton's social geography reflects this pattern, with low-family status in the inner city, and high-family status found in the suburban areas. It should be noted that this inner city-suburban divide weakened during the twenty year study period. Some of the northern mountain census tracts have experienced a decline in family status, particularly in areas of older housing. Increasing family status found in the inner city tracts is a contradiction of the concentric zone model. However, in Hamilton, this is the case. It can be assumed that the rising number of immigrants from South East Asia, and Portugal, especially in the 1970s has contributed to this pattern (Taylor, 1987).

Foreign immigrants tended to concentrate in the inner city in the past. The downtown core usually provides cheaper housing, and the availability of low paying jobs is often greater in this area. The ethnic status dimension can be found in the form of enclaves, where subgroups of the population reside in highly segregated neighbourhoods (Golledge and Stimson, 1997). The high ethnic status spaces are typically located in areas of low social status. Taylor discovered that Hamilton's ethnic status dimension changed over the twenty year period, although the inner city core remained a concentrated area for immigrants. Over time, the high ethnic status areas in the north end of the city extended eastwards along Barton Street, and by 1981, there was a significant

concentration that existed in east Hamilton, and the west end of Stoney Creek (Taylor, 1987).

While it appears as though this model can accurately explain the residential differentiation of cities, it is important to realize that studies around the world show some variation. A factorial ecology study of Montreal demonstrated that the socio-economic status dimension contained some elements of the ethnic dimension (Foggin and Polese, 1977). High status areas were occupied mainly by those of British descent, while areas of low status were inhabited by the French population. It was determined that social status and ethnicity are not independent phenomena (Foggin and Polese, 1977). However, for the most part, Canadian and American cities conform to the three-factor model.

Studies of European cities offer less conclusive results, demonstrating a more dominant socio-economic status and family dimensions. Studies of Copenhagen and Helsinki reproduced the socio-economic and family constructs, but notably absent was the ethnic dimension (Herbert, 1973). Knox and Pinch (2006) explain the exclusion as a societal difference where European cities tend not to have substantial ethnic minorities, and those groups that do exist are more integrated with the charter population from the census tract level. British cities reveal a different ecological structure based on the role of policies related to the housing market (Knox and Pinch, 2006). The country's developed public sector has allowed housing market characteristics to stand out in dictating the ecology of its cities (Herbert, 1973). A factorial ecology study of Cardiff and Swansea in South Wales expressed measures of occupancy, tenure and housing conditions, leading to two principle components (Herbert, 1973). Component one took into account occupancy

and tenure, while the second component identified different conditions of housing (Herbert, 1973). These two components comprised of 51% of the total variance of Cardiff and 41% of the variance in Swansea (Herbert, 1973). Despite socio-economic status and family status dimensions being the primary constructs, it is the housing variables that are the significant measures. The high scores of the two housing components generally are characteristic of many similar British studies.

2.4.2 Criticisms of Factorial Ecology

Like all methods, this multivariate approach has its limitations. Several criticisms are connected with the generality of its results. Factorial ecology provides little reasoning as to why variations take place between cities (Davies, 1984). This approach merely recognizes patterns and measures them in order to identify the social dimensions and spatial patterns (Bourne and Ley, 1993). Davies (1984) states that this method is superficial in that, early studies of ecology were not designed to test a specific hypothesis but instead to apply number crunching techniques as a way to determine residential differentiation. Even then, results tend to vary depending on the type of factor analysis performed, in that a number of outcomes can be acquired from some data sets (Davies, 1984).

Although studies of factorial ecology search for generalities, this does not mean that one should fall into the trap of ecological fallacy where mistakes arise when making assumptions about individuals from aggregate data (Knox and Pinch, 2006). Factorial ecology reveals that cities in different societies have distinct features. Another limitation with this approach lies in the lack of consideration of the social character of areas. The

constructs developed in factorial ecology do not take into account important considerations of residential differentiation such as; territorial attachment, defensible space, and other sentimental and symbolic concepts (Bourne and Ley, 1993). Social areas which are identified by factorial ecology are not always cohesive communities (Cadwallader, 1985). These social areas are homogeneous in terms of their income, education, and family size, however, this does not necessarily mean that individuals share behavioural and attitudinal characteristics (Cadwallader, 1985).

Despite its share of limitations, factorial ecology studies took an inductive approach in order to search for commonalities in the spatial organization of a number of characteristics of cities, and produced two major conclusions (Wyly, 1999). First, it found the same important constructs that help shape residential differentiation as the deductive approach of social area analysis, and thus can be considered empirically valid. Secondly, the three dimensions are distributed across space in the form of sectors, zones and clusters.

2.5 Recent Research

Since the 1970s, social geography has been revitalized by the return of social theory. A key area of research interest lies in the way urban areas act to sift populations across space (Bourne and Ley, 1993). Residential segregation, defined by Marston and Van Valey, (1979) as the physical separation of population groups in residential space, has long been studied by sociologists and urban researchers. A majority of the recent research has focused on the patterns of racial and ethnic, and economic segregation of different groups. The post-1970 immigration policies have altered the social landscape of

Canada. A substantial amount of literature has covered the segregation by immigrants and ethnicity. An emerging residential segregation based on income has also increased since the late 1980s and early 1990s, and poverty is seen to exist in much greater concentration in Canadian cities (MacLachlan and Sawada, 1997). As countries continue to become more urbanized, current studies in social geography must take into account a wide range of societal structures rather than rely on a few constructs.

2.5.1 Immigrant/Ethnic Segregation

Since World War II, immigration to North America has become strongly tied to urban areas (Hou, 2006). Visible minorities, defined as "persons, other than aboriginal peoples, who are non-Caucasian in race or non-white in colour" are primarily composed of Asians, Africans, Caribbeans and South Americans (Department of Justice Canada, 2000). This population has dramatically migrated toward Canada's metropolitan areas, especially the largest three, Toronto, Montreal, and Vancouver, where approximately 72% of the country's visible minority population reside (Statistics Canada, 2006). Larry Bourne developed the "social mosaic hypothesis" for Canadian cities that explains "...an increasing level of social diversity – notably the emergence of a more detailed and fragmented ethnocultural mosaic." (1989, 314). This hypothesis suggests that the urban social patterns are much more complex, and less predictable than the traditional ecological model implies, where the landscape is separated into large homogenous zones (Bourne, 1989). Furthermore, Bourne established a more traditional "dispersed city hypothesis" which focuses on the suburbanization of ethnic and immigrant groups that

occurs following the rest of the population (Bourne 1989). This hypothesis has been tested in studies of Toronto, Montreal and Vancouver.

A study by Doucet (1999) demonstrates that a large number of the recent immigrants in Toronto 'skip' the downtown stage and move outwards into the suburbs immediately. In 1996, Scarborough, a suburb of Toronto, had more visible minorities than the actual City of Toronto, while other neighbourhoods in such communities as North York, Markham and Mississauga have established themselves as multicultural centres (Doucet, 1999). Similar results are found in Montreal as visible minorities tend to disperse into inner suburbs such as St-Laurent, Dollard-Des-Ormeaux, Laval and Brossard (Archambault et al., 1999). Hiebert's study of Vancouver (1999) discovered that most recent immigrants choose to settle in peripheral areas. However, Ray (1994) cautions that each immigrant group varies in their socio-economic status and housing conditions.

Settlement patterns of ethnic groups differ between cities as a result of their housing markets. Fong (1996) suggests that the age of a city is directly related to levels of segregation. This can be shown in the case of Montreal, an example of an older Canadian city, featuring a higher level of segregation for Asians and Blacks than younger cities like Vancouver (Fong, 1996). Fong (1996) also maintains that the concentration of cheaper and older housing in older inner cities also yields higher levels of segregation when compared to younger cities. Housing affordability is another issue that dictates the residential differentiation of cities. Pendakur and Pendakur (1998) found that the visible minority populations of Toronto, Montreal and Vancouver had much lower earnings than

the charter (French and English) population, thus constraining their housing options. Visible minorities in Montreal were more financially limited than minorities in Toronto, and therefore rely on cheaper apartment accommodations (Pendakur and Pendakur, 1998). However, Bauder and Sharpe (2002) found that while visible minorities were becoming a larger share of the population in Toronto, Montreal, and Vancouver, they were not ghettoised, and even the most segregated were not concentrated among themselves. Another major finding reveals that the clusters of ethnic minority groups that did exist, such as the Chinese in Toronto, typically had above average incomes and high rates of home ownership (Walks and Bourne, 2006). Segregation levels have decreased for most ethnic groups in Canada's three largest CMAs between 1986 and 2001 (Walks and Bourne, 2006; Bauder and Sharpe, 2002). Studies conclude that housing characteristics are more important in explaining the residential organization in urban areas, while spatial patterns of visible minorities are directly related to the arrangement of housing (Bauder and Sharpe, 2002).

2.5.2 Economic Segregation

It has been well documented that globalization and occupational changes that are associated with the post-Fordist economic restructuring has led to the social polarization of urban areas (Walks, 2001). Social polarization occurs as a result of the new employment structure, where cities tend to be dominated by service industries. The loss of manufacturing industries caused by technological change, increased competition from imported manufactured goods, and the closing of traditional branch plants have eliminated a large number of low-skilled manual manufacturing employment in

developed countries (MacLachlan and Sawada, 1997). This has resulted in occupational polarization, where there is an increase at the top and bottom of the income and employment hierarchy, and a decrease in middle-income employment opportunities (Walks, 2001). The occupational restructuring has also yielded greater wage inequalities.

These changes have significantly altered the social structure of cities. The urban social space is becoming increasingly polarized on the basis of those who participate in the financial and information service industries and the marginalized population consisting of those who are unemployed, manufacturing workers, low-level service workers, low-status immigrants and minorities (Marcuse and van Kempen, 2000). The post-Fordist social ecology could be imagined as "elites and middle class at [the] centre and in exclusive suburban and exurban enclaves" while the working class is pushed into the "suburbs and in inner-city public housing" (Caulfield, 1994, 119). A recent study by Hulchanski (2007) illustrates this income polarization of Toronto's neighbourhoods between 1970 and 2000. By examining a plethora of socio-economic characteristics, it can be concluded that the social geography has changed significantly. Three different neighbourhoods, or 'cities', emerge within Toronto during this thirty year period (Hulchanski, 2007). The reason for the appearance of distinct neighbourhoods is rooted in the shrinking of the middle-income areas. A 34% decrease in middle-income neighbourhoods between 1970 and 2000 has significantly increased low-income regions (Hulchanski, 2007). As a result, both the poorest and wealthiest areas have increased. As of 2000, half of the City of Toronto neighbourhoods are considered low income (Hulchanski, 2007). In 1971, there was a clear distinction between city and suburbs, as

low-level service workers, immigrants and the low income population were concentrated in the inner city, while suburban Toronto consisted of the middle-income and rich, and those with above-average occupations (Walks, 2001).

Recent studies on income segregation in Canadian cities demonstrate an uneven distribution of income. Bourne (1989) claims that segregation levels vary from city to city depending on its size, as larger cities tend to be more unequal in terms of income. It has also been found that income differentiation does not conform to the basic inner-city to suburban gradient, nor a sectoral pattern (Bourne 1997). Walks (2001) discovered that intra-zonal variability has emerged, and that high levels of social polarization exist even within neighbourhoods. Most commonly, this polarization occurs in the outer areas of the inner-city, and the newer suburbs, where both contain poorer and richer neighbourhoods (Walks, 2001).

The older suburbs tend to house those of lower income. When comparing the three largest CMAs, Montreal is considered to be the most highly segregated by income (Ross et al., 2004). It scored very high in terms of its concentration of segregation (Ross et al., 2004). This occurs as a result of the city occupying an island which restricts the possibility of low income areas spreading too far from the inner city. Toronto's income segregation was lower due to its relatively lower score measuring the centralization of inequality (Ross et al., 2004). This suggests that much of the income inequality is occurring outside the downtown core, and in the older suburban areas. Vancouver ranked the least segregated according to income when compared to Montreal and Toronto, however it did register a high score related to its concentration of segregation (Ross et al.,

2004). Also of note, Hamilton has a distinct income segregation configuration, similar to Toronto's in that it demonstrates a high unevenness and concentration of low income census tracts, but lacks centralization (Ross et al., 2004).

2.6 Chapter Summary

Social geography has progressed dramatically over the course of nearly a century. The discipline has grown in terms of its scope and research methods utilized. The Chicago School of human ecology represented the beginning of social geography with its reliance on qualitative methods in order to understand the structure of the city. Quantitative geography replaced qualitative research methods with social area analysis and factorial ecology emerging as more concrete techniques to measure variables and their importance in explaining the residential structure of urban space. In the late 1970s and early 1980s, the social structures of cities have been heavily influenced by the massive restructuring of western economies. Recently, cities in Canada have been greatly influenced by immigrant groups and ethnic minorities, and several studies have documented their existence, segregation indices and mobility through time. Another key area of interest for geographers lies in the income distribution in Canadian cities. Studies tend to focus on which areas of cities are most likely to be concentrated with poor and wealthy neighbourhoods. As cities continue to be shaped by the post-Fordism movement, the scope of urban issues and research methods will undoubtedly change to face the new challenges of the 21st century.

CHAPTER 3 METHODOLOGY

3.0 Introduction

This chapter begins with a discussion of the history of Canadian census, and how Statistics Canada has defined Census Metropolitan Areas and census tracts for data collection purposes. The study area is examined, along with a discussion regarding the changing census data in each of the selected study years, followed by a discussion regarding data collection, the mapping of the data, the Bank of Canada Calculator, and finally the limitations of the study.

3.1 History of Canadian Census

The origins of practicing census data collection date back to the beginnings of civilization. Babylon (3800 B.C.), China (3000 B.C.) and Egypt (2200 B.C.) were the first societies to record basic information of its citizens (Statistics Canada, 2009). The primary reason for conducting this task was for the conscription of its young males to the military, and for the taxation of its population by the rulers. The first census that was carried out in Canada was completed by Jean Talon, the intendant of the colony of New France, back in 1666 (Statistics Canada, 2009). As the French colony was first beginning to develop, King Louis XIV felt it was necessary to expand the settlement in order for it to be self-sufficient and able to provide commodities to the French economy (Statistics Canada, 2009). Talon figured he needed dependable statistics in an effort to organize and spur development of New France. Basic statistics were recorded for the 3,125 citizens

such as age, sex, marital status, and occupation by Talon himself as he visited the colonists during 1666 (Statistics Canada, 2009).

Census data has been collected ever since that initial documentation, and shortly after the Canadian Confederation of 1867, according to The Constitution Act of 1867, it was deemed that the first ever Canadian census would take place in 1871, and every ten years following (Statistics Canada, 2009). In 1956, it was ruled that a quinquennial census would take place nationwide as it would offer a better measure for how the country was performing in terms of its economic growth and urbanization (Statistics Canada, 2009).

As a result of the increasing urbanization levels of Canada – in 2006, roughly 80% of Canadians resided in urban areas – Statistics Canada created Census Metropolitan Areas (Statistics Canada, 2007). Census data for CMA's have been documented since 1941. A Census Metropolitan Area, as of 2006, was defined as an urban area which houses 100,000 residents, and must contain an urban core of at least 50,000 urbanites (Statistics Canada, 2007). Census tracts have also been created by Statistics Canada, and are designed to be comparatively uniform in its area and population. Census data for this unit has been recorded since 1941, but until 1951, census tracts were called "social areas" (Statistics Canada, 2009). Beginning in 1971, it was deemed that census tracts have a population between 2,500 and 8,000, an area that is as homogeneous as possible from an economic and living condition standpoint, its boundaries typically conform to physical features of the CMA, such as railway tracks and major roadways, and finally have as compact a shape as possible (Statistics Canada, 2007). Census tracts tend to group

residents with similar socio-economic characteristics at the specific time that the boundaries are defined. Census tracts located in the central business district and those which occupy institutions often have smaller populations than the 2,500 person minimum.

3.2 Study Area

Statistics Canada attempts to keep census tract boundaries as consistent as possible from one census year to the next for the purpose of allowing them to be comparable over time. However, as the population of a census tract grows beyond the desired threshold, it may be required for the tract to split. The splitting tends to occur in a way that allows for the aggregate of the new census tracts to equal the total of the original census tract. Census tract boundary changes became an issue in this research, as the Hamilton CMA developed significantly between the census years of 1961 and 2006. As can be seen in Table 3.1, the number of census tracts has more than doubled from 1961 to 2006. Much of this growth can be attributed to the growing suburban communities, such as Ancaster, Flamborough, Grimsby and Burlington.

Year	Number of Census Tracts
1961	81
1971	109
1981	146
1991	163
2001	172
2006	178

Table 3.1 The Number of Census Tracts in Hamilton CMA, 1961-2006

When comparing the number of census tracts of the Hamilton CMA in 1961 to 1971, it became obvious that much of the expansion of the CMA existed in Burlington. Burlington contained 6 census tracts in the 1961 census, but by 1971, 26 tracts were part of Burlington. The original 6 tracts simply divided themselves into a smaller number of units that met the population requirements. Eight census tracts were new to the 1971 census as part of the City of Hamilton, with the majority of these additions to the Hamilton Mountain and East Hamilton.

The period between 1971 and 1981 represented the splitting of the CMA's suburban communities. East and West Flamborough, along with Waterdown merged in the mid 1970s to form the Township of Flamborough, and in the 1981 census consisted of five census tracts. The Town of Ancaster possessed six census tracts in 1981 as opposed to the one it held in 1971. The Township of Glanbrook combined the individual Townships of Glanford and Binbrook, and has maintained its two census tracts. The Town of Stoney Creek in 1981 includes the former Townships of Stoney Creek and Saltfleet, and complementing this merge is the splitting of two census tracts into nine individual units. Another census tract was added to Burlington's total yielding 27 census tracts by 1981. The development of Grimsby was evident as the number of census tracts increased from one, in 1971 to four by 1981. The City of Hamilton remained relatively unchanged with the exception of the Hamilton Mountain and East Hamilton. As these two areas continued to grow in terms of population, the need for splitting was necessary.

The difference in the number of census tracts between 1981 and 1991 was significantly less. Burlington and Stoney Creek added to their total of census tracts over

the ten year period, however, the majority of the CMA retained the same number of census tracts and boundaries, showing signs of stability. The south part of the Hamilton Mountain has continued to develop – the area of Hamilton that has expanded the most in terms of the number of census tracts.

The increase in the number of census tracts as part of the Hamilton CMA between 1991 and 2001 was small, and pertained only to the suburban communities. Burlington, Stoney Creek, Dundas, Ancaster, Flamborough and Grimsby added at least one census tract to their respective totals. The Hamilton Mountain added one census tract, but East and West Hamilton's totals between the two years remained the same. By 2006, very little change has taken place in the five year time period. Only six new census tracts have been added to the CMA with three of them fitting into the City of Burlington.

The Hamilton CMA, as of 2006, consists of the City of Hamilton, City of Burlington and Town of Grimsby. Included in the City of Hamilton, are the suburban areas of: Flamborough, Dundas, Ancaster, Glanbrook and Stoney Creek. This study sorted the census tracts of the CMA into 10 different geographical areas: Burlington, Flamborough, Dundas, Ancaster, Glanbrook, Stoney Creek, Grimsby, West Hamilton (all census tracts west of James Street below the escarpment), East Hamilton (all census tracts east of James Street below the escarpment), and the Hamilton Mountain (all census tracts located on the escarpment). This process was repeated for all of the CMA's census tracts, for each of the six years that are being examined, as can be seen in Table 3.2. By grouping the census tracts according to their geographical area, and focusing on entire

communities as a whole, it eliminates the need to be concerned with small boundary changes that exist with some census tracts over time.

	1961	1971	1981	1991	2001	2006
Burlington	6	26	27	32	35	38
Glanbrook	2	2	2	2	2	2
Stoney Creek	2	2	9	15	16	16
Mountain	18	23	33	38	38	39
East Hamilton	33	34	41	42	42	42
West Hamilton	14	16	16	16	16	16
Dundas	1	1	3	4	5	5
Ancaster	1	1	6	5	6	7
Flamborough	4	3	5	5	7	8
Grimsby	N/A*	1	4	4	5	5
TOTAL	81	109	146	163	172	178

Table 3.2 Number of Census Tracts of Geographic Areas in Hamilton CMA, 1961-2006

*Town of Grimsby was not part of Hamilton CMA in 1961

3.3 Census Data Information, 1961-2006

The 1961 Hamilton CMA Profile Tables present the census tract data used in this research. Included in the profile tables are basic population and housing data from the 1961 Census. Within the population figures are details surrounding the nature of families and households, and also the labour force as part of each census tract. The 1961 Census reported a new variable: the level of education of all household members (Statistics Canada, 2009). Specifically, the data reported the highest grade of schooling attended:

those individuals currently attending school (elementary, high school and university), and those who are not attending school, or who never did participate. The data that relates to occupied dwellings uses a 20% sample of dwellings, rather than the 100% sample which is used for the remaining characteristics (Statistics Canada, 2009). Due to the 20% sample, dwelling characteristics that do not reach a minimum threshold of 100 when estimated, are not made public, but instead are represented by a symbol.

The 1971 Hamilton CMA Profile Tables present the census tract data used in this research. The year 1971 marked the 100th anniversary of the nation's first census, and during this year, Statistics Canada, a federal department, became responsible for producing statistics of Canadian households. Before 1971, the Ministry of Agriculture, Ministry of Trade and Commerce, and the Dominion Bureau of Statistics each were responsible for conducting Canadian censuses (Statistics Canada, 2009). According to the Statistics Act, it became a mandatory statute to hold a census every five years for the purposes of gathering population and agricultural information (Statistics Canada, 2009). During 1971, a significant change to the census data collection format where selfenumeration was allowed, thereby permitting individuals to fill out their questionnaires, as opposed to the previous method of enumeration (interview). Census enumerators dropped off the questionnaires and were mailed back by respondents in urban areas. Another major difference in the 1971 census included the rounding of numbers for the purpose of confidentiality. The reason for the rounding is to eliminate the possibility of a small figure being identified with a specific individual. This is prevented, by randomly rounding all of the last or unit digits to zero or five. There are cases where the totals do

not add up to equal the sum of the rounded figures. As well, newer variables were added to the 1971 census. The first includes the possibility for respondents to select a level of schooling with "no other training", or "with other training" representing those with vocational training and/or post-secondary non-university training. The other deals with respondents to identify the language most often spoken at home.

The 1981 Hamilton CMA Profile Tables present the census tract data used in this research. Similar to the 1971 census data, the 1981 data has been manipulated by the practice of "random rounding" to maintain a sense of confidentiality. It should be noted that once again, the totals may not equal the sum of the individual figures. Percentages which are based on the rounded digits may not equal the total.

The 1991 Hamilton CMA Profile Tables present the census tract data used in this research. Part A encompasses the basic demographic, mother tongue, dwelling, household and family data on a 100% basis, while the data from Part B focuses on household characteristics like language, ethnic origin, place of birth, schooling, religion, labour force activity, housing costs and income, from a 20% sample.

The 2001 Census data used in this research is titled "Profile of Census Tracts in Hamilton". New to this census year's data is the incorporation of population counts that include both 100% and 20% samples (Statistics Canada, 2009). Data surrounding the language used at work, generation status and religion were also new to the 2001 census. Incidence reporting takes place in this census, where, depending on frequent responses by CMA residents, specific categories may appear. This occurred for some variables

including: mother tongue, home language, and language used at work. Respondents gave either a single or multi-response to these selected characteristics.

The 2006 Census data used in this research is titled "Profile of Census Tracts in Hamilton". Much like the 2001 census tract profile, this year's edition uses both 100% and 20% sample population counts for the numerous characteristics (Statistics Canada, 2009). Incidence reporting exists for the variables related to mother tongue, language spoken most often at home, knowledge of non-official languages, language used most often at work and ethnic origin. New data for 2006 data is reported for the location of study, either inside or outside of Canada. The 'location' refers to the province, territory or country where the highest certificate, diploma, or degree above the high school level was obtained.

3.4 Data Collection

For the purpose of this study, census data have been collected at the census tract level for the Hamilton Census Metropolitan Area in 1961, 1971, 1981, 1991, 2001 and most recently, 2006. These years were selected in large part due to the expansion of the rural areas of the Hamilton CMA, and their growing importance in shaping the social landscape of the area up to 2006. These years also coincided with the economic restructuring that began in many western nations by the 1970s. By examining the overall socio-economic characteristics of the population of the Hamilton CMA every ten years and lastly five years over a forty-five year time interval, it is possible to gain a more complete understanding of how the social geography of the area has changed through time. This research is important to not only residents of the CMA, but also municipal,

provincial and federal politicians. Policy makers are also likely to be intrigued by the results, as policies may need to be changed, or added to reflect the changing composition of the metropolitan's residents. This study uses a number of socio-economic and demographic variables, ranging from population, income, housing and tenure, education, immigrant, households, and occupations. These variables were selected because of their importance in explaining a changing social landscape.

The Hamilton CMA census tract level profile tables for 1961, 1971, 1981, 1991, 2001 and 2006 were retrieved from the Computing in the Humanities and Social Sciences facility within the Faculty of Arts and Science at the University of Toronto. The Canadian Census Analyser offers a wide range of Canadian census data to users. Data are provided in the format of profile tables for Canada and its provinces, federal electoral districts, census tracts, and enumeration areas and dissemination areas, as well as microdata films for individuals, households and families, and postal code conversion data. Specifically, census tract data can be obtained for any one of Canada's Census Metropolitan Areas for 1961, 1971, 1981, 1986, 1991, 1996, 2001 and 2006. Users have the opportunity to select an output method for acquiring the data in various formats such as: HyperText Markup Language (HTML), text, spreadsheet, SAS, SPSS, and dBase. In this study, the HTML option was used and converted into Microsoft Excel in order for the data to be analyzed. Also, this format is compatible with ArcGIS, a Geographic Information System software program that allows for the mapping of different variables.

3.5 Mapping of Data

Once the census variables had been selected, and its data converted into Microsoft Excel, it became possible to give these variables some spatial context. This study used a Geographic Information System software program, called ArcGIS 9.0, to project the census data onto base maps of the Hamilton CMA in order to obtain a visual representation of the social landscape of the study area. Base maps, containing each of the census tracts of the Hamilton CMA, were provided by the Lloyd Reeds Map Collection at McMaster University for the census years of 1991, 2001 and 2006. However, these maps did not exist for any census years prior to 1991. As a result, this study used the 1991 base map as the foundation to develop the 1961, 1971 and 1981 maps of the Hamilton CMA. Using a shape file that projected the CMA's major road networks onto the 1991 base map, it was possible to define census tract boundaries for earlier years.

The CMA Profile Tables, for each census year, are available containing census tract data for all of Canada's metropolitan areas. In these Profile Tables is a map of the CMA, with labelled census tract boundaries. This research used the 1961, 1971 and 1981 Hamilton CMA reference maps as a guide, in combination with the 1991 base map in order to alter the boundaries of the census tracts for the creation of base maps of the first three years of the study period. Because there were fewer census tracts in 1961, 1971 and 1981 than in 1991, it was necessary to merge together census tract boundaries that existed in the 1991 base map, but that did not exist in earlier years. For example, in 1991, much of Burlington was developed and this particular area contained 32 census tracts, while in 1961 only 6 census tracts existed. Therefore, when creating the 1961 base map, it was

necessary to merge many of the 1991 census tracts to fit those census tracts of 1961, and rename each tract to its original census tract number, from 1961. Not all of the census tracts in 1991 that had changed their boundaries from earlier census years were easily merged together. Some census tracts that existed in 1991 required a manual adjusting of the vertices of its polygons. In terms of creating the base maps for the first three years of the study period, it began by creating the 1981 map, then proceeded to 1971, while finishing with 1961. The purpose of creating each of these base maps allowed the wide ranging variables pertaining to each census tract to be witnessed in a visual context.

3.6 Bank of Canada Calculator

When examining the Hamilton CMA between the years of 1961 and 2006, characteristics that yield a monetary value need a multiplier which incorporates inflation into its figure. An average individual income of \$10,000 in 1961 is worth significantly more than \$10,000 in 2006. Using the Bank of Canada calculator allows one to enter in a dollar figure for any year between 1914 and 2009, and can calculate its income change over the same time period (Bank of Canada, 2009). While average individual income ratios of each geographic area were compared to the CMA average individual income for each study year, this calculator enables the income variables to possess numeric values, with inflation accounted for. The Bank of Canada provides a Consumer Price Index for the two years that are being compared. In this case, by dividing the 2006 CPI by the CPI of the earlier year desired it provides a multiplier. By multiplying the average individual income in a specific year by its multiplier (see Table 3.3), one gets the real 2006 dollar value. This maintains a level of consistency, as all figures are in 2006 dollars.

The formula used for this calculation is shown:

<u>2006 CPI</u> = multiplier x year CPI

Year	1961 CPI	Multiplier
1961	15.7	109.2/15.7 = 6.96
1971	20.7	109.2/20.7 = 5.28
1981	48.3	109.2/48.3 = 2.26
1991	82.3	109.2/82.3 = 1.33
2001	97.8	109.2/97.8 = 1.12
2006	109.2	109.2/109.2 = 1

Table 3.3 CPI and Multiplier values for 1961-2006

*2006 CPI remains constant at 109.2

Source: Bank of Canada, 2009

3.7 Limitations

In any study limitations may arise which prevent the results from being completely accurate. In this study, there are a few such limitations which exist that undoubtedly have a small impact on the eventual results.

The grouping of the CMA's individual census tracts into one ten geographic areas is indeed a limitation. By placing census tracts into a broad geographic grouping, it undermines the heterogeneity of the smaller individual units. For example, not every census tract of East Hamilton has witnessed a more than 10% decrease in its individual income relative to the Hamilton CMA between 1961 and 2006. Likewise, not every census tract belonging to City 1 has experienced a more than 10% increase relative to the Hamilton CMA during the study period. Subsequently, the socio-economic and demographic characteristics associated with each of the "Three Cities" should also be

evaluated with caution as again, the broad groupings of these individual census tracts weakens the individuality of each census tract.

Since this research relies exclusively on census data, the results can only report the information that has been collected and disseminated by Statistics Canada. While census data covers a very wide range of socio-economic and demographic variables, there is always the opportunity to collect even more detailed or specific information, that may produce significant findings. Especially for some of the earlier census years (1961, 1971 and 1981) in this study, there are only basic census tract characteristics, whereas the 1991, 2001 and 2006 variables are much more comprehensive. Thus, the study is limited to the data that has been provided for the census tracts of the Hamilton CMA for each of the study years.

There are a few census tracts in which there are no data for some or all characteristics. In 1971, census tract 18 has no data pertaining to its occupied dwellings, labour force, and income values. The reason for no data existing for occupied dwellings is that there are no private-type dwellings in this particular census tract. The labour force and most of its income characteristics are filled with values of zero in the census. The 1981 census data shows no data for several characteristics in census tracts 16, 18 and 72.01. Values of zero reflect all data for census tract 18, except for total population. Census tracts 16 and 72.01 yield blank data indicating that the figures are not appropriate or not applicable to the income characteristics. In 1991, census tract 18 has been suppressed, as all 174 people that reside in this area are institutionalized. Similarly, census tract 16, and 72.01 have suppressed data for all of its income characteristics. In

2001, census tract 18 has absent data due to the fact that the figures are not appropriate or not applicable. Census tract 72.01 has suppressed data for all of its income characteristics. The 2006 census year has suppressed census tract 18 in the Hamilton CMA. Census tract 72.01 has suppressed income data. These zero-values, and the suppressed data, or even suppressed census tracts need to be taken into consideration when analyzing and census data. While the omitted data will unlikely yield significant error, it is important to make note that these exclusions do exist.

The collection and processing of census data endure rigorous processes to make sure that its figures adhere to high standards. However, when dealing with such large amounts of data, small errors may arise. The major errors are: coverage errors, nonresponse errors, response errors, processing errors and sampling errors. A more in-depth description of each of these errors can be found in the Appendix.

3.8 Chapter Summary

This chapter has provided an historical discussion of the Canadian census, while also explaining Statistics Canada's definition of Census Metropolitan Areas and census tracts. The study area was examined, with a discussion regarding the changing boundaries, and how these issues were dealt with. The remaining portion of the chapter dealt with a description concerning the changing census data in each of the study periods, followed by an explanation of the data collection, how the data was mapped, the use of the Bank of Canada Calculator, and the limitations of this research.

CHAPTER 4 RESULTS

4.0 Introduction

This chapter describes the findings from the census variables selected at the census tract level for the Hamilton CMA and outlines the resulting themes from the data. The chapter begins with a description of the evolution of the Hamilton CMA between 1961 and 2006, followed by an explanation of the process in which census tracts were placed into one of "Three Cities". Finally, variables related to population size, income, housing and tenure, education, immigration, households, and occupations are examined and how these have changed over time.

4.1 Hamilton CMA Background Information

The Hamilton Census Metropolitan Area (CMA) experienced significant changes between 1961 and 2006. It developed from a CMA of one city, three towns, seven townships and a village in 1961, to two cities and one town in 2006. In 1961, the CMA was ranked the 6th most populous metropolitan area in Canada, however by 2006, had slipped to 9th largest (Statistics Canada, 2009). Politically, the most notable change to the CMA occurred on January 1, 2001 when six municipalities (Ancaster, Dundas, Flamborough, Glanbrook, Hamilton and Stoney Creek) amalgamated into the newest version of the City of Hamilton.

As can be seen in Table 4.1, over the course of the forty-five year period, a number of communities have been affected by merging, and simultaneously, many of the geographic areas have developed from townships to towns, and towns to cities. In 1961,

Burlington was only considered a town but reached city status by 1981. In 1961, Hamilton already had the distinction of being a city, and in 2001, incorporated other smaller geographic areas included in the CMA.

The Town of Grimsby is unique in that it was not included in the Hamilton CMA during the 1961 census period, but was instead a town that was part of the Lincoln Municipality. In 1971, the Town of Grimsby was incorporated into Hamilton's CMA, and has since then, joined Burlington and Hamilton as the three urban areas that comprise the Hamilton Census Metropolitan Area.

1961	1971	1981	1991	2001	2006
Burlington –	Burlington –	Burlington –	Burlington –	Burlington	Burlington
Town	Town	City	City	- City	- City
Hamilton –	Hamilton –	Hamilton –	Hamilton –	Hamilton –	Hamilton
City	City	City	City	City	- City
Waterdown	Waterdown	Flamborough	Flamborough	Hamilton –	Hamilton
– Village	– Village	– Township	– Town	City	– City
Flamborough	Flamborough	Flamborough	Flamborough	Hamilton –	Hamilton
E –	East –	– Township	– Town	City	– City
Township	Township				
Flamborough	Flamborough	Flamborough	Flamborough	Hamilton –	Hamilton
W -	W –	– Township	– Town	City	– City
Township	Township				
Dundas –	Dundas –	Dundas –	Dundas –	Hamilton –	Hamilton
Town	Town	Town	Town	City	– City
Ancaster -	Ancaster –	Ancaster –	Ancaster –	Hamilton –	Hamilton
Township	Township	Town	Town	City	– City
Saltfleet –	Saltfleet –	Stoney	Stoney	Hamilton –	Hamilton
Township	Township	Creek –	Creek – City	City	– City
		Town			
Stoney	Stoney	Stoney	Stoney	Hamilton –	Hamilton
Creek -	Creek –	Creek –	Creek – City	City	– City
Town	Town	Town			
Beverly -	Flamborough	Flamborough	Flamborough	Hamilton –	Hamilton
Township	W –	– Township	– Town	City	– City
	Township				
Glanford -	Glanford –	Glanbrook –	Glanbrook –	Hamilton -	Hamilton -
Township	Township	Township	Township	City	City
Binbrook -	Binbrook –	Glanbrook –	Glanbrook –	Hamilton –	Hamilton
Township	Township	Township	Township	City	- City
N/A	Grimsby –	Grimsby –	Grimsby -	Grimsby -	Grimsby -
	Town	Town	Town	Town	Town

Table 4.1 Changing Hamilton CMA between 1961 and 2006

4.2 Three Cities Model

Cities are complex and dynamic entities. Over the course of the twentieth century, and into the early years of the twenty-first century, cities have transformed

considerably. Changing from an industrial to post-industrial society combined with the emerging effects of global economics has resulted in the social polarization within cities. Extending on the work that J. David Hulchanski, Larry Bourne, Richard Maaranen, Robert Murdie and R. Alan Walks have done on the City of Toronto (1970-2000), this research uses a similar model in order to observe the changing social landscape of the Hamilton CMA between 1961 and 2006. Hulchanski and his team examined the changing neighbourhoods of the City of Toronto between 1970 and 2000. Their study (2007) aimed to identify who lives where, based on the socio-economic status of its residents in each neighbourhood, and how the average status of residents in each of these areas has changed over the thirty year study period. As seen in Figure 4.1, they found that each census tract, or 'neighbourhood' falls into one of three distinct cities between 1970-2000: (i) where the census tract average income of the population has increased by 20% or more (City 1); (ii) where the census tract average income of the population has either increased or decreased by no more than 20% (City 2); and (iii) where the census tract average income of the population has decreased by 20% or more (City 3).



Figure 4.1 Change in Average Individual Income, City of Toronto, 1970 to 2000

Source: Hulchanski, 2007

This research used the census tract average individual income for all persons reporting an income above the age of 15. A weighted average was calculated so that it gives a more accurate representation of income levels and the population with income within a given census tract. Once a weighted average was calculated for each census tract, a CMA average individual income was determined. This process was repeated for each of the six census years used in the study (1961, 1971, 1981, 1991, 2001 and 2006). As mentioned earlier, the Hamilton CMA consists of a number of communities. The CMA was then divided into ten separate geographic areas during the census years of 1971 to 2006; Burlington, West Hamilton, East Hamilton, Hamilton Mountain, Stoney Creek, Grimsby, Glanbrook, Ancaster, Dundas, and Flamborough. Of course, in 1961, Grimsby was not a part of the CMA, and thus only nine geographic areas made up the metro area.
While the occasional census tract was added to these areas over time, by keeping the larger geographic areas consistent, it allows for a better understanding of individual communities, especially as they relate to the Hamilton CMA. After computing the weighted average of the individual income for each of the separate communities over the six census years, a ratio comparing the weighted average individual income of each area's census tracts compared to the CMA average was calculated. By subtracting the 2006 ratio from the 1961 ratio, the difference shows by how much a community increased or decreased relative to the Hamilton CMA.

The findings, as seen in Table 4.2, show that Ancaster, Dundas, Flamborough and Grimsby all had a weighted average individual income that increased by 10% or more from 1961 to 2006, relative to the CMA average. Burlington, Glanbrook and West Hamilton each had incomes that fell into the category of increasing or decreasing by no more than 10%, and East Hamilton, Mountain and Stoney Creek had incomes that decreased by more than 10% between 1961 and 2006.

Geographic	1961	1971	1981	1991	2001	2006	Difference 1961
Area							and 2006
Burlington	1.25	1.22	1.17	1.20	1.27	1.24	-0.01
Glanbrook	1.01	1.06	1.04	0.96	1.00	0.99	-0.02
Flamborough	0.98	1.03	1.03	1.16	1.19	1.16	0.18
Dundas	1.05	1.08	0.99	1.12	1.15	1.17	0.12
Ancaster	1.32	1.20	1.19	1.38	1.33	1.43	0.11
Grimsby	N/A	0.99	1.04	1.05	1.09	1.10	*0.11
East	0.89	0.86	0.85	0.79	0.72	0.71	
Hamilton							-0.18
West	0.91	0.94	0.95	0.92	0.88	0.86	
Hamilton							-0.06
Mountain	1.06	1.02	0.99	0.92	0.87	0.87	-0.18
Stoney Creek	1.08	1.03	1.02	0.99	0.98	0.97	-0.11

Table 4.2 Average Individual Income Ratio of Hamilton CMA Geographic Areas,1961-2006

*Grimsby is included in City 3 because its average individual income between 2006 and 1971 has increased by more than 10%

The Hamilton CMA remains consistent at 1.0 over each time period, since geographic areas are relative to the overall average. Therefore any income ratio above 1.0 indicates that the community is above the CMA average, while any income ratio below 1.0 signifies that the region is below the CMA average. In terms of grouping these communities into City 1 (average income increased by 10% or more), City 2 (average income increased or decreased by no more than 10%) and City 3 (average income decreased by 10% or more), this research, like Hulchanski's, uses the difference between the most recent census year, 2006, and the 1961 year.

The results reflect that the Hamilton CMA is composed of a number of significantly different communities each with unique income patterns, especially for those belonging to City 1. For example, Ancaster is the only geographic region to be above the CMA average in terms of its income in each time period. Flamborough has seen the greatest increase in its income levels, but in 1961 actually fell below the CMA average, yet has witnessed tremendous income growth since then. Dundas has had a steady increase in its income ratio since 1981 where it dipped below the CMA average. Grimsby remains the only geographic area which has witnessed an increase in each census year. While Burlington, Glanbrook, and West Hamilton are grouped together as part of City 2, they arrived at this grouping in rather different ways. Burlington contains ratios above the CMA average for each census year in the study period, however, the difference between the start and end years reflect that Burlington's average individual income ratio has decreased slightly. Glanbrook's income ratios have stayed relatively close to the CMA average, hovering both above and below the 1.0 level. West Hamilton's income ratios have been below the CMA benchmark and contain the largest difference of all communities' part of City 2. The census tracts belonging to the Hamilton Mountain and Stoney Creek have seen income levels above the CMA average, but not since the 1981 census year, and have steadily witnessed a declining income ratio. East Hamilton is the only geographic area that has contained below average income ratios in each time period. Also of note, each of the communities that are grouped as part of City 3 has seen a declining, or unchanged income ratio throughout the forty-five year period. As shown in Figure 4.2, each of the communities is in close proximity to their respective City groupings. A striking contrast is evident between the built-up urban areas of East Hamilton, the Hamilton Mountain and Stoney Creek, and the more suburban communities of Burlington, Flamborough, Ancaster, Dundas, West Hamilton, Glanbrook and Grimsby.





Although City 1, as of 2006, is comprised of geographic areas with the largest increase of average individual income between 1961 and 2006, this has not always been the case. Figure 4.3 combines the ten geographic areas into their respective city grouping, and illustrates the average individual income of each of the "Three Cities" relative to the average of the Hamilton CMA between 1961 and 2006. City 1 and City 2 have experienced similar routes over time. In 1961, City 1 held the distinction of having the communities with the highest average individual income relative to the rest of the CMA until 1971. During the 1971 and 1981 census years, City 2 featured the geographic areas containing the highest average individual, just ahead of those part of City 1.

However since 1991, the communities of Ancaster, Dundas, Flamborough and Grimsby have experienced a significant increase (12%) in its average individual income relative to the Hamilton CMA. During the same time period City 2 has seen an increase, followed by a slight decrease. For the majority of the time period, the communities of Burlington, Glanbrook and West Hamilton have felt an increase, and between 2001 and 2006, it witnessed a small decrease. However, between 1961 and 2006, these geographic areas increased (9%) their average individual income relative to the CMA. City 3 has witnessed a steady decline in its average income ratio through each census year until 2001, where its ratio has remained consistent in 2006. Its average income levels have decreased (13%) relative to the CMA average between 1961 and 2006.





The Hamilton CMA average individual income remains consistent with an income ratio at 1.0 in 2006. Therefore City 1 and City 2 contain census tracts with average income ratios that are significantly above the CMA average while City 3 possesses census tracts with average income ratios that are considerably below the CMA average. What this figure demonstrates is the fact that while City 1 has increased in terms of its income ratio and City 3 has decreased in its income ratio across time, the grouping of communities belonging to City 2 should be observed closely due to its decline over the past five years. The CMA is encountering a growing gap among its "Three Cities". In 1961, the difference in income ratios between the highest and lowest grouping stood at 14%, while in 2006, the disparity rested at 39%.

After classifying census tracts into one of "Three Cities", another way of examining the changing income levels is to categorize each one into different income groups, shown in Figure 4.4.





Figure 4.4 depicts the changing census tracts in the Hamilton CMA according to where they fit in each of the income groups. Taking the weighted average individual income of each census tract, for each of the six census years, and classifying it as very high (more than 40% above the CMA average), high (20% to 40% above), middle-income (20% below to 20% above), low (20% to 40% below) or very low (more than 40% below) census tract a temporal view of the CMA's neighbourhoods is provided.

It is evident that the Hamilton CMA has experienced a loss of 26% of middleincome census tracts from 1961 to 2006. Furthermore, much of this loss has occurred over a relatively short period of time, since 1991. To make up for the loss of middleincome census tracts, the most significant increase belongs to the grouping of low income census tracts. This grouping has seen an increase in the percentage of the CMA's census tracts from 14% in 1981 to 29% in 2006. The low and very low income census tracts combined have increased from 16% in 1961 to 31% in 2006. Also of note, there were no very low census tracts that existed in 1961, however, by 2001 there were five, but shrinking to two in 2006. At the other end of the spectrum, the number of high, and very high income census tracts have also grown, albeit at a slower rate than the low and very low income groupings. It should be observed that both ends of the scale, very low and very high groups, have increased between 1961 and 2006. The census tracts with incomes greater than 40% of the Hamilton CMA's average increased from 4% to 6%, while the areas with incomes more than 40% below the CMA's average also increased from 0% to 2%. While these numbers are not substantially large, they do reflect a

changing CMA, whereby the loss of middle-income census tracts are being replaced by census tracts of high and low income.





Figure 4.5 reveals the spatial location of census tracts and their income averages in 2006. What is clear from this map is the considerable clustering that exists among census tracts in each of the "Three Cities". Almost all of the low and very low income census tracts, symbolized by the darker shaded areas, are located within City 3, and more specifically, East Hamilton while also encompassing areas of the Hamilton Mountain. On the other hand, the lighter shaded areas representing high and very high income census tracts are found in the suburban communities of the Hamilton CMA. The north and south-west areas of Burlington (City 2), and the east portion of Flamborough, much of Ancaster, and parts of Dundas, part of City 1, are significantly represented. Middleincome census tracts can be found throughout the CMA, but with much greater consistency in Flamborough, Glanbrook and Grimsby, and much of Dundas.

Now that a method of examining the communities of the Hamilton CMA over a significant time period has been established, it is possible to look at who lives in these "Three Cities" based on a wide range of socio-economic and demographic variables, and how these communities have changed over time. While income was the characteristic that was chosen to define the "Three Cities", there are several variables that demonstrate the dividing cities within the Hamilton CMA. Before investigating the patterns and processes over the course of forty-five years, it is important to consider the urban changes that the CMA has undergone with respect to its expansion and population growth.

4.3 Size and Population

The share of census tracts that belong to each of the "Three Cities" can be seen in Figure 4.6, with City 1, City 2 and City 3 holding approximately 15%, 30% and 55%, respectively in 2006. Over the duration of the study period, City 3 has consistently assumed the highest percentage of the CMA's census tracts, as the combination of East Hamilton, Hamilton Mountain and Stoney Creek have remained built-up areas. City 2, comprising Burlington, Glanbrook and West Mountain have maintained the second highest percentage of census tracts through each time period. Burlington and West Mountain are built up geographic areas, but not quite to the same extent as the grouping of City 3. The lowest percentage of census tracts within the Hamilton CMA has

consistently been maintained by City 1. During the census years of 1961 and 1971, the communities of Ancaster, Flamborough and Grimsby were undeveloped as much of the land was used for agricultural purposes. Recently, housing developments have contributed to its increase in the CMA share of census tracts. It should be noted that City 1 has doubled its share of the CMA census tracts from 1961 (7%) to 2006 (14%), while City 3 has seen its share decline by 11% from 65% to 54% over the same time period. The share of City 2 has stayed relatively consistent. This indicates that during this time period (1961-2006), much of the urban expansion has taken place in suburban communities of the Hamilton CMA.



Figure 4.6

Census tracts generally contain a population ranging from 2,500 to 8,000 people (Statistics Canada, 2007). Therefore in areas of higher density and urban development, census tracts are more numerous. As Figure 4.7 illustrates, the CMA share of census tracts yields very similar results in terms of the distribution of population across the "Three Cities". City 3 has the largest share at just under half the CMA's total population (49%), while City 2 contains 33%, and City 1 holds 17%. Once again, when looking at the share of each city through the forty-five year time period, one can see that City 3 has experienced a slight decline, contributing to an 11% loss, with City 1 being the primary beneficiary with a 7% gain. City 2 has witnessed a 4% growth in its share, but has remained virtually unchanged since 1971.





When examining population figures over time, it is helpful to consider the population change between the first and last years. With regards to the Hamilton CMA between 1961 and 2006, City 1 has grown the most, with a 144% increase, City 2 a 101% increase, and City 3 a 44% rise. Overall, the CMA grew by 73%. These percentages are directly related to Figures 4.6 and 4.7. Ancaster, Dundas, Flamborough and Grimsby, geographic areas of City 1, have increased their share of the CMA's census tracts, and correspondingly have increased their share of the CMA's total population. Therefore it is no surprise to see that this grouping has experienced the largest population growth between 1961 and 2006. Areas in these communities are encountering significant

expansion in subdivisions and surveys. Most census tracts comprising East Hamilton, the Hamilton Mountain and Stoney Creek were already built up in 1961, limiting their ability to add significantly to their population totals. As a result, while the overall population growth is less than the CMA average, this city is also suffering losses in the share of census tracts and population percentages related to the CMA as a whole. While City 2 has witnessed an above average growth rate, it has seen only slight increases in its share of census tracts and population.

The population change between 2001 and 2006 reveals a very similar trend in comparison with the change in population between 1961 and 2006. City 1 encountered a population growth of 9% between 2001 and 2006, almost double the CMA average of 5%, much like the growth it has experienced between 1961 and 2006. City 2 and City 3 possessed population growth increases of 7% and 2% respectively, comparable to the proportions for the entire forty-five year period. This demonstrates that the "Three Cities" are in a stable state where they are experiencing steady growth.

Lastly, to illustrate a slow but steady shift in basic population characteristics is the changing share of dwellings belonging to each of the "Three Cities", shown in Figure 4.8. A converging pattern takes place between the three groupings, as they are becoming more evenly distributed. In 1961, City 3 contained the majority (59%) of all CMA dwellings, while City 1 and 2 possessed 11% and 30% respectively. Each census year examined since 1961, City 1 has increased its share, to the point where by 2006, it had reached 16%. City 2 has seen a slight increase throughout much of this time period increasing its share from 30% to 35%. Both City 1 and City 2 have been gaining ground on City 3 as it

has decreased its portion from almost three-fifths of all dwellings in 1961 to less than half (49%) the CMA's dwellings. The percentage gap between City 1 (lowest share) and City 3 (highest share) in 1961 stood at 48%. This space has narrowed considerably over the past four and one-half half decades to 33%.





Comparing the population and dwelling figures between 1961 and 2006 allows us to see that, while City 3 is still the most populous area of the CMA, it is no longer the dominating city it once was. The census tracts in the communities of City 1 (Ancaster, Dundas, Flamborough and Stoney Creek) and City 2 (Burlington, Glanbrook and West Hamilton) have been growing in terms of its share of population, and dwellings. Moreover, income variables show that the CMA has been experiencing a similar inequality when comparing City 1 and City 2, with City 3.

4.4 Income

The average individual income (in 2006 dollars) of each of the "Three Cities" compared to the CMA average, seen in Figure 4.9 illustrates the widening disparity that exists. In 1961, each of the "Three Cities" possessed similar average individual income figures, hovering around \$25,000. Moving through time, while the average individual income of every grouping has increased, the distribution has not been equal.





City 1 and City 2 have increased in much greater proportion, especially over the past fifteen years (1991 through 2006). While these two cities have increased their share of the CMA's average individual income, City 3 continues to lag behind. During the last three time periods of this study, it has become noticeably visible that the gap between City 1 and City 3 is growing larger. The change in average individual income of the "Three Cities" between 2001 and 2006 tells a slightly different story, however. In this five year time period, the average individual income of City 1 continues to increase when

compared to the CMA average at a 2% rate. City 2, in fact, has decreased in its average income by 3%. City 3 has seen no increase or decrease, remaining at 0%. As a whole, the CMA has declined by 1% in its average income over the past five years. Thus it is important to recognize that while it appears as though City 1 and City 2 are pulling away from City 3, care must be exercised in monitoring how City 2 fares over the course of the next few census years, with regards to its average individual income levels, as compared to the CMA average. Its declining growth rate is difficult to observe, due to the fact that its income level is much higher than the CMA threshold, but nonetheless, the diminishing trend does exist.

Figure 4.10 demonstrates a very similar trend for the "Three Cities". Average family income (in 2006 dollars) has increased significantly over the forty-five year time period, with City 1 exhibiting the largest increase.



Figure 4.10

Much like average individual income, the average family income characteristic has continued to escalate in City 1, over the past five years. City 2 has witnessed a slight decline compared to the CMA average over the past five years. City 3 has a well-below CMA average, and has shown no signs of being able to pull closer to that number. Once again, the "Three Cities" encountered very similar average family incomes from 1961 until 1981, and by 1991, began to show very divergent income trends.

Another income-related variable that demonstrates the growing polarization in the Hamilton CMA can be seen in Table 4.3. This variable, the number of households who have an income of \$100,000 or more, has only been documented over the most recent two census years used in this study. The results indicate that each of the "Three Cities" has witnessed fairly significant increases over just five years, however, the *percentage* of households with that level of income is drastically different. Nearly 40% of City 1 households possess \$100,000 or more in 2006. While each of the "Three Cities" has experienced positive growth, as of 2006, less than one in four CMA households reached this income level. Of note, City 2 and City 3 have declined and stayed the same respectively over the past five years in terms of its average individual income relative to the Hamilton CMA, although its percent of households with income greater than \$100,000, have grown by 7% and 6% respectively.

Table 4.3 Percent of households with incomes of \$100,000 or more in HamiltonCMA, 2001-2006

Year	City 1	City 2	City 3	СМА
2001	29%	21%	11%	17%
2006	39%	28%	17%	24%

More importantly, certain areas of each of the "Three Cities" have higher percentages of households with incomes of \$100,000 or more. It must be emphasized that while 17% of households in City 3 reach this income threshold, when viewing Figure 4.11, very few census tracts emerge with a high concentration. Census tracts belonging to Stoney Creek exhibit high percentages of households above \$100,000. However most census tracts in East Hamilton and the Hamilton Mountain have a very low percentage of households with incomes of \$100,000 or greater. Much of the increase between 2001 and 2006 figures in City 3 can be attributed to households in Stoney Creek. The CMA's other communities contain significantly higher percentage tracts, and have a greater mix. Figure 4.11 specifically shows that parts of North and South Burlington (City 2) have from 43% to 59% of households possessing incomes of \$100,000, and City 1, with portions of Flamborough, and Ancaster holding the same type of income levels. City 1 is almost entirely composed of census tracts with at least 20% of its households earning \$100,000, thus contributing to its 39% city total. City 2 has a more uneven distribution as it is made up of census tracts that belong to several different percentage groups. The disparity among the Hamilton CMA census tracts is clearly evident with regards to income.





Undoubtedly, the amount of income that an individual possesses plays a significant role in deciding the type and location of the dwelling. The link between income and housing and tenure variables is predictable.

4.5 Housing and Tenure

Figure 4.12 indicates a remarkable increase in the average value of owneroccupied dwellings (in 2006 dollars) over the course of this time period. In 1961, the value of owner-occupied dwellings was almost the same for each grouping, hovering around the \$100,000 mark. By 1971, slight differences began to emerge, with City 1 holding the highest value (\$152,682) and City 3 the lowest (\$117,818). The development of single-family housing construction in the suburban communities of the CMA since 1961 has led to increasing values of owner-occupied dwellings, especially in City 1 and City 2.





Between 1991 and 2001, a decrease in the value of dwellings occurred for all "Three Cities", perhaps attributed to the restructuring of the Hamilton CMA economy, which will be discussed later on in this chapter. However, each has witnessed an increase in value between 2001 and 2006. City 1 has experienced the greatest gain with an average value of owner-occupied dwellings of \$346,175, significantly higher than that of City 3 at \$216,380. City 2 fits in between with an average of \$324,892, although much closer to the level of City 1. The trend for City 3 has not been promising over the past few census years, as its average value ratio compared to the CMA average has declined from 0.86 in 1991 to 0.78 in 2006. A strong market for owner occupied dwellings is evident for City 1 and 2, and the values of City 2, have closely rivalled those of City 1

throughout the entire period, although have never exceeded its figures. In 2006, from a spatial perspective, Ancaster, Burlington and Flamborough each had a few census tracts where the average value of the owner-occupied dwelling was between \$418,427 and \$626,229. The census tracts belonging to the lowest grouping of owner-occupied dwelling values were all found below the Hamilton Mountain, with the majority part of City 3. These patterns have not changed significantly throughout the forty-five year period. The greatest numbers of low dwelling values have always been located north of Main Street East, stretching west of the downtown core, across the city until reaching the Red Hill Valley. Ancaster, Burlington and Flamborough have consistently featured census tracts with the highest average owner-occupied dwelling values across each of the census years.

The average owner's payment for dwellings (in 2006 dollars) is relatively consistent among each of the "Three Cities" in the Hamilton CMA, as shown in Table 4.4. This particular variable was not available in the Census Profile data for 1961 and 1971, so the data are reported for 1981, 1991, 2001 and 2006. The average owner's payment refers to the total average monthly payments made by the owner of the household in order to maintain shelter (Statistics Canada, 2009). These payments include the mortgage payment and the costs of electricity, heat and municipal services. In each census year, the dollar figures are almost exactly the same for City 1 and City 2, with the former having the highest values the past two census years, while the latter owning greater values in 1981 and 1991. City 3 has lagged behind in each of the four years. As of 2006, the average owner's payment for City 3 fell about 10% below the CMA average.

The spatial distribution of this variable is similar to that of the average owner-occupied dwelling values. The census tracts containing high average dwelling values tend to have the higher average payments, and a similar trend occurs for those of low dwelling values. One area where the correlation is not visible occurs south of Limeridge Road, extending to Mountain Freeway, from Upper Horning Road all the way across to Centennial Parkway. This stretch has had high average owner payments during 1981, 1991, 2001 and 2006, yet the accompanying average owner-occupied dwelling values remain only moderate.

Year	City 1	City 2	City 3	СМА
1981	\$907	\$920	\$756	\$832
1991	\$1,185	\$1,190	\$978	\$1,082
2001	\$1,158	\$1,147	\$952	\$1,057
2006	\$1,268	\$1,242	\$1,040	\$1,154

Table 4.4 Average Owner's Payment (in 2006 dollars), Hamilton CMA, 1981-2006

Shifting the focus to rented dwellings, the percentage has been declining over the past three and one-half decades. Figure 4.13 illustrates that the peak period for rented dwellings occurred in 1971 and 1981 with CMA averages at 36% and 37% respectively. City 2 and City 3 have held very similar figures during the entire forty-five year time period, and both have had a greater percentage of rented dwellings than the CMA average. Consequently, this means that City 1 has yielded significantly lower percentages in order to account for the discrepancy.





From a spatial perspective, during the rental boom, in 1971 a large cluster was found in the downtown core of Hamilton, from Wentworth Street to the east, south to the Escarpment, west to Locke Street and north to Cannon Street. High percentages of rental dwellings surrounded the immediate area as well. The downtown area of Burlington (from King Road to Guelph Line and Lakeshore Road to the Queen Elizabeth Way) contained census tracts with significant numbers of rental units as well. East Hamilton and areas on the Hamilton Mountain also possessed large numbers of rental accommodations. However, since 1981, rental dwellings have been largely confined to census tracts in the downtown cluster of Hamilton. Rental dwellings consist of anywhere between 65% to over 90% of overall occupied dwellings in these areas. The suburban communities of the CMA contain virtually no rental units.

The average gross rent (in 2006 dollars) of dwellings in the Hamilton CMA can be seen in Figure 4.14. Unlike the average value of owner-occupied dwellings and its nearly three-fold growth rate, the CMA's average rent has increased in smaller increments. Average gross rent is defined as the total average monthly payments paid by the tenant household in order to secure housing. The gross rent includes the monthly rent, costs of electricity, heat and the municipal services. The CMA average gross rent has increased by \$260 (in 2006 dollars) between 1961 and 2006, with City 1 and City 2 well above that marker. Two significant time periods accentuate the rising values of rent; the period between 1961 and 1971 where the CMA average rent increased by \$120 and the period between 1981 and 1991 where the average rent rose again by \$150. Much like average value of owner-occupied dwellings, the average gross rent of the CMA declined between 1991 and 2001. This may have had to do with the economic circumstances in the Hamilton area during this time. Nevertheless the "Three Cities" each experienced an increase in average gross rent by 2006. With the exception of its 2006 figure, City 2 has had the highest average rent value of all the "Three Cities". In 2006, City 1 (\$835)

overtook City 2 (\$828), while City 3 remained the most affordable place to rent, registering in at a monthly average of \$718.





When comparing the average gross rent of the "Three Cities" to the percent of rented dwellings in 2006, there is a definite correlation between supply and demand. The most affordable average rent can be found in City 3, where there is also the highest percent of rented dwellings in the CMA. Similarly City 1, in 2006, has the highest average gross rent, and likewise has the smallest percent of rented units. Also, an important result to consider is that the average rent is increasing while the percent of rented dwellings is decreasing, thereby perhaps causing an issue with regards to supply and demand for the CMA as a whole.

The number of renter households spending more than 30% of their income on housing has also become a serious issue, especially over the past few census years. In 1991, the CMA average was 29%, and by 2006 the number jumped to 44%. City 1 has

shown the largest increase, as its percentage has more than doubled from 21% in 1991 to 43% by 2006. It is also the only grouping that has experienced a substantial increase in each of 1981, 1991, 2001 and 2006. City 2 appears to be in a state of stability, as over the past two census years, its percentage has barely risen, from 42% to 43%. The opposite situation is occurring in City 3, where during the past two census years (2001 and 2006), its percentage has declined slightly from 46% to 45%.

Table 4.5 Average monthly payments for owned and rented dwellings, 2006

	City 1	City 2	City 3	СМА
Average Owner's Payment	\$1,268	\$1,242	\$1,040	\$1,154
Average Gross Rent	\$835	\$828	\$718	\$767

Table 4.5 indicates that the average owner's payment in the "Three Cities" is much higher than the average gross rent, when focusing on the figures in 2006. While this is no surprise, the percentage difference between owner payments and rents points to the separation of the "Three Cities". City 1 has a 34% difference, with City 2 containing a 33% disparity and City 3, a 31% variation. These results indicate that there is a much greater disparity between the monthly payments of owners versus tenants in City 1 and City 2, even with higher dollar figures for the two types of monthly payments.

Another important variable of the housing dimension is its age and durability. These are critical aspects to any person looking to enter into the housing market. When analyzing Figure 4.15 one can see that the percent of dwellings that were constructed before 1946 have gradually declined since 1971. The most significant drop-off was witnessed between 1971 and 1981 where the CMA average plummeted twelve percentages points. Most notably, City 2 and City 3 encountered 13% and 14% drops

respectively during the ten year period. By 2006, the CMA average consisted of only 15% of its houses having been constructed prior to 1946. However, it should be mentioned that City 3, the earliest of the "Three Cities" to be developed, is composed of 18% pre-1946 dwellings. In 2006, City 1 finally overtook City 2 for having the smallest percentage of dwellings built before 1946, after the five previous census years of City 2 holding that distinction.





At the other end of the spectrum, and looking at the percentage of private dwellings that have been constructed since 1991, what can be noticed is the opposite trend. City 1 and City 2 have the highest percentage of recent dwellings (since 1991), with City 3 containing the lowest proportion. As of 2006, the CMA average for this variable is 19%. City 1 with 30% and City 3 posting a 13% figure demonstrates the distinctiveness between the ages of occupied dwellings in the Hamilton CMA. City 2, with a 23% average falls above the CMA average. City 1, and its 30% of dwellings built since 1991 shows an indication of the type of booming residential development that is taking place in the communities of Ancaster, Flamborough, Grimsby, and to a lesser extent, Dundas. That being said, City 3 is composed of a relatively aging housing stock with a small percentage of recent dwellings (over the past fifteen years) and almost one in five dwellings built before 1946.

Much like the housing and tenure variables, education characteristics reveal similar results. A growing disparity between City 1 and City 2 compared to City 3 is obvious with regards to post-secondary success.

4.6 Education

Education is a key variable in determining the composition of the Hamilton CMA's "Three Cities". This variable was very difficult to keep consistent throughout the study period (1961-2006) due to the fact that in earlier census years, it reports the population five years of age and older, whereas in later years it took into consideration those fifteen, twenty, and twenty-five years of age and above. It is important to take this into consideration when observing Figure 4.16 as the numbers may appear to be deceving.

Figure 4.16 reveals a rapid increase in the percent of population that has earned a university degree. In 1961, it was very rare for any individual to have obtained a university degree, no matter where one resided. However, by the most recent census year, nearly one in every four CMA residents (above the age of 25) achieved this academic accomplishment. There is an obvious correlation between educational attainment and where one lives. City 1 and City 2 have increased their overall percentage

from 3% of its population in 1961, to over 30% by 2006. City 3 has experienced a significant increase as well from 2% in 1961 to 15% in 2006. However, the overall percentage of population that has obtained this educational degree is much smaller than those of City 1 and City 2. It should be noted that census tracts belonging to City 3 have possessed a higher growth rate of the population with a university degree than City 1 and City 2 since the 1971-1981 census period. Therefore, despite a declining share of the CMA's population with a university degree, its increasing growth rates provide a sense of optimism.

The 2006 results include only the population that is 25 years of age and above, and consequently these results represent more realistic percentages of the population who have obtained a university degree. People under the age of 25, especially under 20, 15 and 5 years of age are unlikely to possess this type of educational credential. Therefore, this helps explain why the numbers for earlier census years are perhaps less representative than those of 2006, and why there has been such a dramatic shift in the most recent figures for City 1, City 2 and City 3.





The percentage of the population that has not received a high school diploma is virtually the complete opposite trend to that shown in Figure 4.16. The vast majority of the population in 1961 (CMA average of 90%) and 1971 (CMA average of 87%) did not collect even a high school diploma, whereas by 2006, less than one in five failed to achieve this educational accomplishment. Once again, it should be noted that the same populations were used for this variable. Therefore the results should be interpreted with caution. There is a decreasing trend of achievers at the high school and university level in obtaining diplomas and degrees respectively in City 3 in 2006. Additionally, the 2006 figures likely give a better interpretation of its results because it takes into account only the population that is 25 years and older. City 1, City 2 and City 3 with 12%, 14% and

25% high school dropouts again show a disparity among educational success and geographic location.





As seen in Figure 4.17, the percent of population with a university degree is extremely concentrated in the Hamilton CMA. The most educated people reside in census tracts of Ancaster, West Hamilton, Dundas and Burlington, with as high as almost 70% of its population holding a university degree. While each of these areas feature census tracts with the highest percent of population with this educational attainment, what is noticeable is the fact that the surrounding census tracts also contain highly educated individuals, albeit not quite to the same extent. Much of Dundas, Burlington and Ancaster are occupied by the two highest groupings (ranging from 27% to 69%). These results suggest that individuals holding a university degree are clustered together.

Clustering tends to be a common occurrence for many of the immigration variables in the Hamilton CMA between 1961 and 2006.

4.7 Immigration

The Hamilton CMA has played a significant role in housing immigrants over its history. Certain groups are more likely to settle in specific areas of the CMA, with other groups settling in different regions. There has been a fairly even distribution of the percentage of population that was not born in Canada across the "Three Cities", throughout the time period, shown in Figure 4.18.





City 1, historically has always had the smallest percentage of foreign born population, and this trend has continued through the most recent year of data, 2006. City 3 meanwhile has had the largest share of the CMA's immigrant population residing in its geographic areas, in each of the selected time periods. City 2 fits in between, but has a slightly smaller percentage than the CMA average, indicating that City 3 contains a large proportion of the foreign born population. Also, since 1981, City 1 has had a declining share of the CMA average, while City 3 has increased its share. City 2 has seen relatively minimal growth. What this means is that, especially recently, a greater proportion of the CMA's foreign born population is settling in the communities of City 3. This is clearly evident in Figure 4.19, as the darkest shaded areas can be found east of the Red Hill Valley, parts of Stoney Creek, and several of the census tracts located on the Hamilton Mountain. The neighbourhood of Riverdale, located in East Hamilton, bounded by Centennial Parkway, Queenston Road and Barton Street, is one of the CMA's most diverse census tracts. Nearly half of its population is foreign-born, with almost one-third being a recent immigrant.





The "Three Cities" included in the Hamilton CMA contain a wide variety of immigrants, from different parts of the world. As seen in Figure 4.20, City 2 and City 3 possess similar figures for its immigrants, but are relatively different than those of City 1. European immigrants can be found in each of the "Three Cities", however they appear in greater proportions in City 1 than the rest of the CMA, while those from Asia and the Middle East are much less common in Ancaster, Dundas, Flamborough and Grimsby as compared to City 2 and City 3. Six percent of immigrants residing in City 1 are of American descent, the largest proportion of the CMA's "Three Cities". While City 2 and City 3 have very comparable percentages in terms of its immigrants by place of birth, there are a few slight differences. City 2 contains a greater percentage of American born immigrants (5%) than does City 3 (2%). At the same time, City 3 has a slighly larger proportion of native Caribbean and Bermudans, and Central Americans.



Figure 4.20 Percent of Immigrants by Place of Birth, Hamilton CMA, 2006

While Table 4.6 labels all immigrants from Europe as one group, the census data has categorized this population even further by classifying them as North European, South European, East European or West European. Table 4.6 provides a more detailed description of these European immigrants and where they have tended to settle upon arrival to the Hamilton CMA.

	City 1	City 2	City 3	СМА
West	17%	8%	5%	8%
East	12%	11%	12%	11%
South	12%	13%	32%	23%
North	30%	27%	12%	19%

 Table 4.6 Percent of European Immigrants in Hamilton CMA, 2006

The greatest proportion of immigrants in the Hamilton CMA hail from Europe, however, each of the Three Cities has distinctly different types of these foreigners. Of the 70% of European immigrants who lived in City 1, as of 2006, the majority were from Western and Northern Europe. Almost half of the European immigrants of City 2 were of North European descent, with a small percentage (8%) from Western Europe. City 3 had a very large proportion (32%) of South European immigrants, much greater than any of the other two cities, but also had the smallest percentage of West Europeans as well (5%). The Hamilton CMA as a whole, plays home to mainly descendants from both North and South Europe (19% and 23% respectively). Interestingly, East Europeans were relatively dispersed uniformly across the metropolitan area, while the other three European groups had distinct concentrations in certain areas of the CMA .




While Figure 4.20 displays the percent of immigrants by place of birth for each of the "Three Cities" in the Hamilton CMA in 2006, it is also worth considering the temporal perspective. Figure 4.21 reveals where immigrants have come from between 1961 and 2006. In each of the census study years, European immigrants have dominated the CMA. The dominance reached its apex in 1961, when 95% of the CMA's immigrants hailed from European countries. Those from the United Kingdom have been most represented in the Hamilton area throughout the study period. Despite the large European influence in the CMA, there have been very different settlement patterns of its groups within the "Three Cities". City 1 has mainly hosted the immigrants from the British Isles, but primarily the United Kingdom, and Western European nations such as the Netherlands and Germany. A greater percentage of immigrants residing in City 2 have arrived from East European countries such as Poland, Hungary and the former USSR. Especially in the earlier years of the study period, there was a noteworthy concentration of Italians also inhabiting the geographic areas of City 2. By 2006, City 2 was housing immigrants from nations around the world, although those from the United Kingdom, Netherlands, Germany and Italy were most common. The communities of City 3 have been even more diverse than City 2, with notable percentages of Poles, Portuguese, Yugoslavians, Croatians, a very large group of Italians, and more recently those who hail from the Middle East and Asian nations.

In terms of recent immigrants, those who arrived within the past five years (except for 1991, which defines recent immigrants as those who arrived within the past ten years), the census data reveals interesting trends. It must be noted that the 1981 census data did

not reveal any statistics for recent immigrants, and is not included in the results. As Figure 4.22 demonstrates, the 1961 census year represented the highest percentage (23%) of recent immigrants as foreign born residents in the Hamilton CMA. Between 1991 and 2001, the CMA lost a significant share of its recent immigrants, although in the most recent five year time period, there has been the slightest of increases. Most interestingly, is the fact that between 2001 and 2006, it has been City 1 (2%) and City 2 (1%) that has witnessed a small increase, whereas City 3 has stayed at a constant level. In each of the study years, City 3 has always held the largest percentage of immigrants of all the CMA's "Three Cities". No longer is it safe to assume that recent immigrants occupy census tracts in and around the Central Business District and downtown core of the City of Hamilton. In the case of the Hamilton CMA, especially recently, the suburban communities have played an increasing role in housing this population.



After taking a look at the recent immigrants, as a percentage of all immigrants, it is important to focus on the other end of the spectrum; the pre-1961 immigrants. This

variable was only found in the census data beginning in 1991, through 2006. Not surprisingly, the percentage of immigrants who arrived before 1961 to the Hamilton CMA has declined quite significantly in each census year since 1991, illustrated in Figure 4.23.



Figure 4.23

This decrease can be attributed to the fact that this population arrived at least 45 years ago, and has grown older every year. What should be noticed is that City 1 has consistently housed a significant proportion of this population. As these immigrants become familiarized and accustomed to the culture and society, they become more embedded in the socio-economic hierarchy resulting in similar opportunities to those born in Canada. Not surprisingly, as can be seen in Figure 4.24, more than half of the immigrants living in City 1 can be classified as third generation immigrants. So while the pre-1961 foreigners may not have originally settled in City 1 when they first arrived to the Hamilton CMA, by 1991 many of these migrants were living in Ancaster, Flamborough, Dundas or Grimsby. In contrast, the results indicate that in 1991, 2001 and 2006, City 2 and City 3 have accommodated very similar percentages of pre-1961

immigrants, illustrating that not all immigrants arriving before 1961 choose to settle in City 1, even after getting acclimatized to Canadian culture. As mentioned earlier, City 3 possesses the largest percentage of rental dwellings and the most affordable units, making this area particularly attractive for first generation immigrants. However, there is a correlation between the generation of immigrants and where they live. The earlier one has arrived to Canada, the more likely one is to be living in a suburban community.





The visible minority population is another important group to focus on, and determine where they are living in order to better understand the changing social landscape of the Hamilton CMA. Figure 4.25 reveals that City 3 is home to the largest percentage of the CMA's visible minorities. While City 1 and City 2 have both felt an increase of 1% between 2001 and 2006, the proportion of visible minorites in City 3 has risen by 3%. Although recent immigrants appear to be seeking housing in City 1 and City 2, it does not seem as though the same percentage of visible minorities are opting for housing in suburban communities.





In 2006, the spatial distribution of visible minorities, seen in Figure 4.26, closely resembles the arrangement of immigrants during the same year (shown in Figure 4.19). Census tracts containing the highest percent of visible minorities can be found near the West Hamilton and East Hamilton border (James Street), and another large cluster located on the Hamilton Mountain. When comparing visible minorities to immigrants, a noticeable absence of the former appears east of the Red Hill Valley in East Hamilton. That being said, the visible minority population, in 2006, is largely confined to West Hamilton, East Hamilton and the Hamilton Mountain. This population is almost non-existent in census tracts of the suburban communities as Flamborough, Glanbrook and Grismby each feature census tracts with visible minorities ranging from 0% to 5% of its total population.





While the generation status, and the place of birth of immigrants, vary across the Hamilton CMA, so too do different household types.

4.8 Households

The size of households has become smaller between 1961 and 2006. The CMA average number of persons per household in 1961 stood at 3.7, much higher than the 2.6 figure as of 2006. Households within the boundaries of City 1 have always had numbers above the metropolitan area average. City 2 has consistently had the smallest number of persons per household in each census year, with City 3 containing figures exactly identical to the CMA average.

The household structure has also been significantly altered, as can be seen in Figure 4.27. The CMA average has witnessed a threefold increase in the percentage of one-person households, from 8% in 1961 to 26% in 2006. This is a remarkable increase, considering that in 2006 only 17% of households contained in City 1 were classified as one-person. This demonstrates the high levels of one-person dwellings located in City 2 and City 3. As shown in Figure 4.27, between 1961 and 1981, a high percentage of households became inhabited by a single person. From 1971 to 2006, the CMA average of the metropolitan area doubled from 13% to 26% however, over the past five years, there has been little growth. Based on 2006 census data, a high percentage of one-person households can be found just below the Escarpment towards the west end of Hamilton. The suburban areas of Flamborough, Ancaster and Grimsby are almost completely free of one-person homes, contributing to the low percentages of this variable in City 1. The southern portion of Burlington, and West Hamilton contain much higher percentages, thus factoring into City 2 having the highest percentage of one-person households in the Hamilton CMA despite the fact that Glanbrook, and north Burlington are relatively nonexistent.





While the one-person households as a percentage of total households have increased between 1961 and 2001, before leveling out in 2006, the rate of growth has actually declined during this same time period. Figure 4.28 shows that it has been the census tracts of City 1 that have witnessed the highest growth rates among the "Three Cities" between the 1971-1981 and 2001-2006 census years, despite the fact that they have the lowest percentage of one-person households when looking at total households. What this means is that the census tracts of City 1 have become the most sought after areas for households containing one-persons.





There has been a CMA-wide decline over the past forty-five years in the share of children under the age of 20 as a percentage of the total population. When viewing Figure 4.29, one can see that each census year since 1961, the CMA as a whole has contributed a smaller percentage of children (under 20 years of age) compared to its total population, from 38% to 25%.





However, the communities of City 1 have continued to remain above the CMA average in terms of its percentage of children, although recently, its figure has become only slightly larger than that of the metropolitan area. City 2 has maintained the smallest percentages of children throughout the majority of the forty-five year time period. As shown in Figure 4.27, City 1 has by far, the smallest percent of one-person households, while City 2 has the largest, and thus contributing towards its high and low proportions respectively of its population under the age of 20.

A significant demographic shift can be seen as a result of the emerging phenomena of the one-person household, coupled with the declining percentage of the population under the age of twenty. Even the percentage of families who have children, of any age, living at home has consistently declined between 1981 and 2006, seen in Figure 4.30. Each of the "Three Cities" has witnessed a reduction, resulting from a society that has children moving away from home at an earlier age.





Another variable demonstrating the changing composition of households in the Hamilton CMA is that of non-family households as a percentage of total households. As one can see from Figure 4.31, an increase, followed by a decrease is evident. The percentage of non-family households of total households grew substantially between 1971 and 1981, but has diminished since 1991. This illustrates the fact that more recently, a greater percentage of households are composed of families, as opposed to non-families. Through each of the census years, the communities of City 1 have had the smallest share of non-family households, exhibiting the point that these areas tend to house mainly families. The opposite occurs for City 2, as its figures indicate that many of its households are those of the non-family variety.



While the percentage of families of two parents has slowly decreased from 1981 until 2006, the lone-parent families as a percentage of families has increased, seen in Figure 4.32.





Not surprisingly, since 1981, City 3 has maintained the highest percentage of single-parent families as a proportion of total families. That being said, the share of lone-

parent families has not changed much over the course of the twenty-five year period. City 3 has seen its proportion decrease slightly from holding 62% of the CMA's singleparent families in 1981, to 60% in 2006. When examining the spatial distribution of the lone parent families, shown in Figure 4.33, one can see that the highest concentration of lone parent families can be found below the escarpment, especially the census tracts that occupy the downtown core.





There are also notable areas in East Hamilton as well. Many of the census tracts located on the Hamilton Mountain possess high percentages ranging from 20% to 27% as

well. Much of Stoney Creek also features above average percentages of lone parent families, thus contributing to the high levels of City 3. While some areas of City 2 have some lone parent families, their intensity is much lower, with most of its tracts found in West Hamilton. The suburban communities of the Hamilton CMA have relatively little of this type of family structure.

Having seen that the proportion of the CMA's population of children under the age of twenty has decreased over the past forty-five years, one may expect the opposite to be true for seniors, as a percentage of the total population. This is the case, as its share has steadily increased throughout the CMA between 1961 and 2006. Seniors are defined as those who are above the age of 65. When looking at Figure 4.34, the "Three Cities" possessed very similar percentages of this population in 1961, however, over the past thirty-five years, some variations have emerged among these geographic areas. Seniors comprise a higher percentage of its total population in City 2 in each census year; the only city that holds this distinction. Furthermore, since 1991, City 1 and City 2 have witnessed an increasing proportion of its population over the age of 65, especially compared to City 3. City 1 has consistently had the smallest share of the CMA's oldest population, however, its proportion has increased in each census year. As the proportion of seniors has grown, so too has its distribution across the "Three Cities". The suburban communties have housed a greater percentage of this population since 1961.





Another way of illustrating the changing composition of the "Three Cities",

specifically with regards to the senior population can be seen in Figure 4.35. It is obvious that when comparing where seniors reside, almost half of the CMA's seniors were found living in City 3, with only 14% in City 1 in 1961. By 2006, City 2 became the preferred location (41%). A much more diverse landscape is evident in the most recent census year, as seniors tend to be spread across the CMA.

Figure 4.35 The Share of where Seniors Reside, Hamilton CMA, 1961-2006



4.9 Occupations

The Hamilton CMA has long been known for its once-booming manufacturing industries. However, over the past half-decade, a striking disparity has emerged. No longer does the CMA rely on its blue-collar labour force. As shown in Figure 4.36, forty-four percent of the CMA labour force was employed in blue-collar occupations in 1961, but has since shrivelled in half, to 22% by 2006. The exact opposite has occurred for the white collar occupations. In 1961, 18% of the labour force was employed in these types of jobs, but by 2006 it doubled to 36%. The year 1981 marked the occasion where the percent of labour force employed in white collar occupations exceeded the percent of labour force working in blue collar occupations. Using Hulchanski's (2007) definition of blue and white collar occupations, the former include jobs in manufacturing, utilities, trades, construction and transportation, while the latter consists of jobs in management, business, finance, administration, natural and applied sciences, health and medicine, social sciences, education, and government and religion.





While the percent of labour force employed in white and blue collar occupations has radically changed over time, it is important to consider where these people reside. The total number of jobs in the manufacturing industry has fallen from 73,255 in 1971 to 56,605 by 2006. Those individuals who reside in City 3 have been most affected by the decline in blue collar jobs. Almost 80% of the blue collar jobs that have been lost in the Hamilton CMA, between 1971 and 2006 have belonged to residents living in City 3. This accentuates the importance of the blue collar industry to individuals residing in the census tracts of East Hamilton, the Hamilton Mountain and Stoney Creek. Residents of City 1, have witnessed a slight increase in the total number of manufacturing jobs during this time period from 7,465 in 1971 to 8,355 in 2006.

The number of jobs in the finance, insurance and real estate industry between 1971 and 2006 have grown from 8,390 in 1971 to 23,060 by 2006, a nearly three-fold increase. While each of the "Three Cities" has experienced at least a two-fold increase in the number of jobs in the FIRE industry, some have benefited more than others. For example, almost four times as many jobs in this sector belonged to residents of City 1 in 2006 than in 1971, meanwhile just over twice as many of these jobs were held by citizens of City 3 during the same time period.

It is apparent that the Hamilton CMA has undergone significant economic restructuring. The blue collar industry is losing its percent of labour force and total number of manufacturing jobs, while simultaneously the white collar industry is experiencing an increase in its percent of labour force and the number of FIRE jobs. However, the spatial distribution of blue collar occupations remains very similar between

1961 and 2006 as shown in Figure 4.37 and Figure 4.38. Census tracts north of Main Street East, stretching from York Boulevard all the way to the Red Hill Valley contained the highest percentage of blue collar occupations in each of the years. The blue collar labour force has also maintained a strong presence in Stoney Creek, and the Hamilton Mountain.

Figure 4.37



Figure 4.38



The same trend exists for the labour force employed in white collar occupations between 1961 and 2006. Individuals tend to be located in the suburban communities of the Hamilton CMA. Census tracts in Burlington, Ancaster, Flamborough, and Dundas contained the highest percentages of its labour force in these occupations in 2006. The lowest percentage values, again not surprisingly, were found to be north of Main Street East.

Those employed in sales and service occupations remained a separate occupation characteristic. The distribution of the labour force employed in this sector is sporadic. Highly concentrated census tracts appear throughout Burlington, West Hamilton, East Hamilton, and the Hamilton Mountain. The highest concentration of the labour force employed in sales and services in 2006 yield percentages that range from 29% to 36%. When compared to blue and white collar occupations, the sales and service opportunities appear to be much more spread out.

It is important not only to consider the blue, white and sales and services occupations as separate entities, but also to think of the CMA as a whole in terms of where jobs can be found. Figure 4.39 reveals a pattern whereby City 3 has been losing its share of total jobs relative to City 1 and City 2. Certainly much of this has to do with the declining blue-collar sector, and the role that it has played in City 3. The labour force employed in white collar occupations has been linked to the suburban communities of the CMA.

Figure 4.39



4.10 Chapter Summary

This chapter reviewed key census variables related to population characteristics, income, housing and tenure, education, immigration and occupations within the Hamilton Census Metropolitan Area between 1961 and 2006. These variables were analyzed from the "Three Cities" perspective, and from a census tract viewpoint. Both figures and tables were utilized to illustrate the changing social geography of the Hamilton CMA.

CHAPTER 5 DISCUSSION AND CONCLUSIONS

This research examines the changing pattern of socio-economic status of the Hamilton CMA between 1961 and 2006. The study has created ten geographic areas which comprise the Hamilton Census Metropolitan Area census tracts. These were created in order to maintain consistency of the growing number of census tracts of the Hamilton CMA over the study period. Each of these individual communities can be placed into one of "Three Cities" based on how its average individual income has compared relative to the Hamilton CMA between 1961 and 2006. A similar study was conducted by J. David Hulchanski, and his team on the City of Toronto between 1970 and 2000. They concluded that Toronto's wealthiest neighbourhoods can be found in the downtown core, while neighbourhoods with little change are located between the two groups, and neighbourhoods with below average individual incomes tend to be concentrated in the northern part of the city (Hulchanski, 2007). The exact opposite scenario exists for the Hamilton CMA over the forty-five year study period. The suburban communities consist of census tracts with above average individual incomes, while the geographic areas nearby the inner-city of Hamilton tend to maintain below average individual incomes. Not only do the groupings of each of the "Three Cities" share similar income characteristics weighed against the metropolitan area, they also feature comparable socio-demographic qualities.

The CMA has grown from a population of 395,189 in 1961 to 692,911 by 2006. Despite the overall growth, over the past forty-five years, much of it can be attributed to

the emerging suburban communities of Ancaster, Dundas, Flamborough and Grimsby. City 3 has seen its share of the CMA population decrease from 60% in 1961, to 49% in 2006. The population increase has coincided with the expansion of the suburban areas, as the number of inhabited dwellings increased by 140% from 1961 to 2006.

A similar trend exists for the income variables as the results indicate that the CMA has experienced a tremendous amount of income polarization. The census tracts within suburban communities of Ancaster, Dundas, Flamborough and Grimsby contain significantly higher average individual incomes relative to the Hamilton CMA than those census tracts belonging to East Hamilton, the Hamilton Mountain and Stoney Creek. Furthermore, the income gap between City 1 and City 3 has continued to widen through time. Similar trends exist for average family income. When considering the spatial distribution of the average individual income, census tracts located below the escarpment in both West and East Hamilton, and those on the Hamilton Mountain contain low and very low income levels respectively, compared to the Hamilton CMA in 2006. While just over half of the CMA's census tracts are considered 'middle-income', it is the intense concentration of the low and very low tracts that is most noticeable.

Stark contrasts characterize the "Three Cities" in terms of the average values, payments, and tenure of the CMA's dwellings. The average value of owner occupied dwellings has increased dramatically over the course of the study period. However, dwellings located in census tracts of City 1 and City 2 have significantly higher values than do those of City 3. These values have also widened considerably over forty-five years. Rented dwellings have historically been most commonly located in census tracts

of City 2 and City 3. However, the average gross rent between the two groupings is very different. Renters have paid a higher monthly rate in City 2 than renters in City 3. In terms of the average owner's payment for owner occupied dwellings, those occupying residences in City 1 and City 2 have paid a much higher amount than those of City 3. There is a direct correlation between where one lives and the socio-economic status of its residents.

The percent of the population with a university degree represents another significant disparity that persists in the Hamilton CMA. Individuals with this educational attainment are most likely to be located in the wealthier geographic areas, and have become highly concentrated over time. Both City 1 and City 2 have the largest percent of university graduates, and have seen their share increase relative to City 3. The spatial distribution of those individuals with the highest post-secondary success is clustered in most census tracts in Burlington, and areas of Ancaster, Dundas and West Hamilton. Very few individuals with a university degree reside in the census tracts located north of Main Street East in Hamilton.

Several variables help to illustrate the uneven distribution of immigrants between 1961 and 2006. In each of the six years in the study, City 3 has housed the highest percent of immigrants. However, between 1961 and 1991, immigrants were spread out among each of the "Three Cities" as the percentage gap between the city with the highest and lowest values narrowed considerably. By 2006, this gap widened, with City 1 housing the lowest percent of immigrants. The place of birth of these immigrants is also different depending on where this population resides. City 1 houses a greater percent of

Europeans, while a smaller percent of Asians and Middle-East than City 3. Recent immigrants have historically been attracted to City 2 and City 3, while visible minorities are also most likely to reside in City 3.

Census tracts of the Hamilton CMA feature significantly different household structures. The percent of lone-parent families occupying census tracts of City 3 have increased dramatically between 1961 and 2006. This cluster occurs with census tracts located in the north end of Hamilton. Lone-parent families, as a percent of total families, are almost non-existent in the CMA's suburban communities. Seniors, aged sixty-five years and above, as a percent of the total population, have been disproportionately located in City 2 and City 3. These two vulnerable population groups are commonly found in below-average income areas.

The occupational variables reveal very contrasting results. There is a considerable divide between where the labour force employed in white and blue collar occupations reside. Furthermore the decline in the number of blue collar occupations compared to the increase in white collar occupations accentuates this fracture.

Each of these socio-economic and demographic variables provides a descriptive account of the changing social landscape of the Hamilton CMA between 1961 and 2006. It is obvious from these results that the Census Metropolitan Area has transformed itself from having much more uniform geographic areas to one that, today, has three distinct cities.

The changing social geography of the Hamilton CMA can be attributed to the labour force that has drastically transformed over forty-five years, as the percent of blue

collar occupations decreased from 44% in 1961 to 22% by 2006. Similarly, during the same time period, the percent of white collar occupations increased from 18% to 36%. Remarkably, the spatial patterns of the percent of blue collar occupations versus white collar occupations have remained the same despite the extreme percentage changes. The census tracts of Hamilton's downtown core, and east end have maintained the highest percent of blue collar occupations, while the CMA's suburban communities have preserved the highest percent of white collar occupations. The accentuated divide between the suburban white collar areas and Hamilton's inner-city blue collar areas serves as a primary example of how economic restructuring has led to social polarization.

Contributions of this research can be found in two areas: theoretical and methodological. This research examined a CMA from a spatial and temporal perspective using a number of census variables. While social geography studies have been conducted for nearly a century, very few researchers have attempted to focus on such diverse variables. It is important to make sense of changes related to demographic shifts, changes in household or family structures, on top of economic and occupational changes in order to understand socio-spatial polarization (Walks, 2001). Those who have researched a particular area have concentrated on larger Canadian CMAs, such as Toronto, Vancouver and Montreal. This study focuses on space and time collectively in order to demonstrate the changes taken place in the smaller and local Canadian CMA of Hamilton.

From a methodological perspective, this research builds on the work of J. David Hulchanski (2007) and his *The Three Cities within Toronto* report. Using Hulchanski's (2007) "Three Cities" model to organize neighbourhoods into one of "Three Cities", this

study was able to decipher distinct characteristics associated with the Hamilton Census Metropolitan Area's census tracts. The study also validates Hulchanski's work in that it demonstrates the versatility in his model that it was able to describe the changing neighbourhoods of both the Toronto and Hamilton CMA. These two CMAs are very different in their socio-economic and demographic characteristics. This research extends beyond original studies by adding 2006 census data, the most recent collection of information.

This study has raised several possibilities for future research. Using Hulchanski's (2007) model to organize census tracts into "Three Cities" could be tested in various CMAs across Canada. It would help determine whether this model can accurately describe other, or all Canadian CMA city types. Similar research projects in different CMA's could take place in order to see if the results from this research are comparable, or at least validate or refute the basic patterns and themes that have been established.

Future studies related to the changing social geography of the Hamilton CMA could include a number of changes. The creation of "Four Cities" would undoubtedly reveal different results, and may be able to better explain Hamilton CMA's census tracts ten or twenty years down the road, as social polarization is likely to continue. It may be worth altering the income thresholds used to define census tract change over time. For example, City 1 may compose those areas that have witnessed a more than 20% change in average individual income relative to the CMA average, City 2, for census tracts with zero to 20% change, City 3, with a decrease of zero to 20% change, and City 4, a decrease of more than 20%. Expanding the number of census variables used in this research would

also likely expose greater changes among census tracts, and would better describe its neighbourhoods. Another future study could look at the census data for each of the census years between 1961 and 2006. This research focused on six of the ten census years during the time period. By using data for each census year, a more comprehensive study would follow. Lastly, examining the changing income levels of each individual census tract of the Hamilton CMA between 1961 and 2006 and its corresponding socioeconomic and demographic characteristics would produce a more descriptive account of the changing metropolitan area.

BIBLIOGRAPHY

Abrahamson, M. (1976). Urban Sociology. Englewood Cliffs, N.J.: Prentice-Hall, Inc.

Archambault, J., Ray, B., Rose, D., and Seguin, M. (1999). *Atlas Immigration et Metropoles* [http://im.metropolis.net/research-policy/research_constent/atlas/index.html] Accessed March, 2009.

Baldwin, J. (1974). Social area analysis and studies of delinquency. *Social Science Research*, *3*, 151-168.

Bank of Canada (2009). *Bank of Canada Inflation Calculator. Statistics Canada Consumer Price Indexes for Canada, Monthly 1914-2006* (V41690973 series.) [http://www.bankofcanada.ca/en/rates/inflation calc.html] Accessed April, 2009.

Bauder, H., and Sharpe, B. (2002). Residential segregation of visible minorities in Canada's gateway cities. *The Canadian Geographer*, 46 (3), 204-222.

Bell, W. (1953). The Social Areas of the San Francisco Bay Region. *American Sociological Review*, 18, 39-47.

Bourne, L., and Ley, D. (1993). *The Changing Social Geography of Canadian Cities*. Montreal and Kingston: McGill-Queen's University Press.

Bourne, L. (1997). Social inequalities, polarization and the redistribution of income within cities: a Canadian example, in: B.A Badcock and M. H. Browett (eds.) Developing Small Area Indicators for Policy Research in Australia, pp. 21–44. Adelaide: University of Adelaide Press.

Bourne, L. (1989). Are new urban forms emerging? Empirical tests for Canadian urban areas. *The Canadian Geographer*, 33, 312-328.

Bulmer, M. (1984). *The Chicago School of Sociology: Institutionalization, Diversity, and the Rise of Sociological Research*. Chicago: The University of Chicago Press.

Burgess, E. (1967). *The Growth of the City*. In R.E. Park, E.W. Burgess, and R.D. McKenzie. (eds.), *The City*. Chicago: University of Chicago Press.

Burgess, E. (1929). Urban areas. In T.V. Smith and L.D. White (eds.), Chicago: An Experiment in Social Science Research. Chicago.

Cadwallader, M. (1985). *Analytical Urban Geography: Spatial Patterns and Theories*. Englewood Cliffs, N.J.: Prentice-Hall, Inc.

Caulfield, J. (1994). *City Form and Everyday Life: Toronto's Gentrification and Critical Social Practice*. Toronto: University of Toronto Press.

Comrey, A.L. (1973). A First Course in Factor Analysis. New York: Academic Press.

Davie, M. R. (1961). *The pattern of urban growth*, in G.P. Murdock (eds.), *Studies in the Science of Society*, New Haven, 1938. Reprinted in Theodorson, 1961, pp. 77-92.

Davies, W.K.D., and Murdie, R.A. (1993). *Measuring the Social Ecology of Cities*. In L. Bourne, and D. Ley (eds.), *The Changing Social Geography of Canadian Cities*. Montreal & Kingston, McGill-Queen's University Press.

Davies, W.K.D. (1984). *Factorial Ecology*. Aldershot, England: Gower Publishing Company Limited.

Department of Justice Canada. (2000) *Employment Equity Act* (1995), C.44, [http://laws.justice.gc.ca/en/E-5.401/text.html]. Accessed March, 2009.

Doucet, M. (1999). *Toronto in Transition: Demographic Change in the Late Twentieth Century*. Virtual Library, Joint Centre of Excellence for Research on Immigration and Settlement. Toronto. [http://ceris.metropolis.net/vl/other/doucet2.html] Accessed March, 2009.

Duncan, G., Aber, J., and Brooks-Gunn, J. (2000). *Neighbourhood Poverty: Policy Implications in Studying Neighbourhood, Volume II.* New York: Russel Sage Foundation.

Faris, R. Foreword to J. David Lewis and Richard L. Smith, *American Sociology and Pramatism: Mead, Chicago Sociology, and Symbolic Interaction*. Chicago: University of Chicago Press, 1980, p. xiv.

Fellmann, J., Getis, A., Shrubsole, D., and Hopkins, J. (2007). *Human Geography: Landscapes of Human Activities*. Canadian Edition. Toronto, McGraw-Hill Ryerson Limited.

Firey, W. (1945). Sentiment and Symbolism as Ecological Variables. *American Sociological_Review, 10*, 140-148.

Foggin, P., and Polese, M. (1977). *The Social Geography of Montreal in 1971*. Centre for Urban and Community Studies, University of Toronto, Research Paper No. 88, Toronto.

Fong, E. (1996). A comparative perspective on racial residential segregation: American and Canadian experiences. *Sociological Quarterly*, *37* (2), 199-226.

Gieryn, T. (2006). City as Truth-Spot: Laboratories and Field-Sites in Urban Studies. *Social Studies of Science*, *36*, (1), 5-38.

Golledge, R., and Stimson, R. (1997). *Spatial Behavior: A Geographic Perspective*. New York: The Guilford Press.

Harvey, D. (1974). Class-monopoly rent, finance capital and the urban revolution. *Regional Studies*, *8*, 239-255.

Hatt, P. (1946). The Concept of the Natural Area. *American Sociological Review*, 11, 423-427.

Herbert, D. (1973). Urban Geography: A Social Perspective. New York: Praeger Publishers, Inc.

Hiebert, D. (1999). Immigration and the changing social geography of greater Vancouver. *BC Studies*, 121, 35-82.

Hou, F. (2006). Spatial Assimilation of Racial Minorities in Canada's Immigrant Gateway Cities. *Urban Studies*, 43 (7), 1191-1213.

Hulchanski, D. (2007). *The Three Cities within Toronto: Income polarization among Toronto's neighbourhoods, 1970-2000.* (Toronto: University of Toronto Centre for Urban Community Studies) Research Paper no. 41.

Knox, P., and Pinch, S. (2006). Urban Social Geography: An Introduction. 5th Edition. Toronto: Prentice Hall.

Knox, P., and Pinch, S. (2000). Urban Social Geography: An Introduction. 4th Edition. Toronto: Prentice Hall.

Ley, D. (1983). A Social Geography of the City. New York: Harper & Row, Publishers.

Lieberson, S. (1963). Ethnic Patterns in American Cities. New York.

McKenzie, R.D. (1926). The Scope of Human Ecology. *Publications of the American Sociological Society* XX, 141-154.

MacLachlan, I., and Sawada, R. (1997). Measures of income inequality and social polarisation in Canadian metropolitan areas. *The Canadian Geographer* 41, 377–397.

Marcuse, P. and Van Kempen, R. (2000). *Globalizing Cities: A New Spatial Order?* Oxford: Blackwell.

Marston, W., and Van Valey, T. (1979). The Role of Residential Segregation in the Assimilation Process. *Annals of the American Academy of Political Science*, 44, 113-25.

Myers, J.K. (1954). Note on the homogeneity of census tracts. *Social Forces*, *32*, 364-366.

Park, R. (1952). *Human Communities: The City and Human Ecology*. New York: American Book-Stratford Press, Inc.

Pendakur, K., and Pendakur, R. (1998). The colour of money: earnings differentials across ethnic groups. *Canadian Journal of Economics*, *31*, 518-548.

Ray, B. (1994). Immigrant settlement and housing in metropolitan Toronto. *The Canadian Geographer, 38*, 262-265.

Rees, P.H. (1970). *Concepts of Social Space: Toward and Urban Social Geography*. In B.J.L. Berry and F. Horton (eds.), *Geographic Perspectives on Urban Systems*. Englewood Cliffs, N.J.: Prentice-Hall. Pp 306-394

Ross, N., Houle, C., Dunn, J., and Aye, M. (2004). Dimensions and dynamics of residential segregation by income in urban Canada, 1991-1996. *The Canadian Geographer*, 48 (4), 433-445.

Sampson, R., and Morenoff, J. (1997). *Ecological Perspectives on the Neighborhood Context of Poverty and Social Organization: Past and Present*. In G.J. Duncan, J. Brooks-Gunn, and J. Lawrence Aber (eds.), *Neighborhood Poverty: Context and Consequences for Children, Volume 2 -Conceptual, Methodological, and Policy Approaches to Studying Neighborhoods*. New York: Russell Sage Foundation Press.

Schnore, L.F. (1965). On the spatial structure of cities in the two Americas, in P.M. Hauser and L.F. Schnore (eds.), *The Study of Urbanization*, New York.

Shevky, E., and Bell, W. (1955). *Social Area Analysis*. Stanford: Stanford University Press.

Shevky, E., and Williams, M. (1949). *The Social Areas of Los Angeles: Analysis and Typology*. Westport, Connecticut: Greenwood Press, Publishers.

Soja, E. (2000). *Postmetropolis: Critical Studies of Cities and Regions*. Oxford: Blackwell Publishers, Inc.

Statistics Canada. (2009). History of the Census of Canada. [http://www12.statcan.ca/census-recensement/2006/ref/about-apropos/hist-eng.cfm] Accessed May 5, 2009.

Statistics Canada. (2007). Overview of the Census of Population: Data Quality. [http://www12.statcan.ca/english/census06/reference/dictionary/ovpop7.cfm] Accessed May 6, 2009.

Statistics Canada. (2007). Overview of the Census of Population: Census Geography. [http://www12.statcan.ca/english/census06/reference/dictionary/ovpop6.cfm] Accessed May 5, 2009.

Statistics Canada. (2006). Table 2. Count, percentage distribution and relative ratio of visible minority population, by census metropolitan areas, 2006. [http://www12.statcan.ca/english/census06/analysis/ethnicorigin/tables/table2.htm] Accessed March, 2009.

Taylor, S.M. (1987). *Social Change in Hamilton, 1961-1981*. In M.J. Dear, J.J. Drake, and L.G. Reeds, (eds.), *Steel City: Hamilton and Region*. Toronto: University of Toronto Press.

Timms, D. (1976). *Social Bases to Social Areas*. In D. Herbert and R. Johnston (eds.), *Social Areas in Cities*. Vol 1. London: Wiley. Pp. 19-39.

Timms, D. (1971). *The Urban Mosaic: Towards A Theory of Residential Differentation*. Cambridge: The University Press.

Van Arsdol, Jr, M.D., Camilleri, S.F., and Schmid, C.F. (1958). The Generality of Urban Social Area Indexes. *American Sociological Review*, 23 (8), 277-284.

Walks, A., and Bourne, L. (2006). "Ghettos in Canada's cities? Racial segregation, ethnic enclaves and poverty concentration in Canadian urban areas." *The Canadian Geographer*, 50 (3) 273-297.

Walks, A. (2001). The Social Ecology of the Post-Fordist/Global City? Economic Restructuring and Socio-spatial Polarisation in the Toronto Urban Region. *Urban Studies*, *38* (3), 407-447.

Wyly, E. (1999). Continuity and Change in the Restless Urban Landscape. *Economic Geography*, 75 (4), 309-338.

Zorbaugh, H. (1961). *The Natural Areas of the City*. Pp 45-49 in G. Theodorson (ed.), *Studies in Human Ecology*. New York, Harper & Row.

Zorbaugh, H. (1929). The Gold Coast and the Slum. University of Chicago Press.

APPENDIX DIFFICULTIES OF CENSUS DATA

The gathering of census data is a very difficult task, and strict measures are in place during the collection and processing stages to ensure the data meets high standards. However, it must be noted that there is always a certain measure of error that exists in census data. This degree of error needs to be taken into account when examining and analyzing the data, especially when users attempt to make conclusions based on these figures. The census process involves a number of steps including the production of questionnaires, data collection, and the processing of the material. At any point throughout this procedure, errors can occur. Even when encountering census data representing a 100% basis there remains the possibility of error. There are two different ways errors can arise; randomly, or systematically (Statistics Canada, 2007). Random errors are generally unpredictable in their estimate, however these have a tendency to cancel out with a larger sample size (Statistics Canada, 2007). When dealing with small population counts, extra caution should be used so that one does not misinterpret the data. Systematic errors occur from biased estimates. These errors exist no matter how large a population sample, and so this poses a problem to data users. Five broad types of error can be found in census data: namely, coverage errors, non-response errors, response errors, processing errors and sampling errors.

Coverage errors

The term coverage errors refer to the occurrence of individuals or dwellings that are missed, enumerated incorrectly, or counted more than once. Clearly, these errors

have a profound effect on a specific area's total population, families, households and dwellings. Every single Canadian resident is sought after on Census day by the census staff. They record a list of all dwellings of a particular area, and deliver a census questionnaire to each listed dwelling by an enumerator via mail or drop-off. When dwellings or individuals are missed in the census count, this results in undercoverage. The census staff may miss a dwelling because they misunderstand the boundaries of census units, or the dwelling may be found on a street that is not listed on the census unit map. Other reasons for missing dwellings are that the structure appears to be a single dwelling, when in fact is a multi-dwelling unit, or lastly the enumerator may not deliver a questionnaire to a dwelling which appears to be uninhabited, when in fact it is. In terms of omitting individuals, the respondent may misread the instructions as to who is to be included in the questionnaire, and may not record all of those individuals residing in the dwelling. Likewise it is possible for individuals to be missed if they maintain two dwellings and are not counted in either situation. This type of coverage error is called overrepresentation, and is much less common than undercoverage.

Overcoverage results in either dwellings or individuals that are either enumerated in an incorrect manner, or are double-counted. For example, if a dwelling is uninhabitable but is listed as a dwelling on the census staff area map, this represents a situation that is incorrectly enumerated. Double-counting a dwelling may occur when the boundaries of the geographical area are unclear to the census staff and dwellings are counted as part of two different areas. In terms of overcoverage of a person, this may happen when a dwelling has been double-counted, or if the respondent misunderstands

who is to be included on the questionnaire. Additionally, foreign residents also may be included in the questionnaires when in fact they are not part of the census population. However, overcoverage is not generally as common as undercoverage, and so it should be noted that dwellings and population have a better chance of being somewhat underrepresented. These coverage errors play an important role in census data as they affect the total number of dwellings or population figures.

Non-response errors

Non-response errors occur when responses are not acquired from households or individuals due to an absence or when responses cannot be received from questions within a completed questionnaire. Essentially, the non-response errors influence the characteristics of dwellings and population. It is the goal of the census staff to obtain a completed questionnaire for each household, however there are cases where this is not possible, even when a dwelling is occupied and a questionnaire was distributed. Many times the questionnaire is returned with missing information (of questions and/or individuals), and the census staff attempts to follow-up. However, there are occurrences where follow-up interviews do not yield any responses. In this situation, in the processing stage, the missing responses are eliminated and replaced with a response from a "similar" record. This potentially causes some issues assuming that non-response individuals share similar characteristics of the respondents.

Response errors

Respondents' filling out the questionnaire does not guarantee that the response is accurate. A respondent may easily misinterpret a question, or especially if they are

writing an answer for another member of the household, they may make a guess. These response errors can come from either respondents, or from census representatives if they make a mistake in the recording of specific data.

Processing errors

Census questions that need a written response are given a numeric code during the processing phase. Coding errors can transpire if the written response is vague, incomplete, and difficult to read, or depending on the extensiveness of the code list. There exists a formal quality control operation that is used to identify, correct and reduce the overall number of coding errors. Today, census coding is automated, which has significantly reduced the number of errors in the coding process.

To ensure that a complete database exists, the data is edited through a sequence of computer checks in order to identify either missing or inconsistent replies. As mentioned earlier, these responses are replaced by inference of similar responses or respondents. While errors are likely to emerge in this type of situation, the methods that are implemented have been tested and yield minimal systematic errors.

Sampling errors

Sampling errors arise due to the fact that there is a 20% population sample that is required to fill in the 'long form' provided by Census Canada, and these responses are weighted up to the entire population. However, this is erroneous in that the distribution of the characteristics of the 20% sample is not usually identical to the distribution of characteristics of the entire population had each household responded to the questionnaire separately. The amount of error depends on the size of population characteristics. For
example, a larger cell value allows for a smaller amount of sampling error, while a small cell value yields a larger amount of error related to sampling. Standard error is the term usually associated with the potential error as a result of sampling. The approximate standard error due to sampling for the 2006 Census sample can be found in Table A.1.

Table A.1 Approximate standard error due to sampling for 2006 Census sample data

Cell Value	Approximate standard error
50 or less	15
100	20
200	30
500	45
1,000	65
2,000	90
5,000	140
10,000	200
20,000	280
50,000	450
100,000	630
500,000	1,400

Source: Statistics Canada, 2006

In order to determine the approximate standard of error due to sampling for a cell of data in the census tabulation, the user must select the standard error value that matches the value of the cell. Therefore, the standard error value, disregarding any other form of error, gives a true value that lies within plus or minus three times the standard error (Statistics Canada, 2006). The standard error values only apply to the data that was collected on a 20% random sample basis.

Random Rounding

Random rounding is used for the purpose of maintaining confidentiality preventing the association of data with specific individuals. This type of procedure takes all of its figures (totals and margins) and randomly rounds up or down to fit a multiple of 5, or 10. It must be noted that this does not add significant error to any of the census data. There may be some differences between the totals and margins. Data is also suppressed if values, especially income, are too narrow, or likewise if values are too large relative to the other figures in a specific geographic area.

Area suppression

All data pertaining to the characteristics of individuals in a geographic area is deleted if the size of a population does not meet the requirement. The data from 100% sample is suppressed if the total population of the area is smaller than 40, while a 20% sample of the total non-institutional population of the area is also less than 40. The suppression of data pertaining to income is deleted in areas where the population is smaller than 250 people (excluding institutional residents), from a 100% or if there are under 40 private households in the 20% sample.