

Suburban Immigrant Settlements in Toronto and Transportation Implications

by

Rafael Harun

A thesis
presented to the University of Waterloo
in fulfillment of the
thesis requirement for the degree of
Doctor of Philosophy
in
Planning

Waterloo, Ontario, Canada, 2021

©Rafael Harun 2021

Examining Committee Membership

The following served on the Examining Committee for this thesis. The decision of the Examining Committee is by majority vote.

External Examiner	Carlos Teixeira Professor, University of British Columbia
Supervisor(s)	Pierre Fillion Professor, University of Waterloo
Internal Member	Markus Moos Associate Professor, University of Waterloo
Internal-external Member	Margaret Walton-Roberts Professor, Wilfrid Laurier University
Other Member(s)	Jeremy Pittman Assistant Professor, University of Waterloo

Author's Declaration

This thesis consists of material all of which I authored or co-authored: see Statement of Contributions included in this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Statement of Contributions

This thesis has five chapters, which include three manuscripts. These manuscripts are sequentially presented in Chapter 2, 3, and 4 (as follows). The manuscript presented in Chapter 2 is co-authored with my superior, Dr. Pierre Filion, and committee member, Dr. Markus Moos. The manuscripts presented in Chapter 3 and 4 are co-authored with my supervisor. In all the research articles, the co-authors have offered intellectual insights, feedback and suggestions, and made editorial contributions.

Manuscript 1 (Chapter 2):

Harun, Rafael., Filion, Pierre., and Moos, Markus. (2021). The Immigrant Effect on Commuting Modal Shares: Variation and Consistency across Metropolitan Zones. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*. [accepted with minor revisions]

Manuscript 2 (Chapter 3):

Harun, Rafael., and Filion, Pierre. (2021). Ethnoburb as a Spatiotemporal Process: Its Implications for Immigrant Settlements. *GeoJournal*. <https://doi.org/10.1007/s10708-020-10355-5> [forthcoming]

Manuscript 3 (Chapter 4):

Harun, Rafael., and Filion, Pierre. Immigrant Suburban Settlement Patterns and Transportation Outcomes: Does Neighbourhood Transit Quality Matter? [ready for submission]

Abstract

Immigrants' social and economic conditions and lifestyles are strong determinants of their residential and transportation choices. Existing studies that analyze immigrants' transportation behaviour have predominantly focused on a range of socioeconomic factors, yet, they have not accounted for the impacts that the residential patterns of immigrants may have on transportation outcomes. Understanding the spatial settlement patterns of immigrants is critical for learning their travel patterns. Immigrants substantially differ from non-immigrants in the dynamics of residential and transportation decisions. Also, the choice of commuting modes in immigrant neighbourhoods may vary because of the differences in built environment conditions, access to quality transit, and socioeconomic characteristics of the residents. By investigating the Toronto metropolitan region, this dissertation explores the impacts of immigrants' spatial settlement patterns on their transportation outcomes through three research articles. It makes theoretical and methodological contributions to the immigrant settlement and transportation literature.

The first research article evaluates the inter-metropolitan-zone variations in immigrant-transportation relationships. Spatially explicit regression models are developed for the Toronto census metropolitan area (CMA) and its three metropolitan zones (inner city, inner suburb, and outer suburb). They compare and contrast the associations between the immigrant concentration levels in the census tracts (CTs) and commuting modal shares while controlling for socioeconomic and built environment factors. Results of the models show that immigrants register strong association with transit use at the CMA level and in each metropolitan zone, where the level of the association is much stronger in the suburbs compared to the inner city. This article detects disproportional transit reliance among immigrants in many areas, such as in Toronto's suburbs, that are poorly served by transit, and reflects on the reasons and consequences of the revealed phenomenon. It suggests a demand-driven transit strategy that would involve adjusting services to the higher transit reliance of immigrants. The inter-metropolitan-zone comparison in this article adds a new spatial perspective to the understanding of immigrant-transportation relationships.

The second research article uses the ethnoburb model to explore the spatial evolution patterns of immigrants by investigating the Chinese and South Asians in the Greater Toronto and Hamilton Area (GTHA). It devises a novel approach to evaluate ethnoburbs in a continuum by classifying them into three distinct categories (Nascent, Mature, and Saturated), which can be considered as different stages of ethnoburb development. The assessment of the spatiotemporal changes of the ethnoburb categories demonstrates that the settlement patterns of the immigrants in the suburbs can take different spatial forms depending on the ethnic group under consideration. The article detects a prevalent

tendency among both the Chinese and South Asians to form spatial clusters. It additionally recognizes considerable differences in settlement preferences between the groups through their distinct spatial arrangements. This study methodologically advances the ethnoburb delineation process, and theoretically contributes to ethnoburb and immigrant settlement scholarship by highlighting complexities and uncertainties associated with the spatial evolution of ethnoburbs. The spatial settlement trends for the Chinese and South Asians determined in this research article has contributed towards the identification of settlement locations for the two minority immigrant groups in the third research article.

The third research article compares transportation outcomes relative to the settlements of immigrant groups. Using a series of regression models, it evaluates differences in commuting patterns between the Chinese and South Asian settlements in the suburbs of Toronto metropolitan region and determines the relative influence of the proximity to quality transit on the choice of commuting modes in those areas while controlling for socioeconomic factors. Results from the models show higher transit dependence in the South Asian settlements compared to that of the Chinese. Findings from the study also suggest a stronger influence of socioeconomic factors and employment locations than quality transit on the transportation and residential choices made by immigrant groups. The article manifests unfavourable circumstances for immigrants to use transit in Toronto suburbs by identifying the dissonance among immigrants' settlement patterns, their choice of commuting modes, and current urban planning approaches. The study advances immigrant-transportation scholarship by adding the transit quality dimension and highlighting inter-immigrant-group differences in immigrants' settlement and transportation relationships. It makes methodological contributions as well by introducing a new day-long transit quality index for the Toronto metropolitan region.

As a whole, this dissertation contributes to the understanding of immigrant-transportation relationships and ethnoburb scholarship by i) delineating ethnoburbs using a novel approach and exploring the complexity in their evolution patterns and immigrant settlements more broadly; ii) assessing the spatial dimension to the immigrant-transportation relationships; iii) examining the relative importance of the proximity to quality transit in transportation outcomes in immigrant settlements; and iv) illustrating the urban planning implications of the immigrant settlement and transportation relationships.

Acknowledgements

First and foremost, I would like to thank my supervisor, Dr. Pierre Filion, for his guidance, intellectual insight, and moral support. Thank you for being extremely patient with me, encouraging me, and challenging me to push my ideas and competencies further.

I would also like to thank my dissertation committee members. I am deeply thankful to Dr. Markus Moos for providing the opportunity to collaborate for a part of this research. I have greatly benefited from his scholarly insight, feedback, and advice. My deepest gratitude also goes to Dr. Margaret Walton-Roberts for all the advice and support regarding my academic affairs. I would also like to thank Dr. Jeremy Pittman for thoughtful discussions, comments, and advice.

Special thanks to Ms. Nina Pulvar and Mr. Seth Koplowitz for the continuous and enthusiastic support to improve my writing, and also for being such great friends.

I am grateful to my colleagues and friends, including Dr. Syed Ismail Hussain, Ms. Fatma Kobaner, Dr. Tapan Dhar, Ms. Sara Saboonian, Mr. Pedrum Fard, Mr. Hazem Ahmed, and Dr. Yu Huang, for giving me inspiration, encouragement, and laughter.

I would like to thank my parents for their unconditional love, support, and sacrifices, which have made me the person I am today. Thank you, Dr. Hamida Akhtar Begum, my aunt, my role model. She indeed is the person who has inspired me for an academic career.

Lastly, and most importantly, thank you, Fatima Alhaan (my wife) and Shehzad Harun (my son). This journey would not have been possible to complete without your support and sacrifice. You are my strength, you are my inspiration, and you give meaning to my life.

My apologies, if I have unintentionally missed anyone to acknowledge.

Dedication

To Fatima Alhaan, my wife, who believes in me more than I believe in myself

Table of Contents

Author’s Declaration	iii
Statement of Contributions.....	iv
Abstract	v
Acknowledgements	vii
Dedication	viii
List of Figures	xii
List of Tables.....	xiii
Chapter 1: Introduction	1
1.1 Immigration Trends.....	3
1.2 Immigrant Settlement Models	7
1.2.1 Ethnoburbs: How Different they are from Other Settlements	12
1.2.2 Ethnoburb Delineation Methods	14
1.2.3 Ethnoburbs and Urban Systems	17
1.3 Immigrants and Transportation	21
1.3.1 Immigrants’ Transportation Behaviour	21
1.3.2 Quality of Transportation and Measurements	24
1.4 Dissertation Goal and Objective.....	26
1.5 Research Questions	27
1.6 The Study Area.....	28
1.7 Overview of Methods.....	30
1.7.1 Data	31
1.7.2 Analysis.....	32
1.8 Structure and Contributions of the Dissertation	33
Chapter 2 : The Immigrant Effect on Commuting Modal Shares: Variation and Consistency across Metropolitan Zones	36
2.1 Abstract	36
2.2 Introduction.....	36
2.3 The Suburbanization of Immigration	37
2.4 Travel Patterns of Immigrants.....	38
2.5 Methods.....	40
2.6 The Toronto CMA Context.....	42
2.7 Findings.....	43
2.7.1 Commuting Mode and Housing	43

2.7.2 The Spatial Distribution of Immigrants.....	46
2.7.3 Modal Split by Level of Immigrant Concentration	47
2.7.4 Immigrant Concentration, Socioeconomic Status, and Commuting Modes	49
2.8 Conclusion: The Immigrant Concentration Effect	53
Chapter 3 : Ethnoburb as a Spatiotemporal Process: Its Implications for Immigrant Settlements....	56
3.1 Abstract	56
3.2 Introduction.....	56
3.3 Defining the Ethnoburb Phenomenon	58
3.4 Immigration in Canada and in Toronto	60
3.5 Methodology	62
3.6 Ethnoburb Delineation and Spatiotemporal Changes.....	65
3.7 Transitions Across Ethnoburb Categories.....	71
3.8 Recent Immigrants in Ethnoburbs.....	72
3.9 Ethnoburb Configuration and Evolution	74
Chapter 4 : Immigrant Suburban Settlement Patterns and Transportation Outcomes: Does Neighbourhood Transit Quality Matter?	77
4.1 Abstract	77
4.2 Introduction.....	77
4.3 The Suburbanization of Immigrants and Public Transit Use	79
4.4 The Toronto Urban Region	81
4.5 Methods.....	82
4.5.1 Measuring Transit Quality and Determining its Association with the Residential and Modal Choice of Immigrants	82
4.5.2 Exploring the Spatial Settlements of Chinese and South Asian Immigrants.....	85
4.5.3 Evaluating Transit Quality and Modal Share Relative to Chinese and South Asian Immigrant Concentrations.....	85
4.6 Transit Quality, Modal Choice and Immigrants.....	86
4.6.1 Immigrant Concentration and Transit Quality	86
4.6.2 Transit Quality, Immigrant Concentration and Journey Mode.....	88
4.7 Chinese and South Asian Immigrants’ Residential Patterns	90
4.8 Transit Quality, Modal Choice and Concentrations of Chinese and South Asian Immigrants	92
4.9 Discussion: Limited Attraction to, and Impact of, Transit Quality Among Immigrants.....	95
Chapter 5 : Conclusion.....	97
5.1 Key Findings	97

5.2 Contributions.....	99
5.2.1 Immigrant Transportation Literature.....	101
5.2.2 Immigrant Settlement Literature.....	103
5.2.3 Urban Planning Policy.....	104
5.3 Limitations.....	105
5.4 Future Research.....	106
5.4.1 Negotiations of Immigrants’ Residential and Transportation Choices.....	107
5.4.2 People- and Place-based Research.....	107
5.4.3 Policy-Oriented Research.....	108
5.4.4 Ethnoburb Evolutions amid Immigration Policy Changes.....	109
5.5 Conclusion.....	109
References.....	111

List of Figures

<i>Figure 1.1: Immigration Trends in Canada (figure adopted from Statistics Canada (2018) and modified)</i>	5
<i>Figure 1.2: Ethnic Trends of the Immigrant Population (figure adopted from Statistics Canada (2018) and modified).....</i>	5
<i>Figure 1.3: Research Domains and Objectives.....</i>	26
<i>Figure 1.4: Immigrants in the Cities of Toronto</i>	28
<i>Figure 2.1: Municipal Concentric Zones of Toronto CMA.....</i>	42
<i>Figure 2.2: Commuting Mode by the Length of Stay of Immigrants in Canada</i>	44
<i>Figure 2.3: Ratio of Immigrants’ Commuting Mode Shares to the Total Population.....</i>	45
<i>Figure 2.4: Distribution of Immigrants in Toronto CMA</i>	47
<i>Figure 2.5: Relationship between Car Use and Distance from CBD for CTs with Different Concentrations of Immigrants.....</i>	49
<i>Figure 2.6: Mean Difference in Distances from CT Centroids to the Nearest Transit Stop Relative to Metropolitan Average</i>	52
<i>Figure 3.1: The Study Area- Greater Toronto and Hamilton Area (GTHA)</i>	63
<i>Figure 3. 2: Spatial Distribution of Chinese Ethnoburb CTs</i>	68
<i>Figure 3. 3: Spatial Distribution of South Asian Ethnoburb CTs</i>	69
<i>Figure 4.1: The Study Area – Toronto Census Metropolitan Area (CMA).....</i>	81
<i>Figure 4.2: Employment by Industry.....</i>	89
<i>Figure 4.3: Concentrations of Chinese and South Asian Immigrants.....</i>	91
<i>Figure 4.4: Quality Transit in Medium and High Concentration Immigrant Neighbourhoods.....</i>	91

List of Tables

<i>Table 1.1: Immigrant Settlement Models, Spatial Outcomes, and Characteristics of the Settlement Outcomes (partly adopted from (Li, 1998b))</i>	8
<i>Table 1.2: Dissertation Chapters and the Objectives Achieved</i>	34
<i>Table 2.1: Distribution of Immigrants Across Metropolitan Zones</i>	46
<i>Table 2.2: Compositions of Census Tracts and their Distribution of Immigrants within each Concentric Zone, 2016</i>	46
<i>Table 2.3: Commuting Modal Shares by Immigrant Concentration of Tracts in Each Concentric Zone</i>	48
<i>Table 2.4: Transportation and Socioeconomic Correlates of Immigrant Concentrations</i>	50
<i>Table 3.1: Definitions of the Three Categories of Ethnoburb Census Tracts (ECTs)</i>	65
<i>Table 3.2: Composition of the Ethnic Groups Living in Ethnoburbs Relative to their Total Population in the GTHA</i>	66
<i>Table 3.3: Composition of Ethnoburbs</i>	67
<i>Table 3.4: Transitions Across Ethnoburb Categories (Relative to the Totals in 2016)</i>	72
<i>Table 3.5: Propensity of Recent Immigrants Living in Ethnoburb CTs (Difference in Mean LQ) ...</i>	73
<i>Table 4.1: Transit Quality in Metropolitan Zones and Municipalities in Toronto</i>	84
<i>Table 4.2: Association of Non-Immigrants and Immigrants with Transit Quality (Standardized Coefficients)</i>	87
<i>Table 4.3: Association of South Asian and Chinese Immigrants with Transit Quality (Standardized Coefficients)</i>	87
<i>Table 4.4: Correlation Analysis of Transit Quality with Transportation Modes</i>	88
<i>Table 4.5: Differences in Transportation Patterns of Chinese and South Asian Immigrant Neighbourhoods (Standardized Coefficients)</i>	88
<i>Table 4.6: Commuting Modal Shares in Toronto Suburbs and in the Chinese and South Asian Suburban Neighbourhoods (Standardized Coefficients)</i>	93
<i>Table 5.1: Contributions of the Dissertation</i>	100

Chapter 1: Introduction

Immigration is changing Canada's demographics. The point-based immigration system in Canada, introduced in the late 1960s, has generated a wide array of opportunities for people originating from diverse ethnic background and country of origin. Whereas historically it has long been people of European descent who represented the majority of the immigrant population in Canada, in more recent years there has been a notable shift toward new immigrants originating largely from Asia. This more recent change has led to an increase in the ethnic diversity of immigrants to Canada (Morency, Malenfant, & MacIsaac, 2017; Statistics Canada, 2013). Further increase in immigration volume, as well as its ethnic diversity are expected, since a minimum annual intake of 300,000 new immigrants are recommended to maintain the population and economic growth of the country, and a vast majority of these new immigrants are expected likely to stem from Asia (El-Assal & Fields, 2017).

Contemporary immigrants have gravitated toward the suburban lifestyle, due to suburban areas often comprising the overwhelming majority of urban population and economic activities (Gordon & Janzen, 2013). Immigrants largely benefit from the lower housing costs, coupled with larger dwelling size, as well as proximity to a growing job pool in the suburbs (Bascaramurty, 2013; Behrens & Köhl, 2011). As a result, unlike past immigrant settlement trends (where immigrants traditionally oriented toward settlement in the inner city), newer waves of immigrants to Canada are forming co-ethnic spatial clusters in peripheral municipalities (Wang & Zhong, 2013). These clusters often develop into complete ethnic communities, containing a wide range of ethnic businesses, services, and institutions that share a strong unifying cultural identity (Wang & Zhong, 2013; Zhuang & Chen, 2016). This growth phenomenon increases the desirability of such locations to additional new immigrants, which in turn results in these ethnic residential clusters to intensify and spatially expand.

The suburban areas where new immigrant ethnic clusters often emerge tend to offer limited transportation options, due to lower-density morphology being ill-suited for transit development (Moos, Woodside, Vinodrai, & Yan, 2018). Transportation options tend to rapidly decline from the inner city to the suburbs of major metropolitan regions like Toronto (Lo, Shalaby, & Alshalalfeh, 2011). In Toronto, within the inner city there are multiple transportation options, including subways, streetcars, local buses, as well as Government of Ontario (GO) transits that connect the inner city to the suburbs and vice versa. In contrast, the suburbs are mostly served by skeleton bus services that often offer lower service frequency and general interconnectivity rates. Hence, cars remain the primary mode of transportation for suburban residents, immigrants and non-immigrants alike.

Transportation usage patterns for immigrants is substantially different from non-immigrants, with the former group having notably higher transit use, greater tendency to carpool, less reliance on cars, and also travelling shorter distances (Blumenberg, 2009; Blumenberg & Song, 2008; Heisz & Schellenberg, 2004; Newbold, Scott, & Burke, 2017). The high rate of transit dependency among immigrants is seemingly incongruent with their tendency to orient to suburban residence, due to the limited transportation options available in the suburban environment. Only a handful of studies have considered immigrant settlement patterns as a means of understanding immigrant travel trends (Lo et al., 2011). Hence, it is relatively unknown if the transit dependency that immigrants exhibit, or their overall transportation behavioural patterns, vary relative to the geographic locations of immigrant residences.

Understanding the spatial context of immigrant's transportation behaviour is important for urban planning purposes. Transportation planning approaches promoted automobile use and heavily reinforced suburban growth in the post-war era. However, at present, in the wake of a much greater environmental awareness, the role which transportation plays in achieving urban sustainability is understood to be much greater (Cervero, 2009; Filion, Bunting, Pavlic, & Langlois, 2010). Contemporary urban planning practice tends to focus more heavily on transit-oriented compact developments that is believed to favour public transit use and reduce automobile dependency (Filion & Kramer, 2012). In keeping with this trend, in Canada, the provincial government of Ontario has initiated projects to expand transit services beyond the inner city to the suburbs, and also increased the frequency of transit services to better meet the needs of residents, immigrants and non-immigrants alike (Metrolinx, 2018c). However, merely increasing expansion on its own does not guarantee transit use, as the utilization of the transit system is also influenced by variables pertaining to the built environment, and the socioeconomic characteristics and individual preferences of commuters (Biggar & Ardoin, 2017; Burian, Zajíčková, Ivan, & Macků, 2018; Ewing & Cervero, 2010; Martin et al., 2016). As the manner in which immigrants negotiate their residential and transportation choices is substantially different from that of non-immigrants, so too it would also seem likely that existing urban planning approaches will also affect immigrants differently from non-immigrants. As such, further evaluation of immigrants' spatial settlement and their social dynamics are paramount to transportation planning, or any urban planning endeavor which strives for urban sustainability.

Canada, the Toronto metropolitan region in particular, is ideal for research in this area, given the large immigrant populations and diverse land-use and transportation patterns. As of 2016, the total number of immigrants residing in Canada was 7.5 million, which represented 21.9 percent of the country's total population (Statistics Canada, 2019b). This significant number reflects an increase of nearly 1.4 million immigrants who arrived exclusively between 2006 and 2016. Half of this

population resided in Ontario, especially in the Greater Toronto and Hamilton Area (GTHA), which is the largest urban region of Canada. Those immigrants orienting toward this region are ethnically diverse and increasingly settling in the suburbs, forming ethnic communities such as ethnoburbs (Hiebert, 2015; Li, 2009d; Lo et al., 2011). Meanwhile, the metropolitan region exhibits considerable spatial variations in land-use and transportation patterns. While the inner city is mostly high-density and transit dependent, the suburbs, on the other hand, are comprised of low-density developments and register high individual car usage (Harun, Fillion, & Moos, 2021).

This dissertation evaluates transportation implications of immigrant settlements in the Toronto metropolitan region by focusing on the immigrant population in general and also on the Chinese and South Asians, who represent the majority of contemporary immigrants in the area. It explores evolutions in the spatial settlement patterns of immigrants and also investigates plausible spatial variations in immigrant-transportation relationships while considering immigrants' residential locations. The research additionally evaluates the effect of proximity to quality transit on the residential and transportation choices that immigrants make. Findings from this dissertation detect considerable complexity and uncertainty in the spatial evolution patterns of immigrant groups, as well as in the immigrant-transportation relationship. They also point to a lack of influence of proximity to quality transit on immigrants' choice of residential locations and commuting modes. Overall, the dissertation detects incongruence among immigrants' residential settlement patterns, their travel behaviour, and existing urban planning approaches in Toronto.

The remaining part of the introduction is organized as follows. I have provided a brief overview of literature on three research domains addressed in this dissertation: immigrant settlement, immigrant commuting patterns, and transportation infrastructure. To address the caveats in existing literature, the objectives of the dissertation and the research questions are laid out. I have then provided a context of the study area and an overview of the methods applied in this dissertation. Finally, additional details of the structure of this dissertation are provided, where I have summarized expectations from each chapter and the contributions they make.

1.1 Immigration Trends

The present degree of immigrant diversity that exists in many North American cities stems from a legacy of historical changes in government immigration policies. As Canada's immigration process was heavily influenced by country-of-origin criteria and racially discriminatory motivations, it adhered to the human capital model in the late 1960s (Siemiatycki, 2011). The promulgation of the Immigration Act in the 1960s eradicated the earlier bias towards European countries of origin, and the determination for granting immigration entry to Canada shifted to focusing on the individual

competencies of applicants, without prioritizing ethnic preference specifically. The point-based immigration system introduced in 1967 evaluated applicants based on their age, education, language abilities, and job skills. Modifications have been made to the system since then to increase the efficiency of the immigration process.

In 2015, Canada launched the Express Entry system that sought to manage immigration application in two stages. First, based on certain criteria, applicants have to meet the requirements of one of three economic immigration programs – the Federal Skilled Worker Program, the Federal Skilled Trades Program, and the Canadian Experience class (Library of Congress, 2020). Once applicants meet the eligibility criteria in any of the three programs, they are entered into a common Express Entry pool of candidates, where their immigration eligibility criteria is ranked against each other immigrant applicants using a Comprehensive Ranking System (CRS). The Government of Canada sets a CRS cut-off point, and only the candidates who survive the elimination stage are invited to initiate application for permanent residence. The applications are re-evaluated against certain eligibility criteria and those applicants deemed satisfactory are then granted permanent residence. Canada also has a Family Reunification Program in place, which is designed to unite the immediate family members of immigrants including spouses and common-law partners, dependent children, and parents and grandparents (even non-immediate family members under certain circumstances). Another source of immigrants coming to Canada stems from “business class immigration” which was introduced in 1978, and later modified, to attract entrepreneurs, investors, and self-employed groups for strengthening the economic component of immigration (Reitz, 1998). Since 2014, applicants, who are interested in setting up businesses and making investments in Canada, are granted immigration under any of the three Business Investment Program (BIP) classes: Investor (IN), Self-employed person (SE), and Entrepreneur (EN) (CIC, 2014).

With one in five people born outside of the country, Canada, after Australia, has the highest immigrant-to-total population ratio among G7 countries including the US and UK (Morency et al., 2017). As of 2016, more than seven million immigrants resided in the country, representing 21.9 percent of the total population – about a threefold increase since 1961 (Figure 1.1). The rate of increase in the immigrant population has been significant in the last few decades. In the 30 years between 1961 and 1991, the number of immigrants to Canada increased by 1.4 million, whereas it took only 15 years (1996 to 2015) to reach 3.1 million. It is projected that increasing the immigration rate to 1 percent of the population by 2030 (up from 0.8 percent in 2017), will mitigate Canada’s domestic challenges pertaining to an ageing population and declining birth rate, as well as substantially boost the annual GDP growth (El-Assal & Fields, 2018). Therefore, substantial growth

in the percentage of the Canadian population which is foreign-born is expected to continue in the coming decades (El-Assal & Fields, 2017).

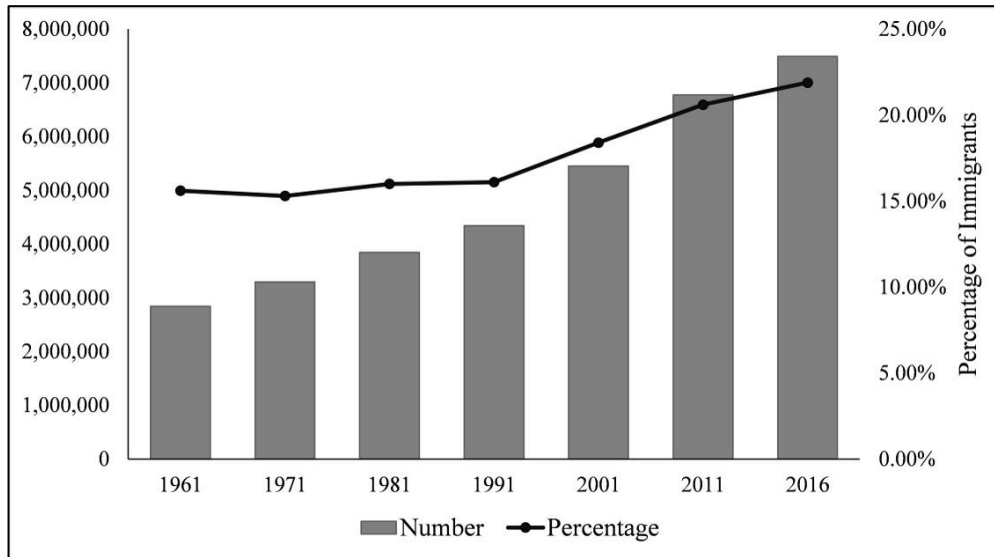


Figure 1.1: Immigration Trends in Canada (figure adopted from Statistics Canada (2018) and Modified)

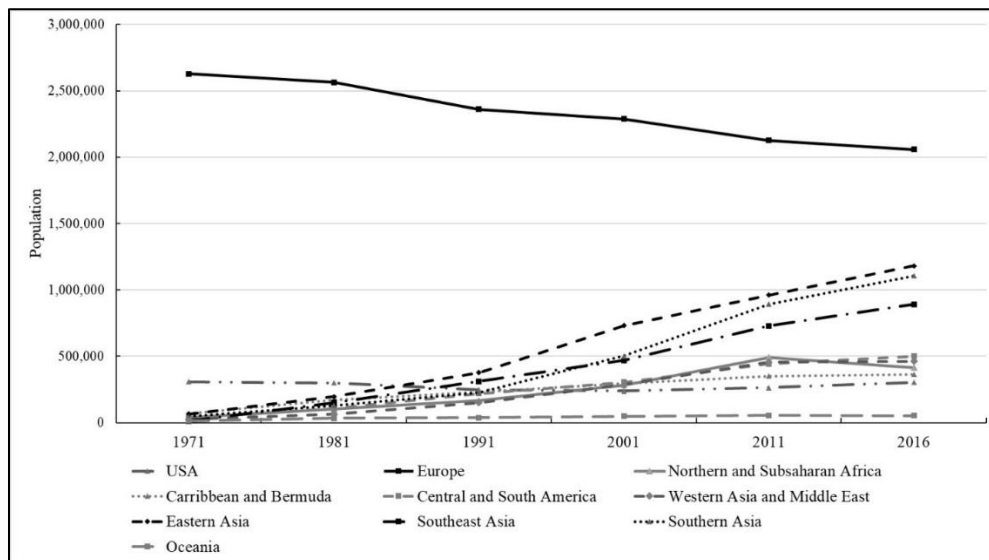


Figure 1.2: Ethnic Trends of the Immigrant Population (figure adopted from Statistics Canada (2018) and modified)

Even though Europeans comprise the majority of the total number of immigrants to Canada, their numbers have been gradually declining, and in fact, during recent years there has been a much greater percentage of ethnic diversity among individuals immigrating to Canada. As shown in Figure

1.2, European immigrants demonstrated a declining trend between 1991 and 2015, yet during the same period, East, Southeast and Southern Asians increased between 2 percent to 4 percent annually. The total number of East Asian immigrants has been the greatest, followed by somewhat smaller numbers of Southern and Southeast Asians. In 2016, the top ten countries from where the majority of immigrants came to Canada were: India (8.9 percent), China (8.6 percent), Philippines (7.8 percent), United Kingdom (6.6 percent), United States (3.4 percent), Italy (3.1 percent), Hong Kong (2.8 percent), Pakistan (2.7 percent), Vietnam (2.2 percent), and Iran (2.0 percent) (Statistics Canada, 2019a). India, China, and Philippines together represented 40 percent of immigrants that arrived between 2011 and 2016 in Canada. Ethnic diversity among new immigrants to Canada is expected to further increase as it is projected that the share of Asian immigrants will reach 57 percent by 2036 (up from 44.8 percent in 2011), whereas immigrants originating in European countries will decline to about 17.8 percent (down from 31.6 percent in 2011) (Morency et al., 2017).

Canadian immigrants are unevenly distributed across the country, with more than half having settled in Ontario, followed by notably smaller amounts having oriented toward British Columbia (17.1 percent) and Quebec (14.5 percent) (Statistics Canada, 2019c). It is in three major Canadian urban centres – Toronto (35.9 percent), Montreal (12.4 percent), and Vancouver (13.1 percent) – where more than 60 percent of immigrants reside (Statistics Canada, 2019c).

As previously noted, it is in the suburbs where immigrant population predominantly congregate (Lo, 2006; Lo et al., 2011; Lo, Wang, Wang, & Yinhan, 2007; Wang & Zhong, 2013). As is the case elsewhere in the world in most global cities, within the Canadian context more specifically, new immigrants are settling in municipalities which are peripheral to large urban centres, and hence avoiding their traditional inner-city gateways (Alba, Logan, Stults, Marzan, & Zhang, 2016; Kivisto, 2017; Li, 2009a; Li, Skop, & Yu, 2016). This suburbanization trend is equally observed among both immigrants who are more established, as well as those who have arrived more recently. In Toronto, the proportion of established immigrants residing in suburban areas increased from 42 percent to 52 percent between 2001 and 2011, and during the same period, the proportion of recent immigrants increased from 32 percent to 42 percent (Vézina & Houle, 2017). A similar increase in the share of both established and recent immigrants was seen in Montreal and Vancouver as well (Vézina & Houle, 2017). Although the established immigrants are expected to suburbanize as per the assimilation theory (Massey & Denton, 1985), the vast increase of specifically more recent immigrants in the peripheral municipalities certainly supports a paradigm shift toward greater focus on suburban settlement (as opposed to urban core) by immigrant populations.

The pattern of immigrant suburbanization has led to the emergence of fully functional ethnic communities in suburbs consisting of ethnic businesses, services, and institutions (Wang & Zhong,

2013). For this reason, new immigrants are often attracted to these places. It is important to note however that there are inter-ethnic differences between various immigrant groups with respect to residential area preferences, specific wants and needs associated with residential area choice, as well as differing socioeconomic circumstances (Hiebert, 1999, 2000). As a result of these differences, immigrant groups are found forming spatial clusters in distinct geographic locations (Wang & Zhong, 2013). Spatial arrangement of immigrant groups certainly affects the functionality of urban areas – a phenomenon that has enhanced interests among urban scholars to study immigrant settlement patterns and assess the consequences on urban forms (Lo et al., 2011; Zhuang, 2013; Zhuang & Chen, 2016).

1.2 Immigrant Settlement Models

Residential settlement patterns for immigrants follow an array of pathways based on their social norms and economic circumstances. Through exploring the interactions immigrants have with broader society, many models have emerged to explain spatial settlement patterns of minority groups in the last hundred years. Place stratification, spatial assimilation, and ethnic community are among the major models that establish the social and spatial nexus among immigrants. In this section, I will briefly describe these models and their corresponding spatial outcomes. The key concept of the models, along with fundamental characteristics of the associated settlement outcomes are summarized in Table 1.1.

The place stratification model views residential arrangement of immigrants as the de facto and de jure outcomes of prejudice and discrimination by the charter group (mostly the White people who constitute the majority). It manifests a hierarchical difference between the non-minority and minority groups and explains how the powerful group manipulates space to segregate the immigrants both physically and socially (Alba & Logan, 1993; Pais, South, & Crowder, 2012). Because Whites generally possess racial superiority in the social order, minority immigrants have been restricted from sharing neighbourhoods with them. The discrimination toward immigrants attributable to this model is entirely based on race-related variables, and even socioeconomic circumstances have lower importance. This blatant discrepancy is highlighted by the notion that the member of the charter group with the lowest socioeconomic status was considered to have a higher rank in society than a member of a minority group with the highest socio-economic resources. This discrimination was often manifested through government and financial institutions in their forming policies and strategies which restricted the social and physical mobility of immigrant groups. For example, during the construction of the Canadian Pacific Railway, many Chinese who worked on the project were forced to settle in inexpensive and dilapidated areas by introducing restrictions on the selling and renting of

properties (Chan, 2012). The result of such segregation was the formation of ghettos found in many metropolitan regions.

Table 1.1: Immigrant Settlement Models, Spatial Outcomes, and Characteristics of the Settlement Outcomes (partly adopted from (Li, 1998b))

	Model Feature	Spatial Outcome	Characteristics of the Settlements
Place Stratification	Systematic deprivation of immigrants based on prejudice and discrimination	Ghetto	<ul style="list-style-type: none"> • Demographically homogenous • Minimal internal stratification • Located in the inner city • Few ethnically owned businesses • Interacts mainly within group
Spatial Assimilation	Associates spatial outcome with socioeconomic mobility of immigrants. It considers that the spatial and social integration of immigrants into the charter society is their final goal.	Enclave	<ul style="list-style-type: none"> • Demographically, one ethnic group comprise the majority • Not much internal stratification • Located both in the inner city and suburb • Economy is biased towards services and labour-intensive sectors • Interacts mainly within group
Ethnic Community	Founded on the notion of voluntarism. It considers that immigrants are resourceful, and they negotiate residential locations based on individual preference, not being constrained by any prejudice or discrimination.	Ethnoburb	<ul style="list-style-type: none"> • Demographically heterogenous • High in internal stratification • Located only in the suburbs • Ethnically owned businesses of all kinds • Interaction is both within and among different groups • Businesses and families have transnational linkages

Ghettos are ethnically homogeneous and geographically restricted, and possess a strong cultural identity that is often defined externally by the majority groups in a particular society (Kaplan, 2018a, 50). The traditional Chinatowns seen in many global cities are de facto creations of discriminatory policies. However, ghettos are considered non-existent in Canada because systematic discrimination of minorities based on race and socioeconomic status is relatively uncommon in the country (Walks & Bourne, 2006).

The second model, spatial assimilation, views immigrants' integration into the mainstream society as being related to the length of stay in a host country, as well as one's socioeconomic mobility. This model is rooted in the century-old theory of assimilation. Based on the study of

immigrants in the Chicago metropolitan area in the 1920s, Park & Burgess (1925) postulated a linear trajectory for the process of immigrant assimilation. They found that new immigrants who were of an ethnic minority background, tended to initially reside in the more economically disadvantaged neighbourhoods of the inner city, closer to where other members of the same ethnic group were already residing. They then tended to move to the suburbs and assimilate with the non-minority group upon gaining socioeconomic momentum. Spatial assimilation theory further highlights the central role of space in this process. The theory postulates that residential integration is the most important outcome of the socioeconomic advancement for immigrants (Massey & Denton, 1985, p. 94). Since the neighbourhoods where non-minority groups commonly live offer better amenities and improved lifestyle, they are indeed the end goal that immigrants' typically strive toward, and which are congruent with their socio-economic achievements. Hence, according to the spatial assimilation model, two types of immigrant neighbourhoods are found in urban forms: i) neighbourhoods where immigrants of high socioeconomic status share space with members of the host society; ii) neighbourhoods where immigrants of low socioeconomic status reside further away from the members of the host society (Fong & Berry, 2017, 13). The latter kind of neighbourhoods are commonly referred to as enclaves.

Enclaves are immigrant settlements containing a high concentration of immigrants, mostly from one ethnic group, with relatively low socioeconomic status. Additionally, the locations where such ethnic enclaves exist are themselves less desirable to live in with respect to the standards determined by mainstream society (Logan, Alba, & Zhang, 2002, p. 300). Due to a tendency for there to be a domination of one ethnic group per such residential area, enclave neighbourhoods register low ethnic diversity and the residents consequently have limited opportunity to interact with other ethnic groups (Kaplan, 2018; Kataure & Walton-Roberts, 2015). Substantial growth of ethnic businesses, services, and institutions often develop in enclaves primarily to serve the dominant ethnic minority community (Qadeer, Agrawal, & Lovell, 2010). However, unlike ghettos, enclaves are dynamic and can evolve both demographically and spatially (Kaplan, 2018; Terzano, 2016). Research has detected that unlike traditional enclaves, the contemporary enclaves tend to have a more diverse composition of ethnic groups and are home of both first and subsequent generations of immigrants (Kataure & Walton-Roberts, 2015; Murdie & Teixeira, 2011; Terzano, 2016). Also, historically, enclaves appeared only in the inner city, whereas, they have matured in the suburbs in more recent years due to notable increases in real estate value over time, and the parallel decline in the availability of affordable housing within the inner city (Li, 2006a). Regardless of all these changes that have materialized in enclaves over the years, one fundamental characteristic that has consistently defined

the uniqueness of the immigrant settlement form is the demographic homogeneity which results from the dominance of a single ethnic group.

Whereas the spatial assimilation model primarily focuses on discrimination that minority groups experience in relation to social and economic conditions, the ethnic community model is more concerned with the notion of 'voluntarism'. As part of this construct, ethnic communities are understood to be formed based on individual preferences, as opposed to broader economic necessity or structural and cultural constraints. Motivation for establishing ethnic communities may sometimes also stem from the desire to create neighbourhoods which symbolically represent and sustain ethnic identity (Logan et al., 2002, p. 300). Globalization and changes to immigration policies in both local and global contexts, have paved the way for well-educated and skilled immigrants from diverse origins to settle in many global cities (Li, 2009c). Because of their market resources, in more recent years, ethnic minority immigrants have greater options for making residential choices, as compared to their earlier counterparts (Wen, Lauderdale, & Kandula, 2009). They are equally likely to congregate near other members of the same ethnic group, or to live in more diverse neighbourhoods that have a negligible minority population. However, it is the proximity to co-ethnics that has dominated the spatial arrangement of immigrant groups even in light of the ethnic community model (Skop & Li, 2010; Wang & Zhong, 2013). In this regard, the ethnic community model intersects with the resurgent ethnicity theory that postulates little gain from living near Whites and more from spatial integration with co-ethnic population through creating spaces and hubs for thriving ethnic business and increasing social capital (Walton, 2015). Even when the immigrants congregate with co-ethnic population, as per the ethnic community model, they are integral to the mainstream economy and society.

Ethnoburbs (or ethnic suburbs) emerged as a form of new immigrant settlement under the auspices of the ethnic community model. Ethnoburbs are defined as multi-ethnic suburbs where one ethnic group resides is a sizeable proportion of the population without necessarily forming the majority (Li, 1998b). Ethnoburbs are fully functional communities with exclusive socio-economic structures, are integrated within mainstream society, and have transnational linkages (Li, 1998a, 2009b). They include a strong presence of ethnic businesses, services, and institutions, which benefit the ethnic community specifically, as well as society more broadly (Li, 2005).

The formation of ethnoburbs is often linked with changes in immigration policies to accommodate economic restructuring and globalization of capital and personal flows (Li 2009b). The transition of immigration policies in Canada from country-based-criteria to the human-capital model not only created immigration opportunities for the educated and skilled global workforce but also attracted investments from wealthy immigrant businesspeople. The country introduced Business

Immigration Programs (BIP) to attract investors, entrepreneurs, and self-employed immigrants to boost its economic growth (CIC, 2014). Immigrants arriving in Canada under the BIP have primarily invested in the real estate sector, and have also established service-oriented businesses, including medical clinics, dentistry, restaurants, travel agency, beauty salon, and barbers (Li, 1998c). These businesses targeting immigrant population mostly appeared in those suburban locations where the immigrants were present in considerable amounts. The presence of ethnic businesses, as well as co-ethnic population, in such suburbs, have attracted new immigrants, which caused ethnoburbs to form, mature, and spatially diffuse (Li 2009b).

Conceptually, it is the demographic and socioeconomic stratification of ethnoburbs that define their uniqueness as an immigrant settlement form (Slattery, 2012). The ethnic diversity in ethnoburbs stems primarily from the fact that they comprise a mix of multiple ethnic groups given that no individual minority group commonly dominates the settlement form. Additionally, the socioeconomic continuum that exists in ethnoburbs stems from the fact that both owners and employees of ethnic businesses all reside in such neighbourhoods (Li, 1998b). Since ethnoburbs are often formed in more desirable suburbs, unlike ghettos or enclaves, they often serve as both the initial and final destination for immigrants. Moreover, the families as well as the businesses found in ethnoburbs have strong transnational ties, which is also considered an important characteristic of the settlement form.

Other concepts, such as “invisiburb” and “ethno-faith-burbs”, have emerged following the establishment of the ethnic community model, and these concepts are nonetheless derivatives of ethnoburbs (Skop, 2002; Skop & Li, 2010). The term “invisiburb” was coined to explain immigrant settlements where an immigrant minority group residing in a particular neighbourhood fails to register ethnic identity or association, even though they may be present in a considerable number or proportion of the total neighbourhood population (Skop, 2002; Skop & Li, 2010). One explanation for this phenomenon is that it is possible that immigrants will register their ethnic signature in these neighbourhoods only once they attain an even higher concentration level. From this perspective, invisiburbs can be viewed as ethnoburbs that await maturation. Meanwhile, scholars have introduced new concepts associating the formation of ethnoburbs with some common cultural thread. Muñoz’s (2011) “ethno-faith-burbs” concept arose as a means of helping to explain the suburban clusters of ethnically Indian populations based on religious affiliation. A similar observation was made by Phillips (2016), based on the Jewish population in Los Angeles, California. Nonetheless, it is the ethnoburb model which has gained utmost acceptance among scholars for its appropriateness in explaining contemporary immigrant settlement dynamics. In this dissertation, I have used the ethnoburb model as a means of evaluating immigrant settlements.

1.2.1 Ethnoburbs: How Different they are from Other Settlements

Ethnoburb is a contextual model derived based on the study of the settlement of the Chinese immigrants in the San Gabriel Valley in Los Angeles, California (Li, 1998a). Wei Li observed that the recent Chinese immigrants were more skilled and affluent than their earlier counterparts, and they tend to settle directly in the suburbs while avoiding the inner city, which traditionally had been the initial settlement zone for immigrants upon entry into the host country. This paradigm shift, and thereby, the formation of ethnoburbs is the result of the changes in global and local policies as well as the post-Fordist economic restructuring (Li, 2009b). Since these neighbourhoods were desirable suburbs offering improved amenities and quality of life to begin with, as well as considerable growth of ethnic businesses, services, and institutions, new immigrants were attracted to the neighbourhoods or places in the vicinity, causing ethnoburbs to grow and spatially diffuse (Li, 1998b; Wang, 2012).

Ethnoburbs may appear similar to other forms of immigrant settlement such as enclaves, but the two differ in a number of ways. For instance, the construct of power dynamics is indeed a key factor that differentiates ethnoburbs and enclaves. The formation of enclaves is influenced by discriminatory limitations which create compact clusters of economically constrained immigrant populations (Logan, Zhang, & Alba, 2002). Enclaves are considered an initial stage of immigrant settlement, as minorities often subsequently move to the suburbs and assimilate with non-minority populations upon gaining further socioeconomic momentum. In contrast, ethnoburbs are both the initial and final destination for immigrant groups. Those immigrants residing in ethnoburbs are generally more educated, more skilled, and more affluent as well, which leads to their selection of residential location being motivated by individual preferences to a greater extent, and less influenced by other constraints (Kaplan, 2018; Li, 1998b).

In addition, the concept of enclave is founded on segregation from other sub-population groups, while that of ethnoburbs is based on greater integration within a given society. Enclaves appear as segregated neighbourhoods dominated by one ethnic group bearing monocultural identity (Qadeer et al., 2010). On the other hand, the concept of ethnoburb is founded on mix. That ethnoburbs are defined as settlements where no single ethnic group necessarily constitute the majority highlights the fact that ethnoburbs are ethnically diverse. Such ethnic diversity was evident in the Chinese ethnoburbs delineated in Toronto since those neighbourhoods had considerable presence of other ethnic groups as well (Wang & Zhong, 2013). The demarcation of enclaves and ethnoburbs based on diversity was apparent in Johnston, Paulsen, & Forrest's (2008) neighbourhood classification system, where the areas bearing high ethnic diversity were regarded as 'ethnoburbs' and the ones that were more homogenous were identified as 'enclaves'.

Diversity in ethnoburbs is not only limited to ethnicity but includes socioeconomic variables as well. Ethnoburbs are home to both economically prosperous and disadvantaged minority populations alike (Li, 1998b). Minorities employed in the ethnically owned businesses located in ethnoburbs often find houses within the same ethnoburb or in a nearby vicinity. As a result, both owners and employees of these businesses are often found sharing the same neighbourhood. It is also true that many minority immigrants who live in ethnoburbs often find jobs in mainstream businesses that are often located away from their residences. In such circumstances, since immigrants generally ponder proximity to their co-ethnics, they often prefer residing in the ethnoburbs and work elsewhere by trading off with longer commutes to work. These circumstances culminate in increasing both socioeconomic and occupational diversity in ethnoburbs.

One of the most significant differences between enclaves and ethnoburbs is the degree to which transnationalism is present in one as compared to the other. Immigrants living in ethnoburbs often continue to retain a strong connection with their country of origin, both in terms of economic activities and family ties. For instance, many Chinese seeking political stability and economic security immigrate to North American countries and expand their businesses by investing in real estate, developing retail and services, purchasing properties, and establishing branches of international conglomerates that are based in their country of origin (Preston, Kobayashi, & Siemiatycki, 2006, p. 93). Such immigrants sometimes lack proficiency in the official language of the host country. However, the language barrier is hardly an impediment to their settlement process, because, establishing transnational businesses and gaining legal rights to reside in the country are the primary objectives of those immigrants, and integrating into the host society is a low priority (Li, 2005). Meanwhile, many immigrant families are found in ethnoburbs, in which the male member usually lives and works either in the country of origin or abroad elsewhere, and provides financial support to the rest of the family members who reside in the host country (Li, 2005; Waters, 2003). Thus, families composed of only the wife and kids are commonly witnessed in ethnoburbs. These types of transnational families are often regarded as “astronaut families” (Zhou et. al, 2019). This phenomenon is significant enough to become an identification term for neighbourhoods that exist in metropolitan regions. For example, in Toronto, there are neighbourhoods called “Begum Para”, where the male member of the household lives abroad while the women reside alone in Canada, sometimes with kids (Aulakh, 2011). While transnational linkages may have some advantages for ethnoburbs, they may also cause ethnoburbs to potentially dissipate through an increased tendency toward return migration (Ghosh, 2007).

Indeed, differences between enclaves and ethnoburbs are converging rapidly. Since enclaves are rapidly growing in the suburbs, contrasting enclaves and ethnoburbs based on the notion that enclaves will appear only in the inner city while ethnoburbs in the suburbs, is no longer valid (Qadeer et al., 2010). In addition, as previously mentioned, contemporary enclaves are much more ethnically diverse than their earlier counterparts (Hackworth & Rekers, 2005b). Amidst all these changes, the one characteristic that has been perceived consistently across contemporary and traditional enclaves is the demographic homogeneity in enclaves caused by the dominance of a single ethnic group. This very characteristic somehow prevents the use of enclaves from learning the spatial evolution patterns of immigrant populations. To illustrate, immigrants who have arrived in more recent years have more market resources compared to their earlier counterparts, and therefore, they are more equipped to select residential locations solely based on individual preferences. Hence, it is perceivable that while some of the immigrants will congregate near co-ethnics, the rest will settle in discrete suburbs with skeletal ethnic minority populations. In such circumstances, if enclaves are used for evaluating evolutions in immigrant settlements for a particular minority group, the evaluation process will focus only on those neighbourhoods that are dominated by that minority group (because one minority group comprise the majority in enclaves), and overlook the ones where members of the minority group are present in lesser concentrations. In contrast, if the ethnoburb model is used for the same purpose, it will account for all the neighbourhoods that have presence of the members of a given minority group in different concentration levels (i.e., neighbourhoods where one minority group is a majority as well as the ones where the group is not a majority). Thus, investigating the evolution patterns in immigrant settlements using the ethnoburb model can reveal the incremental process by which spatial arrangements of immigrants change in metropolitan regions. In this dissertation, I am interested in studying the process of immigrant settlement, both in terms of direction and magnitude of changes, and therefore, I focus on the ethnoburb model.

1.2.2 Ethnoburb Delineation Methods

Existing research on ethnoburbs has chiefly focused on Chinese immigrants. Wei Li introduced the ethnoburb concept based on the spatial settlement trajectories of the Chinese in San Gabriel Valley, California (Li, 1998c). Following this lead, the ethnoburb phenomenon explored in other global metropolitan regions predominantly focused on Chinese immigrants (Chan, 2012; Hong & Yoon, 2014; Xue, Friesen, & O'Sullivan, 2012). However, a limited number of studies have also delineated ethnoburbs focusing on other ethnic groups as well including South Asians and Latinos (Hoalst-Pullen, Slinger-Friedman, Trendell, & Patterson, 2013; Ishizawa & Arunachalam, 2014; Wang & Zhong, 2013; Wen, Lauderdale, & Kandula, 2009). While these studies have mostly relied on the

composition of ethnic groups to identify their corresponding ethnoburbs, some have identified ethnoburbs based on common cultural ties that exist between ethnic minority immigrants. For example, Phillips (2016) has focused on religion to delineate ethnoburbs for the Jewish population in Los Angeles, California. In another study, Muñoz (2011) coined the term “ethno-faith-burb” by exploring settlements of Sikh, Muslim, and Hindus living in Dundee and Glasgow in UK.

The concept of ethnoburb is fluid. The model is indiscriminately used for describing immigrant settlement patterns that emerge due to any ethnic phenomenon as long as it materializes in the suburbs. The term “ethnoburb” is often sporadically used in attempting to describe ethnic minorities living in suburbs without considering the specific characteristics that make ethnoburbs unique. Some studies have interchangeably used the terms ethnoburbs and enclaves to describe the same immigrant settlement outcome, even though the two are substantially different (see Dean et al., 2018 for example).

Fluidity of the ethnoburb concept is also apparent in methodological approaches adopted for delineating the settlement form quantitatively. There is no established criteria or guidelines associated with the operationalization of the concept. Wei Li evaluated five components – ethnic concentration, socioeconomic configuration, economic landscape, cultural representation, and political involvement – to delineate ethnoburbs (Li, 1998a, 1998b). Yet, a majority of studies in this area have predominantly relied on the ethnic composition of neighbourhoods in order to identify them (e.g., Wang & Zhong, 2013). Studies have applied thresholds to the size of ethnic groups in order to identify ethnoburbs where the threshold values considerably varied. Even though Wei Li recommended the use of a 10 to 15 percent threshold for ethnic groups to distinctively delineate their corresponding ethnoburbs, the author used higher values in later studies (Li, 1998b, 2006b). The use of extremely low or high values to identify the settlement form is also apparent. For example, Hong & Yoon (2014) applied a 5 percent threshold to delineate Korean ethnoburbs in Auckland, while Wang & Zhong (2013) applied a 50 percent threshold for identifying South Asian and Chinese ethnoburbs in Toronto. Such substantial difference in values observed in the ethnoburb literature is due to the variations in ethnic compositions of metropolitan regions. Nevertheless, in general, threshold values that delineate ethnoburbs, oscillate between 10 to 35 percent (Hoalst-Pullen et al., 2013; Johnston, Poulsen, & Forrest, 2008; Phillips, 2016).

Research for delineating ethnoburbs has also focused on the spatial arrangement of ethnic groups. For example, Johnston et al. (2008) devised a neighbourhood classification method based on the level of segregation of ethnic groups, whereby, the neighbourhoods that demonstrated a low segregation level were considered to be ethnoburbs. In a separate study, the authors used Getis and Ord statistics (a spatial statistical tool) to assess the strength of the spatial clusters that ethnic groups

formed, while also considering the geographic location of the neighbourhoods in order to identify ethnoburbs (Johnston, Poulsen, & Forrest, 2011). A similar approach was taken by Ishizawa & Arunachalam (2014) where the authors used Local Indicators of Spatial Association (LISA) to evaluate residential settlement patterns for minorities along a continuum of homogeneity and heterogeneity in the ethnoburb identification process.

Few studies have explored the ethnoburb phenomenon in Canada, even though the highly diverse immigrant population indicates the existence of this settlement form. Chan (2012) evaluated the history of Chinese settlements in Canada and identified the pathways along which ethnoburbs evolved. The author viewed ethnoburbs as suburban Chinatowns and described that the ethnic businesses therein were no longer constrained only to this ethnic group; rather they are integrated into the mainstream economy. The impacts such ethnic commerce in ethnoburbs have on the functionality of urban forms were eloquently highlighted in research conducted by Zhuang & Chen (2016). In their study, the authors observed that the ethnic-themed shopping malls appearing in the Chinese ethnoburbs of Toronto metropolitan region have positively contributed to the revitalization of neighbourhoods, both physically and economically.

Meanwhile, the study produced by Wang & Zhong (2013) is plausibly the only Canadian study that explicitly focused on delineating ethnoburbs quantitatively. However, there is indeed some ambiguity in the methodological approaches that were adopted in the study. For delineating the ethnoburbs of the Chinese and South Asians throughout the extended Toronto metropolitan region, a 50 percent threshold was applied on their proportional representation in the neighbourhoods that were examined. Using such a high threshold value is somewhat problematic because having more than half of the population from a given neighbourhood that belongs to a single ethnic group, means that it has low ethnic diversity and is potentially dominated by a single ethnicity. As previously mentioned, a fundamental feature of ethnoburbs that differentiates them from enclaves is their high degree of demographic stratification. From this perspective, the methodology adopted by Wang & Zhong (2013) does not define the uniqueness of the delineated ethnoburbs. Indeed, the authors attempted to establish the uniqueness of the settlement form by exploring socioeconomic compositions and degree of involvement in mainstream politics of the ethnoburb residents. However, because the study was unable to uniquely identify the ethnoburbs based on their demographic composition in the first place, further attempt to establish the uniqueness of ethnoburbs by exploring their socioeconomic dynamics was somewhat ineffective. That being said, the aim of this dissertation is not to suggest a methodology that can distinctively delineate the settlement form, but rather the aim is to examine the construct of 'ethnoburbs' along a continuum and in so doing, introduce a new technique for assessing the evolution in immigrant settlement patterns.

1.2.3 Ethnoburbs and Urban Systems

Ethnoburbs alter the social and economic landscapes of urban forms by forming residential clusters of ethnic groups, and by facilitating growths of ethnic businesses, services, and institutions in the neighbourhoods. Changes in Canada's immigration policies during the 1980s and 1990s led to a notable influx of affluent and resourceful immigrants. Financial agencies made considerable changes in their marketing campaigns to attract investments primarily from the affluent Chinese immigrants during the period. While these investments from the immigrants safeguarded Canada's economy during the recession of the 1990s, they also favoured the rapid growth of ethnic-themed shopping malls in the major metropolitan regions (Lo, 2006). Nearly sixty five Asian-themed shopping malls emerged in the Greater Toronto Area (GTA) by 2009 (Lo, 2009, p. 397). Most of these malls appeared in cities, such as Markham, Richmond Hill, Scarborough, Mississauga, and Brampton, all of which having a substantial population of individuals with Chinese and South Asian backgrounds, although the phenomenon was much more noticeable for the former (Wang & Zhong, 2013, p. 21–22). At the same time, these locations witnessed an additional growth in ethnic businesses and services and cultural institutions that catered to the needs of the minority groups (Wang & Zhong, 2013, p. 19). As the result of the sizeable share of ethnic population, mushrooming ethnic businesses and services, and presence of cultural institutions in the neighbourhoods, there is a strong cultural imprint on the urban forms. The presence of ethnic populations in these areas has become more easily discernable as streets and businesses were given names with clear linguistic and thematic connection to the ethnic communities. For example, in the Toronto suburb of Markham, for some neighbourhoods where there are large South Asian populations, streets are named after cities in Pakistan and India (including New Delhi and Karachi). Similarly, in Brampton, another Toronto suburb, the shopping area appearing at the intersection of Torbram and Castlemore roads was named after a popular neighbourhood in Central Delhi in India – “Karol Bagh”. It contains ethnic grocery stores, restaurants, bakeries, and businesses serving the South Asian population.

Aside from their physical qualities as geographic regions, ethnoburbs are also well engraved into the Canadian culture. For example, Asian night market, a cultural feature that is prominent in Hong Kong, Taiwan, and Mainland China, is now widely celebrated in Richmond, British Columbia by all ethnic groups, immigrants and non-immigrants alike (Pottie-Sherman & Hiebert, 2013).

The physical and social changes that ethnoburbs bring to urban areas are often a source of social conflicts between various subgroups of residents from different ethnic backgrounds. The changes in demographic compositions and traditional landscapes in neighbourhoods that are caused by the influx of immigrant minorities are often unwelcomed by non-ethnic-minority populations. Lieu (2013) detected rising discord and grievances among the long-term non-ethnic-minority residents of

certain neighbourhoods in Temple City, California. This tension stemmed from the replacement of traditional small and locally owned businesses, with Asian bridal shops and retail giants, caused by the rapid influx of a sizeable Asian immigrant population during the 1990s. Similarly, in Waterloo, Ontario, the proposal for a new mosque to accommodate the growing Muslim population in a particular neighbourhood was rigorously opposed by the non-Muslim community, leading to the rise of anti-mosque propaganda on social media (Beattie, 2017; Jackson, 2017).

More often than expected, even the members of ethnic minority groups are uncertain about the changes that materialize in urban forms due to an increase in ethnic population. For example, in the mid-1990s, the development of a Chinese-themed shopping mall in Richmond Hill, Ontario was strongly opposed by many Chinese residents through their raising concerns about parking, noise, and neighbourhood aesthetics. However, Preston & Lo (2000) argue that the fundamental reasons for the disapproval lie in a willingness of a particular ethnic group to embrace multicultural diversity more broadly, as well as their resentment towards being stereotyped based on ethnicity.

From a planning perspective, ethnoburbs increase challenges with providing services in urban areas through the diverse needs and wants that originate from the demographically and socioeconomically stratified immigrant population. It is true that immigrants have a high home-ownership tendency which is influenced by their cultural values, and such behaviour is indeed a driving force behind Canada's real estate market (Yu, 2015). However, due to their social norms and socioeconomic configurations being different from those of the non-immigrant population, some unprecedented adjustments in neighbourhoods are often required. For example, some neighbourhoods in Markham witnessed a declining trend in the real estate price due to a fear of the number "4" (tetrophobia) among Chinese immigrants, who were among the major investors in the area. As a response, the government changed the street numbering, in order to try to assist with boosting real estate sales (Goddard, 2010). Similarly, in Brampton, Ontario, South Asian immigrants have formed multi-generational and multi-family households increasing the average household size, which consequently led to unprecedented growth in the number of kids attending schools (Bascaramurty, 2013). To accommodate for the rising number of children in schools, the school district board was compelled to build a substantial number of additional portables. In addition, the fact that multiple households shared a single-family property, resulted in a high number of vehicles creating parking issues in the neighbourhood. This then led to strong resentment from the non-immigrant population, which generally had smaller average household size (Bascaramurty, 2013; Criscione, 2017). More recently, the new religious accommodation policy devised by the Peel District School Board to meet the students' diverse religious needs has resulted in considerable public outrages (Goffin, 2017).

There is an accentuated demand for affordable housing in ethnoburbs because of their socioeconomic stratification, associated with the co-existence of both high- and low-income immigrants. Studies have shown that immigrants generally spend more than half of their income on meeting housing costs (Newport, 2017). Due to the considerable presence of low-income immigrants in ethnoburbs, affordable housing options are in high demand. However, access to such services is considerably lower in those neighbourhoods largely because affordable housing options are mostly concentrated in high-density areas, and the ethnoburbs have predominantly emerged in low-density neighbourhoods. Even though government has affordable housing programs in place in the regions with low-density suburbs, housing applicants often must contend with lengthy wait times, inferior housing quality, and an incompatibility with what is available to meet their actual needs (Belgrave, 2017).

While socioeconomically constrained immigrants in ethnoburbs register the need for affordable housing, the growing number of business immigrants investing in real estate has made many North American cities unaffordable to live. For example, in Vancouver, wealthy immigrants, who entered the country under the Business Immigration Program (BIP), aspired to ownership of detached houses and luxury condominiums in the most expensive suburban neighbourhoods. The properties owned by such immigrants were valued twice as high as those of Canadian-born households (Ley et al., 2020). This investment trend of the wealthy immigrants soared the price of detached houses in Vancouver by 38% between July 2015 and July 2016 (Ley et al., 2020). The phenomenon has also opened doors for illegal activities such as money laundering through real estate businesses.

There is additional concern with the access to quality health care services in ethnoburbs. A study on Asian residents of San Gabriel Valley, California, found that the low-wage immigrants employed in ethnic businesses are less likely to have good health insurance coverage from their employers, due to either the fact that much of their work was part-time, or the relatively small size of the businesses, both of which were factors in preventing the employee from being offered health benefit coverage (Pih, Hirose, & Mao, 2012). While on the surface the situation may appear less concerning in Canada given its universal health care system, the health plan offered by the government only covers more basic medical services (Government of Canada, 2017). Private insurance is often required for extended health services including prescription drugs, dental care, and physiotherapy – the cost of which is often covered by employers. That ethnic businesses found in ethnoburbs are mostly small and medium enterprises, they are often unable to offer extended health benefits to their employees. Therefore, many of the employees are often found either uninsured or underinsured (Angus Reid Institute, 2015). As a result of the lack of insurance coverage, the

employees are also likely to cut back on prescriptions or go into debt from out of pocket drug expenses (The Fifth Estate, 2017).

There are also cultural factors involved that restrict access to health care services among the immigrants living in ethnoburbs. The ethnic minorities of ethnoburbs are often too much confined within their co-ethnic bubbles and lose connection with the greater society. As a result, some of them are completely unaware of many health facilities and services that are offered by the government (Zanchetta & Poureslami, 2006). Also, the health practitioners sometimes lack cultural sensitivity while providing services that further limit immigrants' access to quality health care (Balsa & McGuire, 2003; Caudle, 1993).

Transportation is another component of the urban system that needs attention in the wake of ethnoburbanization. Burgeoning studies have investigated immigrants' transportation behaviour in urban areas (Blumenberg, 2009; Heisz & Schellenberg, 2004; Newbold et al., 2017); yet there is a dearth of understanding about the differences in travel patterns between the residents of ethnoburbs and non-ethnoburbs. The low-density morphology of suburbs, where ethnoburbs predominantly emerge, is ill-suited for transit-oriented developments (Moos et al., 2018). Therefore, it is generally to be expected that the residents of ethnoburbs will rely mostly on cars for commuting. The phenomenon is not particularly problematic for affluent immigrants because of their greater tendency to have access to vehicles. However, the mobility of those ethnoburb residents who are low-income is certainly affected because of their limited market resources and their greater dependence on public transit services, which are substantially lacking in such neighbourhoods (Chatman, 2014; Heisz & Schellenberg, 2004). As a result of the socioeconomic diversity among ethnoburb residents, it is to be expected that while a part of the ethnoburb residents will demonstrate high car dependence, the rest will rely mostly on transits for commutes. The mix of car and transit reliant population in ethnoburbs may create ambiguity in guiding future planning strategies.

In order to devise planning strategies that enable sustainable urban development, it is critical to consider the relationship between immigrants' settlement patterns and their transportation outcomes. Studies assessing transit quality in Toronto have identified limited access to public transit in low-income areas, where immigrants constitute a large proportion of the total population (Florida, 2011; Hulchanski, 2007). The correlation between areas with poor quality transit and low-income immigrant residents partially stems from the significant rise in real-estate price for properties which are proximate to transit corridors (Kramer, 2013). Additionally, housing that can accommodate immigrants' relatively large households and are also affordable, have greater availability in the lower density suburbs that offer limited transportation options (Agrawal & Lovell, 2008). There are ongoing projects in Ontario that aim to improve access to transit in the suburbs (Metrolinx, 2018c). The extent

to which such expansion will benefit immigrants needs careful evaluation. This is because, their settlement dynamics as well as transportation patterns are substantially different from that of non-immigrants - a notion that is rarely considered in policy formulation. Enhancing the understanding of immigrants' commuting patterns relative to their settlement dynamics is essential for effective planning of transportation infrastructure.

1.3 Immigrants and Transportation

1.3.1 Immigrants' Transportation Behaviour

Immigrants' transportation behaviour is significantly different from that of non-immigrants. Immigrants register higher use of transit and carpooling, lower individual car use, and also shorter travel distances compared to non-immigrants (Blumenberg & Shiki, 2008; Blumenberg & Evans, 2010, 2007; Blumenberg & Song, 2008). Research has found that immigrants in the US are 1.8 times more likely to carpool and 2.8 times more likely to commute by public transit as compared to non-immigrants (Blumenberg, 2009, p. 170). In states like California, immigrants comprise more than 50 percent of commutes made by public transit (Blumenberg & Evans, 2010). A similar trend has been observed in Canada as well (Heisz & Schellenberg, 2004; Newbold et al., 2017).

Immigrant transportation behaviour is largely influenced by their socio-economic circumstances, spatial settlement patterns, and cultural background. Since immigrants generally have lower income than non-immigrants and also have constrained access to vehicles, foreign-born populations are more likely to rely on transits for their commute (Blumenberg & Smart, 2010; Crossman, 2013; Lovejoy & Handy, 2008). Additionally, the tendency of immigrants to spatially cluster with co-ethnics has been associated with high rates of carpooling because of the strong social capital and the high likelihood of immigrants finding jobs in ethnic businesses and services that are closer to their residences (Blumenberg & Smart, 2009) Research has also recognized that the commuting practices of immigrants in their countries of origin is a strong determinant of the travel behaviours they exhibit in the host country (Chatman & Klein, 2013; Tal & Handy, 2010).

Studies have also identified transportation assimilation tendencies among immigrant populations. Immigrants tend to adapt the automobile culture as their length of stay in the host country increases (Asgari, Zaman, & Jin, 2017; Chatman & Klein, 2009:315; Xu, 2018). In a study of Asian immigrants in the US, Hu (2017) detected higher car use among immigrants who stayed longer in the country as compared to immigrants who arrived more recently. In keeping with this notion, in Toronto, Heisz & Schellenberg (2004) and Newbold et al. (2017) found high car use and long travel distances among the more established members of immigrant groups, mirroring the travel behaviour

of non-immigrant resident. The transportation assimilation trend among immigrants is largely influenced by the socioeconomic uplift they tend to experience through living longer in the country.

However, the rapidity at which transportation assimilation materializes varies between ethnic groups. Chinese immigrants tend to assimilate faster into the automobile culture than any other immigrant group (Hu, 2017). They also travel longer distances than other ethnic minorities (Newbold et al., 2017). However, the convergence in travel patterns between Chinese immigrants and non-immigrants is much faster among the new immigrants who have arrived in recent years, as compared to individuals who immigrated less recently (Hu, 2017). This trend certainly reflects how contemporary immigrants possess greater market resources relative to their earlier counterparts.

Research has also found that the spatial location of commuters has substantially higher impact on commuting patterns compared to age, gender, or even income (Beckman & Goulias, 2008). Yet, immigrants' spatial settlement patterns are rarely considered when evaluating their travel behaviour (Chatman, 2014; Liu & Painter, 2012; Smart, 2014). As previously mentioned, studies have associated immigrants' tendency to reside in ethnic clusters with high use of transit and carpooling (Blumenberg & Smart, 2009, 2010; Smart, 2014). This phenomenon is thought to stem from the fact that they are more likely to secure employment in nearby ethnic businesses and services abutting residences (Blumenberg & Smart, 2009). However, this assumption may not hold true, at least in the case of ethnoburbs, because many of the immigrants residing in such areas are highly educated and skilled. Therefore, it is unlikely that they will remain constrained within ethnic businesses for employment opportunities. Jobs that are commensurate with their credentials are more likely to be located away from their ethnic clusters. This spatial mismatch between residences and place of employment will certainly affect their commuting patterns (Liu, 2009, p. 622).

The built environment of neighbourhoods is possibly a stronger determinant of immigrants' travel behaviour compared to other factors, such as social cohesion or cultural values, which are considered important in previous research (Chatman, 2014; Shin, 2017b). There is no doubt that neighbourhoods bearing quality transit encourages transit use and reduces automobile dependency (Cui et al., 2020; Foth, Manaugh, & El-Geneidy, 2014; Manville, Taylor, & Blumenberg, 2018). However, immigrants have formed ethnoburbs in the low-density suburbs, which widely vary in transit quality, and the transit quality of immigrant neighbourhoods is rarely considered in studies when evaluating immigrants' transportation behaviour. As a result, little is known about the extent to which, or if at all, proximity to quality transit in neighbourhoods affects immigrants' choice of commuting mode.

Even though immigrants comprise one fifth of the total Canadian population, there have been relatively few studies evaluating their transportation behaviour (Heisz & Schellenberg, 2004;

Newbold et al., 2017). Heisz & Schellenberg (2004) explored the dynamics of transit use among immigrants in the three major Canadian metropolises – Toronto, Montreal, and Vancouver. Mirroring the findings from research elsewhere, immigrants demonstrated higher use of transit compared to non-immigrants even after controlling for socioeconomic and spatial factors such as age, gender, income, distance to work, and distance between place of residence and the city centre. The high rate of transit use among immigrants is largely due to the inclination of recent immigrants toward using this transportation mode, and also the higher transit fidelity among the cohorts of recent immigrants compared to cohorts of immigrants who arrived at an earlier point in time (Heisz & Schellenberg, 2004, p. 187). In a separate study, Newbold et al. (2017) evaluated immigrants' commuting distance in the greater Toronto metropolitan area. As expected, the study highlighted shorter commuting distance among immigrants compared to the Canadian-born. In both studies, considerable differences in transportation outcomes were detected across minority groups.

However, little is known about the impact that spatial settlement patterns of immigrants may have on their relationship to transportation in Canada. As mentioned earlier, immigrants have demonstrated a strong inclination towards transit use irrespective of the fact that they have predominantly settled in the suburbs that offer limited transportation options. Within the Canadian context, the relationship between settlement patterns for immigrants and their transportation patterns, was solely investigated by Lo et al. (2011). The authors linked immigrants' transportation behaviour (as revealed in prior studies) to their descriptive analysis of settlement trajectories. They emphasized the importance of expanding transportation services beyond the inner city to the suburbs in the Toronto metropolitan region. The study falls short in its methodological robustness regarding the establishment of the empirical relationship between immigrants' settlements and their choice of commuting modes, also did not explicitly consider the influence of neighbourhood characteristics on travel patterns.

Ontario has put forward transportation plans to expand transit services beyond the inner city to the suburbs. The province focuses on improving transit services both in terms of quality and quantity through spatial expansion of existing transit infrastructure and installation of new rapid transit, also by improving the frequency and reliability of the service (Metrolinx, 2018c). However, it is unlikely that all neighbourhoods will be equally benefited by the improvements. In Ontario, local transportation planning is the responsibility of municipal governments, and municipalities differ in financial capacity and commitment (Lawson, 2015). The municipalities also have morphological differences and exhibit variations in population density. Hence, it is perceivable that all neighbourhoods will not experience similar levels of improvement in their transportation infrastructure. Therefore, it can be expected that depending on the geographic location of immigrants

in particular suburbs, they will have varied experience with transit service, and that this in turn will likely affect their travel patterns.

1.3.2 Quality of Transportation and Measurements

This dissertation considers that proximity to quality transit is an important factor that affects immigrants' transportation patterns. It is the quality of service that maintains existing transit customers and attracts new ones (De Oña & De Oña, 2015). However, there is no single approach to assess the quality of transit because in actuality, there are a myriad of factors which are at play in influencing it (including the accessibility and affordability of service, as well as customer satisfaction levels). Transit accessibility indicates the ease with which destinations can be reached by passengers (Hansen, 1959). It concerns the availability and reliability of transit services as well as the interconnectivity between origin and destination (Mamun et al., 2013). Affordability refers to the financial burden households bear in transportation services in order to access fundamental services and activities that includes healthcare, shopping, work, and social activities (Litman, 2020, p. 5). Meanwhile, the perception of the quality of the service, such as cleanliness, comfort, and operator's behaviour, along with the accessibility and affordability of the system determine commuters' satisfaction level with the transit (van Lierop, Badami, & El-Geneidy, 2018). These factors are sometimes integrated to assess the quality of transit, and sometimes addressed in silos, separate from each other.

The most dominant approach to assess transit quality is through evaluating transit accessibility, especially when the objective is to evaluate the effectiveness of transportation and land use plans, as well as to understand broader socioeconomic implications. For example, Filion, McSpurren, & Appleby (2006) evaluated the transit quality of Toronto's neighbourhoods in relation to their accessibility, in order to explore the relationships between housing density and journey patterns. The authors devised a transit quality index by considering the spatial and temporal coverage of transit services and their capacity differences needed to accommodate commuters across various service types. Using a similar approach, Florida (2011) evaluated the state of transit availability in Hulchanski's (2007) "three cities within Toronto". He devised an index to identify transit deserts in the city of Toronto by considering the spatial coverage and frequency of transit services during the rush hour period, while accounting for the relative capacity of different vehicle types. In a separate study, Forth, Manaugh, & El-Geneidy (2013) took a gravitational approach to determine transit accessibility, and thereby, explored the intersection of transit access and spatial disparity in Toronto. "Accessibility" was defined in the study in relation to the ease of accessing jobs and the duration of transit travel time between points of origin and destination. Whereas these studies have mostly

concentrated on peak-hour commutes, El-Geneidy et al. (2016) focused on the spatiotemporal variations in transit service for addressing social disparity issues. More recently, transit quality has also been assessed based on the interconnectivity of transit services across metropolitan regions (Kim & Lee, 2019).

Increasingly, studies have also accounted for passengers' perspectives on assessing the quality of transit services (Abenzoza, Cats, & Susilo, 2017; De Oña & De Oña, 2015; Eboli & Mazzulla, 2011; Grisé & El-Geneidy, 2018; van Lierop et al., 2018). Studies have evaluated a series of comfort factors in order to determine customer's perception towards public transit. These factors have included: crowding, cleanliness, ventilation, vehicle condition, attitudes of driver and personnel, safety, along with availability, affordability, and reliability of transit services (Hansson et al., 2019; van Lierop et al., 2018). These factors are sometime extremely difficult to measure quantitatively because of the inherent subjectivity of the responses, which vary widely across different segments of the population (Grisé & El-Geneidy, 2018). Despite the challenge, Eboli & Mazzulla (2011) laid out a comprehensive methodology to evaluate transit service quality based on both subjective and objective indicators. However, it is important to note that the measurements of the subjective indicators could not effectively describe the quality of the transit services. This study highlighted that the availability and reliability of transit services is the optimum measure for assessing transit quality.

This dissertation uses transit quality as one of the key factors to understand the relationships between immigrant settlements and their transportation outcomes. It concentrates on the availability of transit services throughout the day, in order to determine transit quality for neighbourhoods.

1.4 Dissertation Goal and Objective

This dissertation appears at the intersection of three research domains: immigrant spatial settlements, immigrant commuting patterns, and transportation infrastructure (particularly transit quality) (Figure 1.3). It is founded on the notion that people are where they live. The geographic location of immigrant residences and their proximity to quality transit largely determines the transportation patterns of immigrants. As discussed in earlier sections, little is known about the transportation implications of immigrants' spatial settlement patterns because prior studies have rarely examined their settlement dynamics in order to evaluate travel patterns. It is plausible that immigrant groups will reveal unique spatial settlement patterns because the choice of residential locations among the contemporary immigrants are largely motivated by individual preferences. Meanwhile, there are deviations in the level of access to quality transit across neighbourhoods. Hence, depending on the residential locations

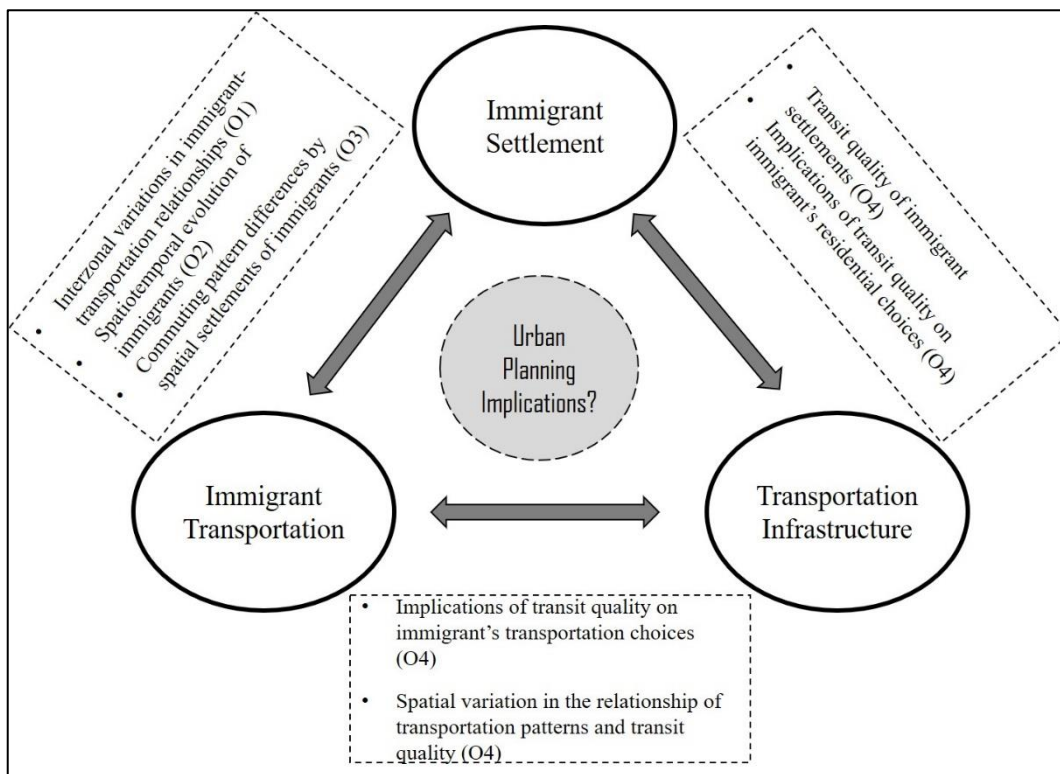


Figure 1.3: Research Domains and Objectives

of immigrants, their experience with transit quality will vary, and so will vary their choice of commuting modes. Establishing an integrated understanding of immigrants' settlement and

transportation dynamics is critical for assessing the efficacies of current urban planning policies and strategies, as well as to help guide future improvements in these areas.

The overarching vision of this dissertation is to foster a better understanding of immigrants' transportation outcomes relative to their spatial settlement patterns. It highlights the intersection among immigrant settlement, immigrant transportation, and transportation infrastructure (transit quality specifically). There are four primary objectives in this dissertation (listed as follows). Figure 1.3 presents these objectives at the interactions of the three research domains.

1. To investigate spatial variation in immigrants' transportation patterns
2. To evaluate the spatial evolution of immigrants' residential settlements
3. To explore differences in immigrants' transportation outcomes relative to their spatial settlements
4. To understand the nexus among immigrant settlements, transit quality, and transportation outcomes

1.5 Research Questions

The key questions that are addressed in this dissertation are as follows:

1. Do immigrants' transportation patterns vary according to their level of concentration in neighbourhoods? Does the relationship differ between metropolitan zones? What factors help explain such variations?
2. How do ethnoburbs which are comprised of major minority groups evolve over space and time within the study area? What does the trend indicate about future spatial changes for key immigrant groups?
3. Do transportation patterns vary among minority group settlements? What factors influence differences in commuting patterns?
4. What is the transit quality condition for areas with minority group settlements? What influence does transit quality have on the commuting patterns of such areas? Does it vary among minority groups?
5. What influence does transit quality have on the residential and transportation choices that immigrants make? What implications does this suggest for future urban planning?

1.6 The Study Area

This dissertation investigates the Toronto census metropolitan area (CMA).¹ Toronto is selected for its demographic diversity and variations in land use and transportation patterns. As of 2016, nearly 2.7 million immigrants lived in Toronto, representing about half of the total population (Statistics Canada, 2019b). It is certainly one of the most preferred locations for immigrants to settle in Canada. Of the entirety of immigrants who arrived in Canada between 2011 and 2016, about 30 percent settled in Toronto, whereas an equivalent proportion in Montreal and Vancouver were only 14.8 percent and 11.8 percent respectively. These immigrants were ethnically diverse as they come from numerous countries of origin and cultural backgrounds. As of 2016, approximately 56 percent of the total immigrant population in Toronto was from Asian countries, whereas only 22.8 percent was from Europe. Additionally, it is worth noting that the percentage of immigrants from European descent had also fallen by 4 percent between 2011 and 2016. The top five countries that represented a majority of Toronto’s immigrants were: India (11.4 percent), China (9.9 percent), Philippines (7.1 percent), Pakistan (4.4 percent) and Italy (3.8 percent).

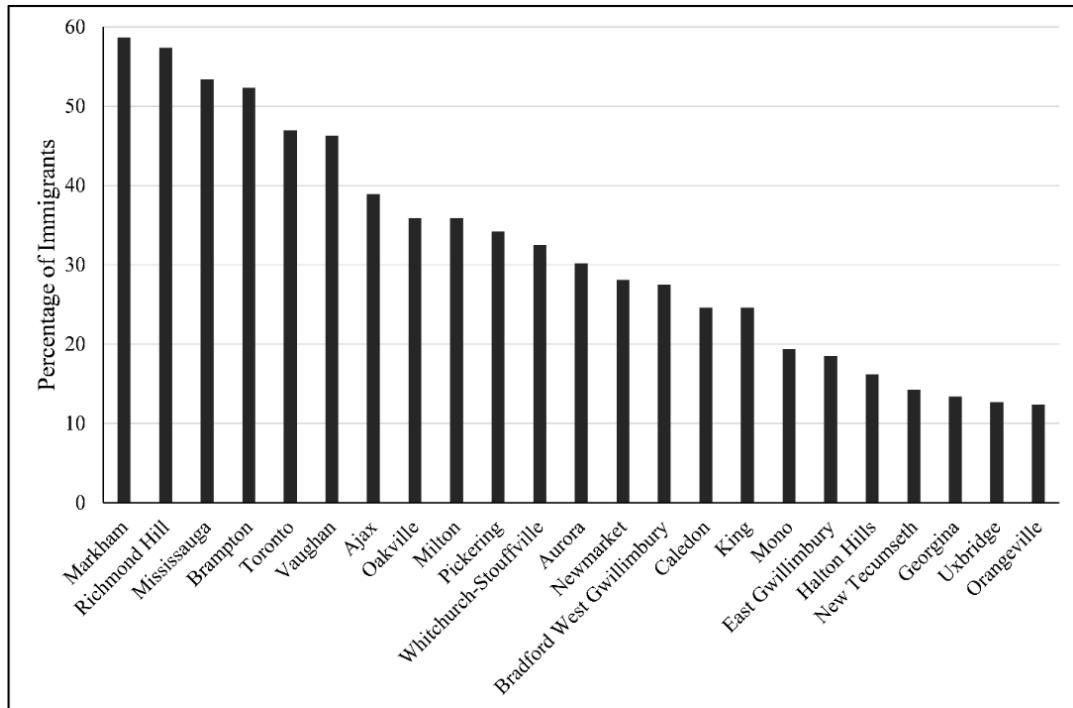


Figure 1.4: Immigrants in the Cities of Toronto

¹ This is to note that the spatial coverage of the study area varies in the studies presented in Chapters 2 to 4. The study presented in Chapter 3 focuses on the Greater Toronto and Hamilton Area (GTHA). It investigates spatial evolution patterns of immigrant populations. The spatial mobility of immigrants is not restricted to the Toronto CMA, and it includes adjacent cities like Hamilton as well. Therefore, studying the entire GTHA provides a comprehensive view of the settlement trajectories of immigrant populations.

The other notable characteristic of Toronto's immigrant population groups is their suburbanization trend. As presented in Figure 1.4, while immigrants constitute about 47 percent of the total population in the city of Toronto, their proportional representation is much higher in peripheral municipalities such as Mississauga, Brampton, Markham, and Richmond Hill. As this was not always the case, the demographic composition of Toronto's suburbs is rapidly changing. Fifty one percent of the total population in the city of Toronto identify as being a member of a visible minority group, and a similar trend is also the case in Markham, Brampton, and Richmond Hill (78 percent, 73 percent, and 60 percent respectively). However, there are considerable differences in the geographic distribution of residences between immigrant groups (Wang & Zhong, 2013).

This dissertation classifies the geography of the Toronto metropolitan region into three metropolitan zones (inner city, inner suburb, and outer suburb) based on their period of development, as was done in earlier studies (Bunting & Filion, 1996; Skaburskis & Moos, 2008).² The inner city, comprising of the former city of Toronto, York, and East York, are mostly high-density developments built prior to 1946. The zone offers multiple transit options including the subway, streetcar, and local bus services. The Government of Ontario (GO) transit service that connects inner city and suburbs radiates from downtown Toronto. Therefore, not surprisingly, the inner city registers the highest transit ridership in the Toronto metropolitan region. The inner suburbs, on the other hand, are mostly automobile dependent. The zone was generally developed between 1946 and 1970 bearing a mixture of high- and low-density developments. Some portions of the inner suburb are served by subways, whereas others cope with infrequent bus services (Filion et al., 2006). Meanwhile, the outer suburbs, developed after 1970, have uniform low-density configurations. Such low-density morphology of the zone is ill suited for transit development (Moos et al., 2018). Therefore, the residents of outer suburbs mostly rely on cars for commutes. Even though bus rapid transit is present in some parts of the zone, infrequent local bus services cover the vast majority. The presence of GO transit services certainly improves the connectivity between suburbs and the inner city, but they poorly interconnect the suburbs. Nonetheless, many cities in the outer suburbs have experienced substantial growth in transit use in the last few years (Marshall, 2018).

Regarding transportation planning, there is a hierarchy in Ontario's political structure. The province sets policy and defines planning and development priorities for municipalities, controls funding, and approves investments. Municipal governments are responsible for planning and operating local transportation services in accordance with provincial laws, statutes, and regulations (Ministry of Transportation, 2017). In 2006, Metrolinx, a regional transportation authority, was

² The spatial boundaries of the three zones are shown in Figure 2.1, 3.1, and 4.1.

formed by the province of Ontario in order to improve coordination among the province and municipalities in transportation planning and management. The agency has laid out a regional transportation plan (RTP) for the extended Toronto metropolitan region in accordance with other provincial plans, such as Ontario's Greenbelt (Ontario Ministry of Municipal Affairs and Housing, 2017) and Places to Grow (Ontario Ministry of Public Infrastructure, 2019), with the broader objective of curtailing urban sprawl and promoting transit use. The RTP aimed to develop an integrated, multi-modal transport system at a regional level, in order to serve the needs of residents, businesses, and institutions (Metrolinx, 2018c). Expanding the existing transit infrastructure beyond the inner city to the suburbs, and establishing fast, frequent, and reliable transit are among the many goals that the RTP sought to achieve (Addie, 2013; Metrolinx, 2018c). However, even though the formation of Metrolinx was meant to improve the coordination among all the three levels of government, in actuality, it provoked conflicts surrounding the role, authority, and jurisdiction of municipal transportation authorities, such as the Toronto Transit Commission (TTC) (Addie, 2013).

There is a disconnect between the locations where quality transportation services are needed, and where these services are actually present in the Toronto metropolitan region. Research has found that the highest population growth in the metropolitan region materialized in areas that were not necessarily near frequent transit corridors or GO transit services (Burchfield & Kramer, 2015). There has also been a considerable mismatch between employment nodes and the higher order transit availability for the region (Blais, 2015). Moreover, Florida (2011, 2012) has raised transit equity concerns in Toronto since limited access to transit services was detected in areas that had high proportions of low-income subgroups within the population as a whole. This was the case, even though many of these same low-income individuals largely depend on transits for both work-related and discretionary commutes.

1.7 Overview of Methods

In this dissertation, I take a positivist approach toward the evaluation of the interactions between the three research domains – immigrant settlement, immigrant transportation, and transportation infrastructure, and in so doing, achieve the intended research objectives (Figure 1.3). Data from multiple sources was collected, and statistical analyses were performed to develop quantitative indices and to determine all relationships. There was also a hierarchical approach taken with regard to the research focus, whereby Chapter 2 focuses on the immigrant population in general, while in contrast, Chapters 3 and 4 concentrate on Chinese and South Asian immigrant groups more specifically (as they are the major minority groups in Toronto).

1.7.1 Data

The analyses performed in this dissertation are predominantly based on Canadian census data, although some external data sources were also drawn upon. Chapter 3 evaluates spatiotemporal changes for immigrant settlements using the 2006 and 2016 census data. Census data from 2016 is used to derive immigrant-transportation relationships in Chapter 2 and 4; however, Chapter 4 also uses transit information from OpenMobilityData (a data archive that disseminates official public transit data globally).

Three categories of census variables are used in this dissertation: demographic, socioeconomic and built environment, and transportation. Demographic variables, collected from census, include “visible minority”, “immigrant’s places of birth”, and “recent immigrant’s places of birth”. The visible minority variable records responses from individuals who identify themselves as non-Caucasian and non-Aboriginal. The latter two demographic variables were used to determine the total numbers of South Asian and Chinese immigrants, and the proportion of these groups who arrived five years prior to the census year (commonly referred to as “recent” immigrants). The settlement patterns of the Chinese and South Asians evaluated in Chapter 3 was based on the “visible minority” variable, whereas the analyses in Chapter 2 and 4 were based on immigrant information. The selection of the variable focused on in Chapter 3, was based on the fact that the same variable was used in the previous research on Toronto-area ethnoburbs. As such, the research findings from the current study can be compared to that of the prior studies (Wang & Zhong, 2013). However, it is important to note that either the “visible minority” or “immigrant’s places of birth” variables do not impact upon the settlement patterns exhibited by Chinese and South Asians.

The socioeconomic and built environment variables, also collected from census, includes household size, education, income, employment, housing tenure, and housing types. These variables were selected because of their significance in influencing immigrants’ transportation behaviour as identified in earlier studies (Blumenberg, 2009; Heisz & Schellenberg, 2004; Newbold et al., 2017). Additional new variables were created in Chapter 2, representing the distance of immigrant neighbourhoods from the central business district (CBD) using standard GIS methodology.

With regard to the transportation data, the percentage use for the various commuting modes (car, transit, carpool, and active transportation) that enabled individuals to access place of employment was derived from the census. The active transportation variable included information on walking and biking. Transit service information was retrieved from the OpenMobilityData archive in General Transit Feed Specification (GTFS) format, which was processed in ArcGIS 10.6.

The census data was acquired at the census tract (CT) level. The population in CTs hover between 2,500 and 8,000, and are considered ideal for representing neighbourhoods (Breau, Shin, &

Burkhart, 2018). Accordingly, the “distance from CBD” variable was created representing distances from the centroid of the CTs to the CBD. Transit information retrieved from the GTFS feed was also aggregated at the CT level. Nevertheless, some descriptive analyses in Chapter 2 and 4 were performed in “census analyzer” based on individual level data.

1.7.2 Analysis

The analysis performed in this dissertation can be divided into three categories: i) ethnoburb delineation; ii) measurement of transit quality; and iii) determining relationships. Although the methodology is detailed in the included chapters, following is a brief overview.

Delineating Ethnoburbs:

Ethnoburbs are delineated in the Toronto metropolitan area for the years 2006 and 2016. Unlike previous research, the delineation of ethnoburbs in this dissertation was based on ethnic mix rather than segregation. Prior studies have identified the settlement form by focusing on the degree of spatial segregation among ethnic groups (e.g., Wang & Zhong, 2013), whereas, the present study delineates ethnoburbs through a consideration of ethnic diversity in neighbourhoods. It identifies three types of ethnoburbs – Nascent, Mature, and Saturated – based on an integrated evaluation of ethnic compositions and levels of ethnic diversity levels in CTs. This approach follows the neighbourhood classification method adopted by Holloway, Wright, & Ellis, (2012) and Wright, Holloway, & Ellis (2011). Ethnoburbs were delineated for the Chinese and South Asians to assess their settlement trajectories in chapter 3. The revealed spatial settlement trends also contributed to the identification of Chinese and South Asian neighbourhoods in Chapter 4.

Measuring Transit Quality:

This dissertation used transit quality as an exploratory variable to evaluate immigrants’ transportation behaviour in Chapter 4. A new index was devised to define transit quality of the CTs in the Toronto metropolitan region, which is based on the day-long availability of transit services. The methodology is foundationally based on Filion et al. (2006) and Florida (2011), who assessed transit quality in relation to the frequency of transit services, service area, and the type of transit service. Unlike the existing transit indexes that concentrate only on subways, streetcars, and local buses, the index developed as part of this dissertation considers GO transit services as well. The inclusion of GO transit service information in the index development process was critical because the service is a major contributor to transit use in the suburbs, and Chapter 4 predominantly focuses on immigrants’ transportation behaviour in the suburban realm.

Determining Relationships:

A series of multiple regression models were developed in Chapters 2 and 4 for exploring important relationships. In Chapter 2, regression models were developed to assess the relationship between immigrant concentration levels in CTs with the choice of commuting modes. Similarly, in Chapter 4, regression models were developed to: i) identify differences in the use of specific transportation modes relative to the settlement patterns of Chinese and South Asian groups, and ii) explore the influence of transit quality on transportation outcomes in the Chinese and South Asian neighbourhoods. All the models developed in this dissertation controlled for socioeconomic variables.

Considerable attention was also given to multicollinearity for selecting the final models. Multicollinearity exists when the data are spatially dependent. The phenomenon compromises the robustness of regression models by reducing the precision of the estimated co-efficient. To avoid the issue, spatial error regression analysis was performed in Chapter 2 which controls for spatial effects (Irwin & Geoghegan, 2001). Also, in Chapter 4, the Variance Inflation Factor (VIF) of the regression models was consulted to identify models that do not raise multicollinearity concerns. By established standards, models bearing VIF less than 4 are considered robust (Moos, 2014). Therefore, only the models that had VIF values below the standard were included.

1.8 Structure and Contributions of the Dissertation

This dissertation follows a manuscript-based format that consists of three stand-alone manuscripts. These manuscripts are included from Chapter 2 to 4. Table 1.2 lists the manuscripts and their status, along with the dissertation objectives they meet. They substantially contribute to theoretical and methodological advances in the immigrant settlement and transportation literature, and also, the findings from the studies have strong urban planning implications.

Chapter 2 (Manuscript i) explores the spatial variations in immigrant-transportation relationships. It determines the relationships by investigating associations of immigrant concentration levels in CTs with commuting patterns using spatial error regression models while controlling for socioeconomic and built environment factors. The study compares and contrasts the relationships across Toronto's three metropolitan-zones – inner city, inner suburbs, and outer suburbs – to detect spatial variations. The manuscript has been accepted for publication (with minor revisions) by the “Journal of Urbanism: International Research on Placemaking and Urban Sustainability”.

The manuscript contributes to the understanding of interzonal variations in immigrants' transportation patterns, which is the first objective of this dissertation. The study reemphasizes immigrants' affinity to transit, but also detects variations in the strength of the relationship across metropolitan zones. Additionally, the manuscript highlights inequality concerns with regard to access

to quality transit in neighbourhoods with high concentrations of immigrants. This study is the first of its kind that empirically associated immigrants' spatial settlement pattern in order to evaluate their transportation behaviour within the broader Canadian context.

Table 1.2: Dissertation Chapters and the Objectives Achieved

Chapters	Manuscript title	Journal	Status	Dissertation Objective Addressed
Chapter 2 (Manuscript i)	The Immigrant Effect on Commuting Modal Shares: Variation and Consistency across Metropolitan Zones	Journal of Urbanism: International Research on Placemaking and Urban Sustainability	Accepted with minor revisions (Revisions submitted)	1. To investigate spatial variation in immigrants' transportation patterns
Chapter 3 (Manuscript ii)	Ethnoburb as a Spatiotemporal Process: Its Implications for Immigrant Settlements	GeoJournal	Accepted (Forthcoming)	2. To evaluate the spatial evolution of immigrants' residential settlements
Chapter 4 (Manuscript iii)	Immigrant Suburban Settlement Patterns and Transportation Outcomes: Does Neighbourhood Transit Quality Matter?		Ready for submission	3. To explore differences in immigrants' transportation outcomes relative to their spatial settlements 4. To understand the nexus among immigrant settlements, transit quality, and transportation outcomes

Chapter 3 (Manuscript ii) evaluates spatiotemporal changes in immigrant's settlement patterns focusing on major ethnic groups, addressing the second dissertation objective. It investigates residential outcomes of Chinese and South Asians in the extended Toronto metropolitan region using the ethnoburb model. In so doing, the study introduces a novel approach for delineating ethnoburbs into three distinct categories, and assesses spatiotemporal changes in the ethnoburbs of the two minority groups for understanding their future spatial evolution patterns. The manuscript is accepted for publication by "GeoJournal".

The manuscript in this chapter makes both theoretical and methodological contributions to the immigrant settlement literature. It makes methodological contributions to the literature by introducing a new approach of ethnoburb delineation. Meanwhile, the study makes theoretical

contributions by highlighting inter-ethnic differences in settlement preferences and identifying complexities and uncertainties involved in the spatial evolution patterns of ethnoburbs.

Chapter 4 (Manuscript iii) addresses the third and fourth objective of this dissertation. The objective of this particular manuscript is twofold. First, it evaluates differences in transportation outcomes among the Chinese and South Asian settlements. Second, it seeks to assess the implications of transit quality on the residential and transportation choices that immigrants make. By focusing on the Toronto CMA, a series of regression models are developed to reveal the relationships. The study identifies considerable differences in travel patterns in the Chinese and South Asian neighbourhoods. It also determines the degree of significance of proximity to quality transit on the residential and transportation choices of immigrants. The manuscript is ready for submission to a peer-reviewed journal for publication.

This manuscript makes methodological and theoretical contributions to the immigrant transportation literature. It methodologically contributes by devising a new day-long transit quality index for evaluating the transit quality of neighbourhoods. The study makes theoretical contributions to the literature by highlighting the differences in transportation patterns between Chinese and South Asian neighbourhoods, and by showing the role that proximity to quality transit plays in immigrant neighbourhoods in mobilizing choice of commuting modes.

Finally, Chapter 5 summarizes the key findings from Chapter 2 to 4. It then illustrates the theoretical and methodological contributions they make and also discuss the planning implications for the findings. Within this chapter, there is also a discussion of potential research limitations, as well as the identification of some potential future research direction and opportunities.

Chapter 2: The Immigrant Effect on Commuting Modal Shares: Variation and Consistency across Metropolitan Zones

2.1 Abstract

The literature has identified an “immigrant effect” in commuting modal shares, accounting for higher reliance on public transit. Few studies have, however, studied the immigrant effect at the intra-metropolitan scale. This paper relies on individual- and census tract-level data to identify relations between immigrant modal shares and housing location within three metropolitan concentric zones (inner city, inner and outer suburb) and selected socioeconomic variables. Findings from the Toronto metropolitan area confirm the existence of an immigrant effect, as immigrants register higher levels of transit use than the domestically born population in all categories of residential location across the metropolitan region. The paper reflects on reasons for, and sustainability consequences of, disproportional immigrant transit reliance in sectors, such as the outer suburb, that are poorly served by transit. It suggests a demand-driven transit strategy that would involve adjusting services to the higher transit reliance of immigrants.

Keywords: Immigrant Settlement; transportation pattern; suburbanization; Toronto

2.2 Introduction

Just as immigrants opt for suburban residential locations, researchers have pointed to a lasting ‘immigrant effect’ on commuting patterns, whereby immigrants contribute to lower overall car-use regardless of income. However, much less is known about potential intra-metropolitan spatial variations of this effect. The lower car-dependency among immigrants seems paradoxical given their increasing presence in low-density suburbs where transit availability is sparse relative to more central locations. There is little research that can help us understand whether immigrants in the suburbs also post lower car dependency compared to other suburban residents; or whether, instead, the overall metropolitan-level effect is driven primarily by a subset of immigrants who reside in the more transit-accessible inner city. Better understanding of these dynamics can aid in the design of public transit policies to meet potential sustainability goals of lower car use.

In this paper, we investigate commuting patterns of immigrants within the Toronto census metropolitan area (CMA). Statistics Canada applies the term “immigrant” to describe a person who is born outside Canada and has been granted legal rights to live in the country permanently (Statistics Canada, 2019d). In Toronto, immigrants constitute nearly half of the total population and are highly diverse in terms of ethnicity and country of origin (Vézina & Houle, 2017). The characteristics of

immigrants that differentiate them from non-immigrants are well documented in the literature. Research has shown that immigrants generally have lower incomes and larger family sizes compared to non-immigrant populations (Agarwal, 2010; Crossman, 2013). It also portrays distinct preferences, which are largely influenced by the culture at their country of origin, in selecting residential locations and making lifestyle choices (Li, 2009c). Interactions between these socioeconomic factors culminate in differences in the utilization of urban services, such as transportation, between immigrants and non-immigrants in metropolitan regions (Heisz & Schellenberg, 2004).

To analyse commuting patterns of immigrants, we first use individual-level census data to describe how the commuting patterns of immigrants living in different housing types and tenures vary from those of the non-immigrants with similar housing circumstances. Second, we compare commuting characteristics of census tracts, categorized according to their proportion of immigrants. We develop models for the whole CMA and for each metropolitan zone (inner city, inner and outer suburbs), and use standardized coefficients to compare models. The models measure how commuting modes vary with the concentration of immigrants within census tracts, while accounting for other characteristics that impact commuting behaviour.

Census tract data can only reveal a relationship between commuting behaviour and immigrant concentrations at the tract level. It does not measure immigrants' individual transportation behaviour directly. However, in combination with the individual data analysed here and in prior research, we can (cautiously) draw conclusions about how the commuting behaviour of immigrants varies spatially.

Findings demonstrate that immigrants register lower car-dependency than non-immigrants regardless of housing type or tenure. The census tract-level analysis shows an increase in public transit use, and carpooling, with higher levels of immigrant concentration in all metropolitan zones. The persistently higher transit use in tracts with concentrations of immigrants irrespective of zone shows that the 'immigrant effect' on car dependency exists even in suburbs with relatively low levels of public transit service. Findings thus refute the view that higher public transit use among immigrants stems solely from a tendency for them to reside in sectors that are well served by transit.

2.3 The Suburbanization of Immigration

The percentage of immigrants in Canada was 21.9 percent in 2016. In Toronto, Canada's largest metropolitan region, this proportion reached 46.1 percent. Among nations hosting high numbers of immigrants, Canada stands out because of the high diversity of backgrounds and country of origins (Hiebert, 2016). Most immigrants to Canada are selected through a points system, which in theory is intended to gauge their capacity to integrate to Canadian society, especially its job market (Knowles,

2016, 247 - 271). Despite their diversity and qualification, and Canada's multicultural policies, integration of immigrants within Canadian society is frequently impaired by the non-recognition of foreign work and educational credentials, structural racism and exclusion (Guo, 2009). As a result, many immigrants must settle for jobs that do not correspond to their skill set, and thus end up in precarious, low-paid employment (Kaushal et al., 2016; Wilkinson et al., 2016).

As suburbs contain most of the metropolitan population, jobs, services and retailing, it is not unexpected that a majority of immigrants now opt for suburban living (Gordon & Janzen, 2013). Immigrants, like other residents, suburbanize in large part to benefit from lower housing cost, particularly for larger ground-level dwellings, and proximity to a growing suburban job pool (Behrens & Kühl, 2011).

More so than the general population, some immigrant households are drawn to big suburban houses, capable of accommodating large extended families (Bascaramurty, 2013). Existing concentrations of residents belonging to their own ethnic group, which ease access to family members and friends along with ethnic-oriented shops, employment, institutions and places of worship, may also account for the disproportionate appeal the suburb exerts on immigrants (Qadeer, Agrawal, & Lovell, 2010). These suburban ethnic concentrations express the distinctive culture of immigrants in local politics, the retail scene and public institutions (Li, 1998b; 2006b; Wang & Zhong, 2013).

2.4 Travel Patterns of Immigrants

Prior studies of travel behaviour identified patterns among immigrants that differ from those of domestically born, notably less driving, higher reliance on public transit and carpooling, along with shorter travelled distances (Blumenberg & Evans, 2010, 2007; Blumenberg & Shiki, 2008; Blumenberg & Song, 2008). These differences reflect the preferences of immigrants as regards residential location, culture, and socioeconomic status. For instance, transportation habits immigrants bring from their country of origin are believed to contribute to their higher reliance on public transit (Tal & Handy, 2010, 92).

At the same time, these travel distinctions are also seen as consequences of immigrants' socioeconomic circumstances. Higher public transit patronage and shorter travel distances are related to lower income and more precarious labour market circumstances than those of domestically born individuals (Blumenberg & Shiki, 2008; Chatman & Klein, 2013; Clark & Wang, 2010; Lovejoy & Handy, 2008). For many immigrants, difficulties inherent in integrating into their host country, especially its labour market, result in limited resources restricting their location and transportation choices (Blumenberg, 2009). Historically, the lower income of immigrants had a dual transit-conducive effect on their travel pattern: It made it difficult for them to rely on the car and confined

them to high-density inner-city neighbourhoods, which were generally well served by public transit.

Several studies point to a transportation assimilation tendency among immigrants, whereby their travel pattern loses its distinctiveness as the stay in the host country lengthens (Asgari, Zaman, & Jin, 2017; Chatman & Klein, 2009,315; Xu, 2018). For example, Hu (2017) documented the rapid adoption of the North American automobile culture by Asian immigrants in the US. In a similar vein, two Toronto-focussed studies exposed a convergence between the commuting distance and modal shares of foreign- and domestically born residents with increasing length of stay in Canada (Heisz & Schellenberg, 2004; Newbold & Scott, 2018; Newbold et al., 2017).

Tal & Handy (2010, 85) note wide differences in the rapidity with which the transportation patterns of different immigrant groups converge with those of non-immigrants. They also find that some immigrant groups maintain higher levels of public transit use regardless of length of stay in the host country. It is noteworthy, however, that despite the identification of differences between transportation patterns of foreign- and domestically born residents, there is less variation in the travel behaviours of immigrants and non-immigrants sharing similar socioeconomic characteristics.

The residential geographies of immigrants and their transportation behaviour are closely linked. Yet, the two are often studied in isolation. A few studies have considered immigrant settlement patterns to understand their transportation behaviour predominantly focussing on carpooling (Liu & Painter, 2012; Shin, 2017a; 2017b). Lo et al., (2011) have stressed the importance of improved governance to better account for the impacts of immigrant settlement on transportation infrastructure. However, the impact on transport patterns of variations in spatial concentrations of immigrants remains largely unexplored.

Clearly, the suburban geography of immigrants in Toronto would suggest higher car dependency due to the nexus between car use and the suburban realm. The low density of suburbs, their functionally specialized planning and limited transit options make them ill-suited to non-automobile modes (Moos, et al., 2018). In the Toronto CMA, transit services generally decline with distance from the central business district (CBD).

Therefore, we expect that immigrants living near the CBD will demonstrate higher reliance on public transit, walking and cycling than suburban immigrants. But how do the differences in modal split between immigrants and non-immigrants vary in different areas within a specific metropolitan area? In other words, does the relationship between distance from the CBD and car-dependency change at the same rate for immigrants and non-immigrants? Or are inner city immigrants primarily responsible for a metropolitan-wide lower car use among immigrants as compared to non-immigrants? These are the questions driving this paper.

2.5 Methods

The data originate from the 2016 Canadian census. We use variables on immigration status, household composition, education, income, housing, and commuting mode at the individual and census tract (CT) level.

Two additional variables were computed to improve understanding of transportation patterns. Distance from the centroid of each CT to the central business district (CBD) was calculated. Also, we measured distances from the centroid of the tracts to their nearest rapid transit stop (bus rapid transit or rail system) to assess the proximity of CTs to quality public transit. Information on the transit system was generated in ArcGIS 10.6 using the information collected in General Transit Feed Specification (GTFS) format from multiple sources.

The analysis in this research is divided into three parts: i) individual-level data on commuting patterns ii) immigrants' spatial distribution at the CT level, and iii) relationship between commuting mode and the spatial concentration of immigrant residential areas.

First, the individual data compares commuting modes of non-immigrants and immigrants, including the length of stay in the host country variable for the latter. Publicly available individual-level census data do not allow the cross-tabulation of immigrant and non-immigrant commuting data with intra-CMA residential locations. Thus, we compare commuting modes by characteristics of the housing stock that have been associated with suburban ways of living in prior research (Moos & Walter-Joseph, 2017; Rosen & Walks, 2015). This approach does not add an explicit spatial dimension. But we know from prior research that the geography of single-detached home ownership increases with distance from the CBD and is generally highest in the outer reaches of the CMA (Taylor & Burchfield, 2010). Nonetheless, when interpreting results from this first part of the research, we must keep in mind that there are some central area CTs that also register high levels of single-detached homeownership.

A location quotient (LQ) was devised using Formula 1 to measure the level of immigrant concentration of the CTs relative to their average in Toronto CMA.

$$LQ = \frac{I_i/P_i}{I/P} \quad (1)$$

where, I_i = total immigrant in CT i ; P_i = total population in CT i ; I = total immigrant in Toronto; and P = total population in Toronto.

The CTs were divided into three groups based on the levels of immigrant concentration. The tracts with LQ values above 1.2 were categorized as “high concentration of immigrants”, and those with scores less than 0.8 were considered to have “low concentration of immigrants”. CTs with in-between LQ values were identified as showing a “medium concentration”. The three categories of

CTs were created within each of the three metropolitan zones (inner city, inner and outer suburb), which were defined following established methods using their period of development (Bunting & Fillion, 1996; Skaburskis & Moos, 2008). The inner city contains CTs originally urbanized before 1946, the inner suburbs were developed for the most part between 1946 and 1971, and the outer suburbs were built primarily from 1971 onwards. Pre-1946 villages and towns that have since been absorbed by suburban development are assigned to the inner or outer suburb zone according to the period when areas surrounding them were developed.

Finally, we compare transportation patterns by levels of CT immigrant concentration within each zone both descriptively and using multivariate analysis. Regression models were constructed to assess the relationship between levels of immigrant concentration and selected socioeconomic and transportation variables. We framed four spatial error regression models, one within each zone and one for the CMA as a whole. The limitation of CT-level data is that they only apply to CT averages, not to individual-level information. So, while the CT data add a more nuanced geographic dimension to the analysis of immigrant settlement patterns, caution must be exercised in interpreting findings.

Spatial error regression models were devised using a maximum likelihood approach in GeoDa (a GIS software package). Spatial error models control for spatial effects (Irwin & Geoghegan, 2001), and thereby, derive more efficient and unbiased relationships compared to other modelling approaches, such as Ordinary Least Square (OLS) regression. Lagrange Multiplier test (LM-lag and LM-error) and their robust versions (RLM-lag and RLM-error) were assessed to detect the presence of spatial dependence. The selection of the spatial error model is further justified by the higher significance of LM-error and RLM-error than LM-lag and RLM-lag respectively. Although OLS and spatial lag models were developed in addition to the spatial error model using the same set of variables, results from the latter model were selected for discussion because of better model fit.

The immigrant LQ values of CTs were added as the dependent variable in the models. The independent variables captured three dimensions – physical, socioeconomic and transportation. For the physical dimension, the model included distances from the centroid of each CT to the CBD as well as the density of private dwellings within each CT. The socioeconomic dimension comprised variables representing the percentage of the population with a university degree, average household size, percentage of households spending thirty percent or more of their income on shelter and housing tenure (owner to renter ratio). The physical and socioeconomic variables were selected because of their importance in shaping transportation outcomes, which is acknowledged in the literature (Heisz & Schellenberg, 2004; Levinson, 1997; Newbold et al., 2017). LQs for four commuting modes were included – driving, public transit, carpooling and active transportation (biking and walking) –

representing their use in each CT relative to the average for the entire CMA.³

Thus, the models will show us how commuting modes vary with levels of immigrant concentration in each zone, while holding other factors that impact residential location patterns constant.

2.6 The Toronto CMA Context

The Toronto CMA (Figure 2.1) was selected for the study because of its high proportion of immigrants and the sharp distinction in land use and transportation patterns between central and outer zones. The inner city registers high densities and shares of non-automobile-based commuting. It is also the urban zone where public transit is most developed and ridership the highest. The inner suburb is more automobile oriented. Transit service quality (frequency and coverage) is highly uneven. Some portions of the inner suburb are served by subways whereas others cope with infrequent local bus

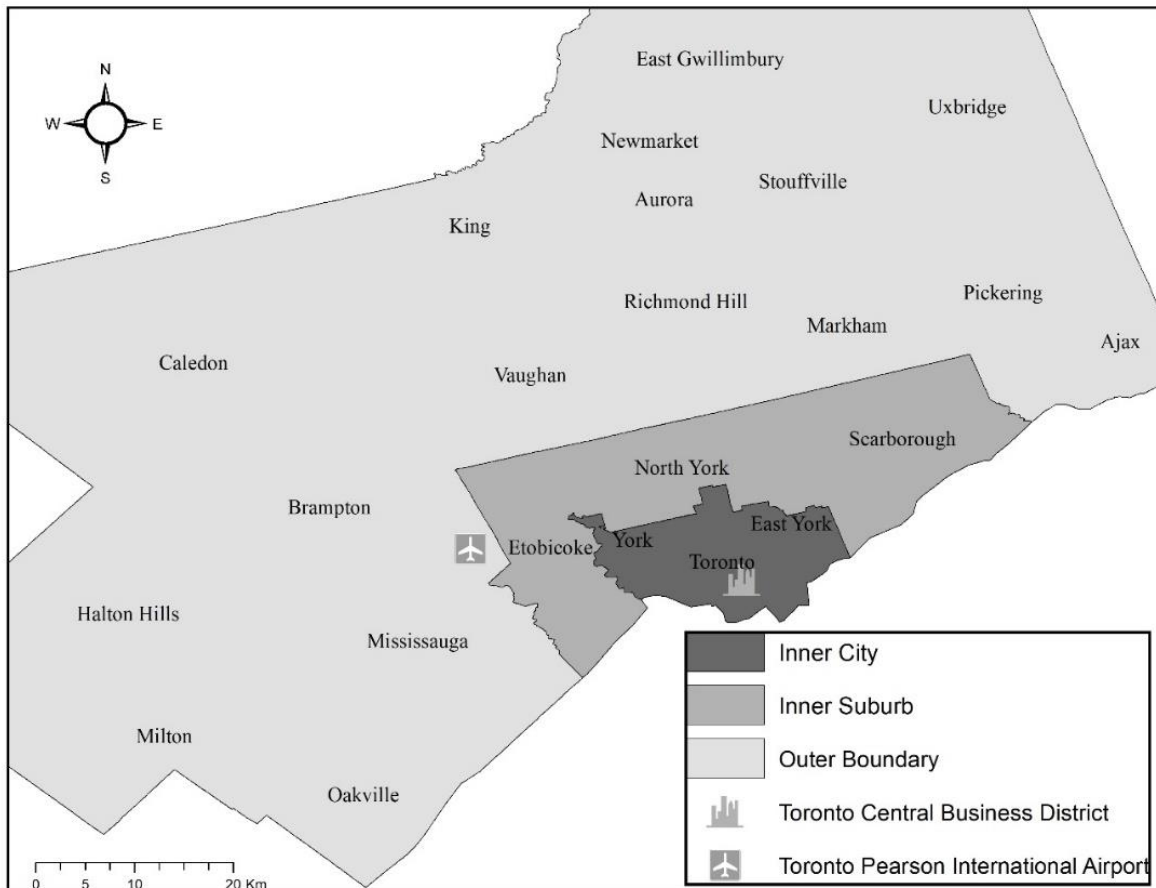


Figure 2.1: Municipal Concentric Zones of Toronto CMA

³ Driving corresponds to the use of car, truck or van for work-related travels as a driver, whereas carpooling corresponds to passengers in these same vehicles.

services (Filion, McSpurren, & Appleby, 2006). The outer suburb presents a more uniform low-density configuration. Apart from rail connections to Downtown Toronto, public transit coverage in the outer suburb is generally infrequent and lacks interconnectivity between dispersed outer-suburban origins and destinations.

Toronto portrays a geography of income that resembles that of other large global cities such as New York. The inner city, after decades of gentrification, posts high income levels contrasting the inner suburbs where incomes have been declining relative to the CMA average. Meanwhile, the outer suburb maintains high incomes, although select portions experience declining incomes (Breau, Shin and Burhkart, 2018). Hulchanski (2007) has documented income polarisation at the CT scale within the City of Toronto as formerly middle-income CTs become over time either wealthier or poorer residential areas. Findings from prior research also point to an association between accessibility to quality public transit and higher income within the inner city, and an association between low-quality transit services and inferior incomes in the suburb, especially the inner suburb (Amar & Teelucksingh, 2015; Jones & Ley, 2016).

2.7 Findings

2.7.1 Commuting Mode and Housing

At the CMA level, our analysis confirms prior findings that immigrants are less likely to drive and more likely to use transit for traveling to work compared to the general population. Based on the 2016 census individual-level data, 60 percent of all Toronto CMA commuters drive to work, compared to 44 percent of immigrant commuters. In contrast, while only 25 percent of the general population use public transit to travel to work, the proportion for immigrants is close to 38 percent. Carpooling is higher among immigrants compared to the rest of the population (8 percent versus 6 percent), albeit it represents a small proportion of the total journeys. Meanwhile, immigrants register higher walking (7 percent versus 5.5 percent) but lower cycling (1 percent versus 1.5 percent) rates as compared to all commuters. While these data apparently suggest automobile dependency among immigrants and non-immigrants alike, they also highlight the fact that immigrants are substantially more reliant on transit services and carpooling for commuting compared to the population as whole.

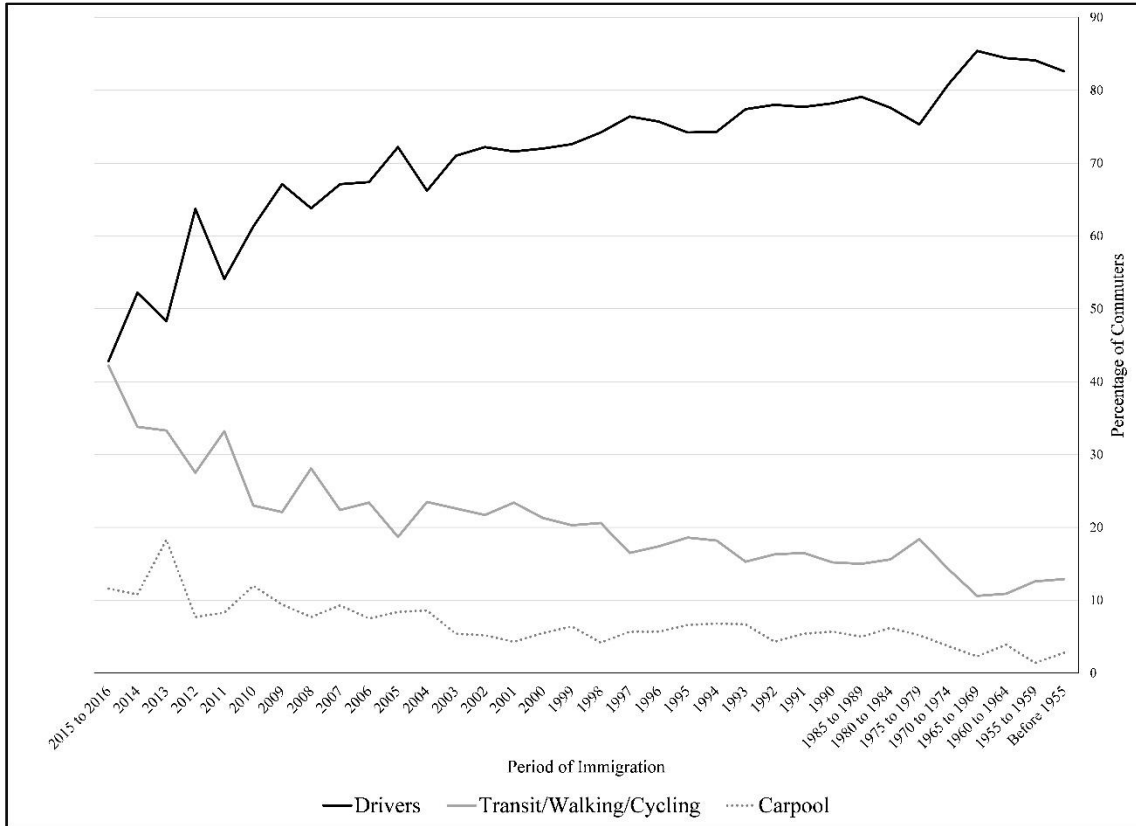


Figure 2.2: *Commuting Mode by the Length of Stay of Immigrants in Canada*

We also find a strong relationship between commuting mode and length of stay in Canada (Figure 2.2). The share of drivers is just under 43 percent for immigrants who arrived between 2015 and 2016. This share among immigrants steadily increases with length of stay. At 85 percent, it is highest among immigrants who settled in Canada between 1965 and 1969. This is 25 percent higher than the share of car commuters among the total population, but comparable to that of the non-immigrants of a similar age.

The data demonstrate changes in transportation behaviour as immigrants become accustomed to dominant North American transportation norms over time. Immigrants rely more on public transit due to income constraints but also because of journey habits acquired in their country of origin (Tal & Handy, 2010). Over time, transit shares drop as immigrants' incomes rise, allowing them to avail themselves of the greater efficiency of the automobile at negotiating the North American metropolitan built form.

However, it needs to be remembered that these are cross-sectional data. There is no guarantee, of course, that new immigrants will follow a similar trajectory over time. Yet, the high suburbanization of immigrants points toward the possibility of even greater car-dependence over time, working against sustainability goals, unless there is a substantial improvement in suburban

transit service and/or severe stagnation in immigrants' incomes.

We now link commuting modes and housing characteristics to provide cursory insight into the intra-metropolitan geography of immigrants' commuting patterns (Figure 2.3). Although not exclusively, single-detached homeownership is generally associated with more dispersed residential locations in Toronto. Even in central locations, single-detached neighbourhoods are much more car dependent than nearby high-density areas. Considering tenure also allows us to see differences in commuting patterns between immigrants and non-immigrants with somewhat similar socio-economic backgrounds.

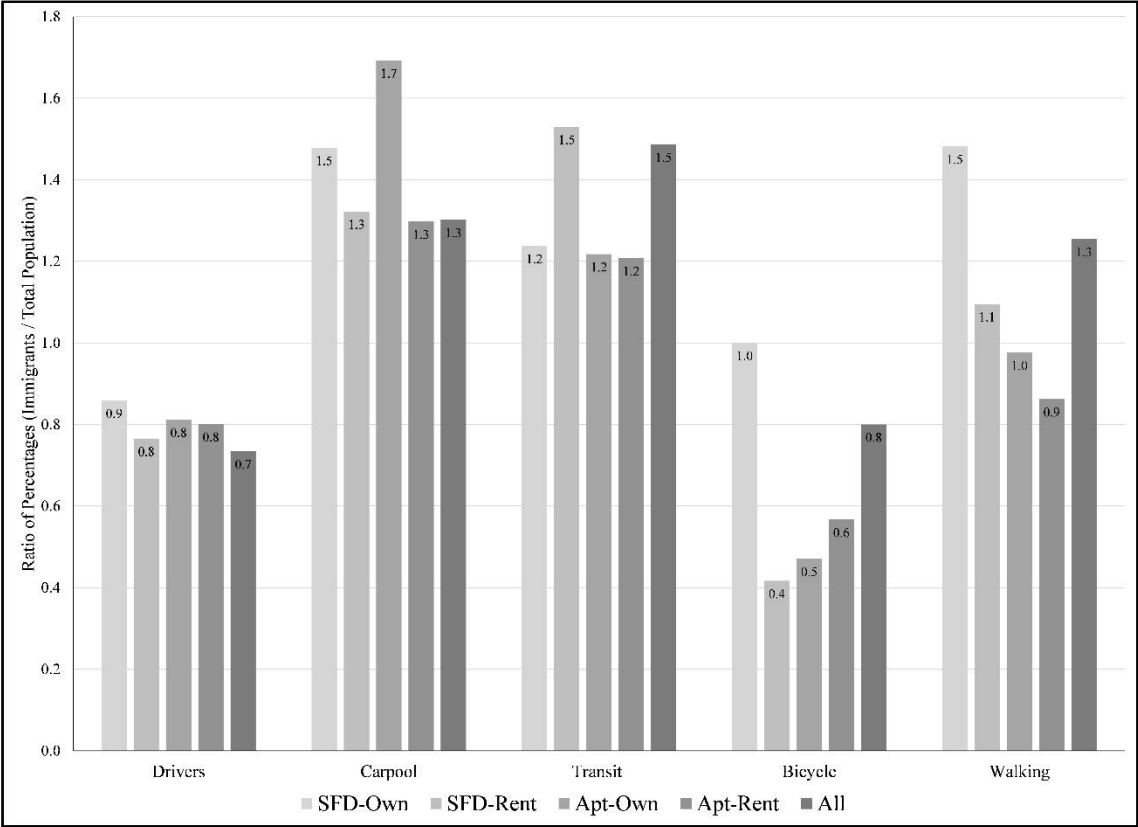


Figure 2.3: Ratio of Immigrants' Commuting Mode Shares to the Total Population

Figure 2.3 shows the ratio of immigrants' commuting mode shares relative to total population mode shares. Values greater than 1 indicate higher reliance on a particular mode on the part of immigrants. Differences between immigrants and the total population are shown for four different housing arrangements: single-detached owned, single-detached rented, apartment owned and apartment rented.

The data indicate that immigrants are less likely to drive to work than the general population living in similar types of housing (Figure 2.3). Immigrants are more likely to carpool and use transit among all housing categories. The difference in carpooling is highest among those living in owned

apartments, while the difference in transit use is highest among renters. With the exception of those residing in owner-occupied single-detached housing, immigrants are less likely to cycle to work but are at least as likely as the total population to walk, with the exception of those renting apartments.

2.7.2 The Spatial Distribution of Immigrants

Not unexpectedly, the spatial analysis shows high suburbanization and clustering of Toronto's immigrant population. Figure 2.4 and Table 2.2 indicate that the tracts with high (LQs exceeding 1.2) immigrant concentration predominantly appear in inner and outer suburbs. There are fewer high-LQ CTs in the inner city, and those that post such concentrations are mostly found at the outer edge of this zone. The inner-city CTs nearing the CBD register a low immigrant presence (LQs below 0.8).

Table 2.1: Distribution of Immigrants Across Metropolitan Zones

	Number of Immigrants	Concentric Zone Immigrants as Percent of all Toronto CMA Immigrants	Immigrants as a Percent of the Concentric Zone Population
Inner City	377,735	13.96	35.5
Inner Suburb	922,360	34.09	53.08
Outer Suburb	1,405,455	51.95	43.88
Total	2,705,550	100	

Table 2.2: Compositions of Census Tracts and their Distribution of Immigrants within each Concentric Zone, 2016

	% of CTs by category within each zone			% distribution of immigrants within each zone		
	Inner City	Inner Suburb	Outer Suburb	Inner City	Inner Suburb	Outer Suburb
LQ < 0.8	59	13	34	42.39	5.68	16.23
0.8 < LQ < 1.2	34	37	36	42.71	32.13	36.52
LQ > 1.2	7	51	30	14.89	62.19	47.25

Meanwhile, high-LQ tracts in the inner and outer suburb form large clusters. Such CTs in the inner suburb tend to be near the outer boundary of this zone, whereas many of these tracts in the outer suburbs appear to be a spill-over of the inner-suburban agglomerations of high LQ CTs.

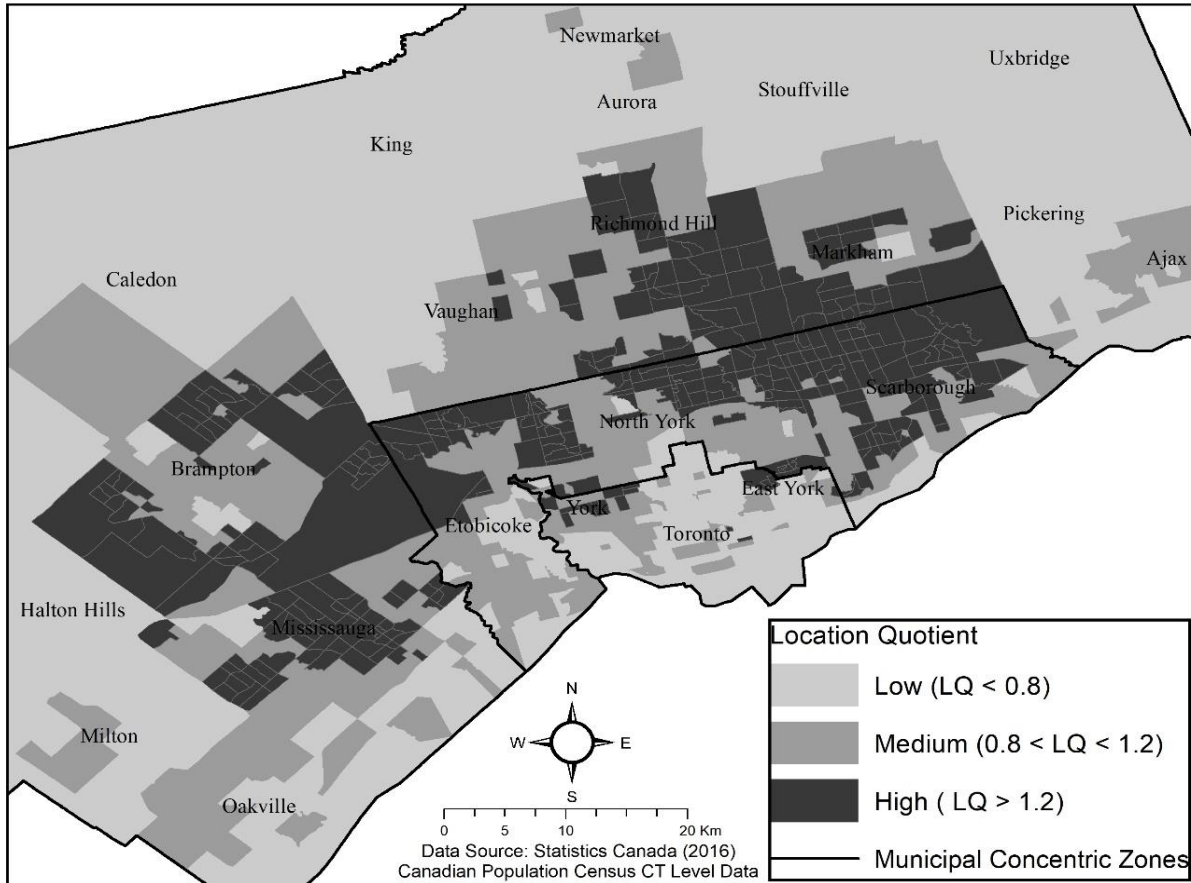


Figure 2.4: Distribution of Immigrants in Toronto CMA

The zonal distribution of the immigrant population further confirms the high degree of suburbanization among immigrants (Table 2.1). The data in Table 2.1 indicate that 86 percent of Toronto immigrants reside in the two suburban concentric zones, where the outer suburb accounts for the majority (52 percent). It is in the inner suburb that immigrants represent the highest percentage of the population (53 percent).

Findings point to the tendency for immigrants to concentrate in high-LQ suburban CTs. The low and medium LQ CTs together contain 85 percent of inner-city immigrants. In contrast, close to half of outer suburban immigrants reside in high LQ CTs. The distribution of immigrants in the inner suburbs is even more concentrated. Nearly two-thirds of inner-suburban immigrants live in high-LQ CTs.

2.7.3 Modal Split by Level of Immigrant Concentration

Table 2.3 presents commuting modal split by CMA zone and level of immigrant concentration. Most glaring is the decrease in transit share as one moves from the inner city to the inner and, then, outer

suburb, accompanied by a rise in driving. This trend is indeed consistent with our expectations as density and multifunctionality as well as transit availability and frequency are highest in the inner city and, generally, decline with distance from the CBD (Lo, Shalaby, & Alshalalfeh, 2011; Miller & Soberman, 2003). Driving dominates in the inner and outer suburb and transit surpasses driving in the inner city, regardless of the level of immigrant concentration. Cycling and walking rates are highest in low- and medium-LQ CTs of the inner city— a zone that is increasingly gentrifying and, on average, has fewer immigrants (Filion, 1991). The finding is consistent with previous studies linking active transportation and gentrification (e.g., John, 2015).

Another noticeable pattern is the higher share of transit commuters in all three zones' high-LQ-tracts. The driving to transit ratio is highest in the low-LQ tracts and decreases with the level of immigrant concentration. Breaking this trend, however, are high-LQ inner-city tracts, which post higher driving shares than inner-city CTs with lower LQs. This is likely in part due to the location of the high-LQ inner city tracts, further from subways and the CBD than CTs with lower LQs.

Table 2.3: Commuting Modal Shares by Immigrant Concentration of Tracts in Each Concentric Zone

		Driving	Transit	Passenger	Walking and Cycling	Driving to Transit Ratio
Inner City	Low	35.38%	37.86%	3.09%	23.25%	0.93
	Medium	29.24%	42.67%	3.37%	24.52%	0.68
	High	38.15%	48.59%	4.95%	7.41%	0.78
Inner Suburb	Low	64.86%	25.12%	4.59%	4.58%	2.58
	Medium	57.77%	32.53%	5.00%	3.72%	1.77
	High	53.17%	36.23%	6.18%	3.56%	1.46
Outer Suburb	Low	79.81%	9.56%	6.05%	3.65%	8.34
	Medium	75.95%	14.37%	6.17%	2.57%	5.28
	High	72.99%	16.88%	7.01%	2.27%	4.32

Of additional relevance to our investigation is the rate at which the transit modal shares of low- and high-LQ CTs decline as we move from the inner city to the outer suburb. As we transition from the inner city to the inner suburb, the decline in transit shares in both low- and high-LQ CTs is about 12 percent. This decline is, however, both more pronounced and uneven when we consider differences in transit shares between the inner and outer suburb. It is 16 percent for low-LQ CTs and reaches 19 percent for high-LQ CTs.

High-LQ CTs in the outer suburb register higher transit shares than low-LQ CTs in the same zone, but this difference is much smaller in the outer suburb than in either the inner suburb or inner

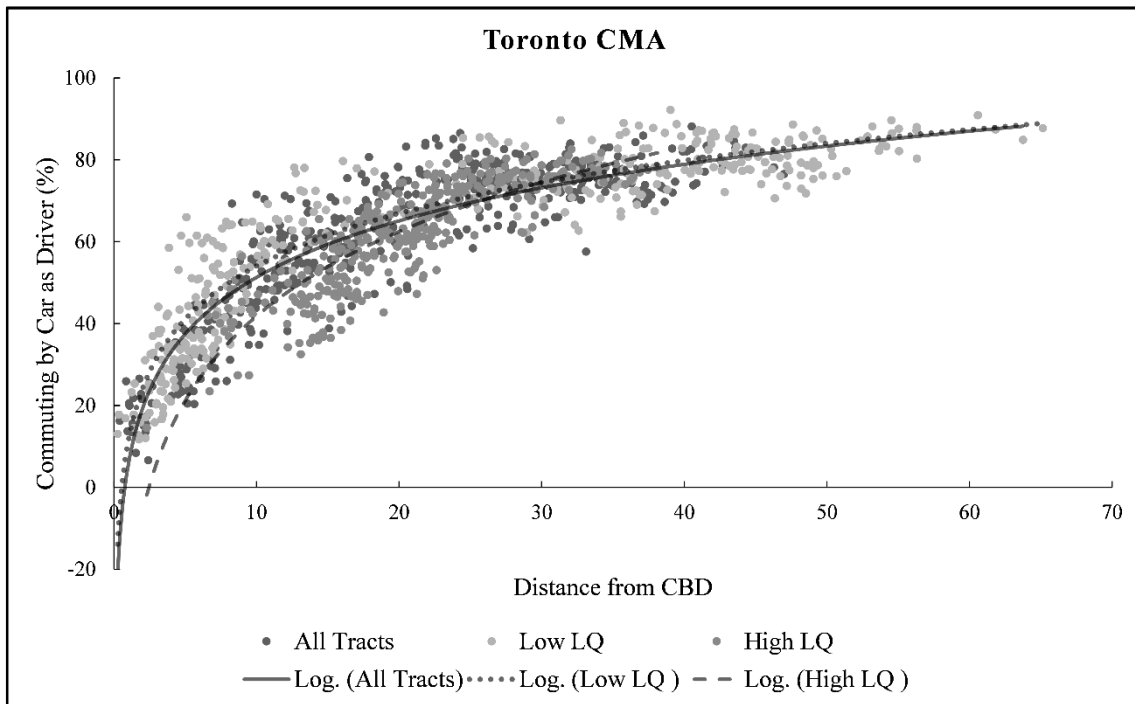


Figure 2.5: Relationship between Car Use and Distance from CBD for CTs with Different Concentrations of Immigrants

city. We suspect that both lower transit service levels as well as higher immigrant incomes in the outer than inner suburb account for this situation.

Figure 2.5 illustrates the relationship between the percentage of a tract’s automobile-based commuters and distance from the CBD, differentiating low and high immigrant tracts. Not surprisingly, driving rises with distance from the CBD, as the density of the built form declines and transit service becomes less frequent. The graph also shows that the tracts with high levels of immigrants are located mostly between 10 and 35 km from the CBD. This coincides with the outer edges of the inner city, the inner suburb and the inner portions of the outer suburb. Most remarkable is how the slope of the relationship between driving and distance from the CBD changes with immigrant concentration levels. The high-LQ tracts see driving commutes increase less quickly with distance from the CBD than the low immigrant tracts or, for this matter, than all tracts.

2.7.4 Immigrant Concentration, Socioeconomic Status, and Commuting Modes

We developed regression models to test whether the relationship between the concentration of immigrants and lower automobile use persists once we account for other factors shaping commuting patterns. In addition to a model including all tracts in the CMA, separate regressions were constructed for each metropolitan zone to see how the relationship between immigrant concentrations and

commuting patterns varies in different parts of the metropolitan region. Table 2.4 summarizes results from the regression analysis.

Table 2.4: Transportation and Socioeconomic Correlates of Immigrant Concentrations

	Toronto CMA	Inner City	Inner Suburb	Outer Suburb
	Coeff	Coeff	Coeff	Coeff
LQ – Driving	0.061	0.118	-0.039	0.016
LQ - Transit	0.154*	0.147*	0.180*	0.224*
LQ – Walk and Cycle	-0.035*	0.024	-0.054*	-0.034
LQ - Passenger	0.071*	0.088*	0.056*	0.068*
Distance from CBD	-0.004*	0.005	0.022*	-0.013*
Dwelling Density	0.018*	0.022*	0.017*	0.050*
University Degree	0.002	-0.193*	-0.031	0.110*
Average Household Size	0.146*	0.119*	0.077*	0.173*
Owner to Renter Ratio	0.004	-0.039	0.040*	-0.002
Spending More than 30% of Income on Shelter	0.362*	0.233*	0.294*	0.392*
CONSTANT	0.014	0.025	0.011	0.150
R ²	0.876	0.783	0.830	0.891
N-Cases	1132	234	336	562

*Significant at 5% Confidence Interval

Relationships between socio-economic variables and immigrant concentrations, for the most part, hold across CMA zones. (Zonal comparisons must be interpreted with caution as they refer to tract-level averages.) We find a positive association between household size and immigrant concentration levels in CTs, reflecting the tendency for immigrants to live in larger households than the non-immigrants. Higher immigrant concentrations were also associated with lower socioeconomic status as indicated by the spending on shelter variable. The proportion of the CT households spending 30 percent or more of their income on shelter increases with immigrant concentration.

These CT-based findings are consistent with results from studies using individual-level data to investigate immigrants in Toronto. Large household size among immigrants is commonly attributed to their adherence to traditional family structures (two parents and children) and the prevalence of multi-family and inter-generational households (Bascaramurty, 2013; Hiebert et al., 2006). Meanwhile, immigrants, especially in their early years, spend, on average, nearly 50 percent of their income on housing, primarily due to their low income (Preston et al., 2009). Overall, both immigrant owners and renters end up allocating a substantial proportion of their incomes to meet housing costs (Hiebert, 2017).

A relationship between the owner to renter ratio and immigrant concentration levels was only detected in the inner suburb. We assume that this positive association reflects high homeownership rates among immigrants, particularly in the inner suburbs, observed in earlier studies (e.g., Hiebert,

2017). A greater appeal of home ownership for immigrants relative to the Canadian-born could also be a factor contributing to their observed tendency to allocate a high portion of their income to housing.

The relationship between immigrant concentrations and education varies by CMA zone. In the outer suburb, an increase in the population with a university degree is positively associated with immigrant concentrations. The finding is not unexpected since the percentage of immigrants with a masters' or doctorate degree is twice that of the non-immigrants (Statistics Canada, 2017a). However, there is a negative association in the inner city between university education and immigrant concentration, consistent with the location of subsidized housing that houses low-income immigrants in Toronto's inner city and to some extent also in the inner suburb. Widespread inner-city gentrification, which attracts mostly highly educated non-immigrants, is a further factor accounting for this observation.

Extensive research has attributed the apparent paradox between immigrants' high education achievement and their difficult economic circumstances to an insufficient recognition in Canada of their out-of-country educational qualification and work experience (Annen, 2019; Drolet & Teixeira, 2019; Premji & Shakya, 2017). Such discrimination results in underemployment and lower incomes.

The commuting patterns revealed by the models are generally in accord with findings from the literature on immigrants' transportation behaviour (Blumenberg & Evans, 2010, 2007; Blumenberg & Shiki, 2008; Blumenberg & Song, 2008; Liu & Painter, 2012; Shin, 2017). Our results point to higher reliance on public transit and carpooling in the high immigrant-concentration tracts. The models detected a positive association between public transit use and immigrant concentration for the entire study area as well as for each CMA zone. Remarkably, the relationship between driving and immigrant concentrations is not statistically significant in any of the models. This points to the fact that although high immigrant areas register inferior driving levels, it remains the dominant mode of transport across the suburban zones in low-, medium- and high-LQ CTs, often by a large margin.

The models also identify an increase in carpooling with higher immigrant concentration levels. We speculate that limited public transit service in the suburbs, where most immigrants reside, contributes to higher carpooling rates. What is more, employment decentralization in Toronto CMA has induced suburban job growth, which largely takes place in industrial and business park configurations, whose low density and large monofunctional expanses make them notoriously difficult to service by transit. In these circumstances, carpooling provides an economical and convenient alternative. Moreover, ethnic districts provide strong social cohesion, which favours carpooling. The findings also suggest lower reliance on active transportation in high-LQ CTs,

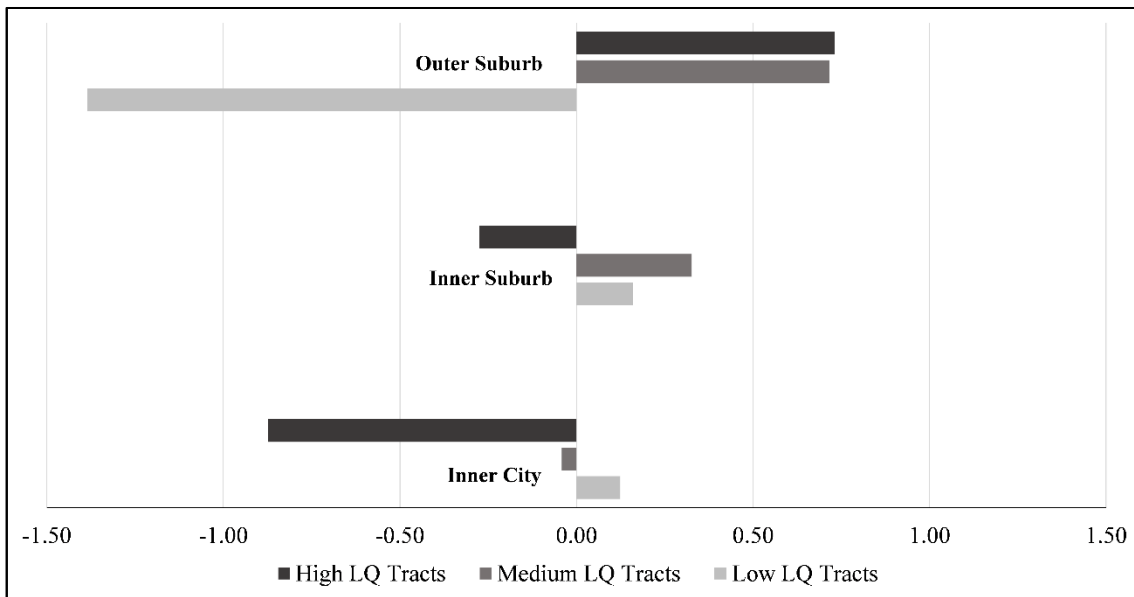


Figure 2.6: Mean Difference in Distances from CT Centroids to the Nearest Transit Stop Relative to Metropolitan Average

especially in the suburbs. One explanation may be the presence of concentrations of immigrants in suburban environments that are car-oriented and therefore hostile to walking and cycling.

The higher transit dependence in high-LQ tracts could be associated with proximity to transit stops, but our analysis indicates otherwise. Figure 2.6 represents the comparison of the mean distance from the centroids of low-, medium-, and high-LQ- tracts to the nearest rail transit and BRT stops with the average distance calculated for their respective metropolitan zone. The positive values in the figure indicate less distance to these transit stops than the zonal average and the negative values suggest longer distances. As indicated in the figure, the medium- and high-LQ tracts in the inner city were located further from such transit stops compared to the low-LQ CTs. The high-LQ tracts in the inner suburb were also more distant from these transit stops than their counterparts. The relationship is reversed in the outer suburb as the medium- and high-LQ tracts registered proximity to rail transit and BRT stops compared to the low-LQ tracts. Regardless, the residents of the medium and high-LQ tracts in the outer suburb still need to travel 2.7 km on average to access transit.

The findings show higher reliance on transit and carpooling in areas with high immigrant concentrations; but they also suggest that the residential locations of immigrants are not necessarily conducive to transit use, raising equity concerns. Transit infrastructure in the Toronto remains highly concentrated in the inner city, particularly in and around the CBD. However, inner city and inner suburb tracts with high immigrant concentrations are located furthest from transit. Prior analysis has also detected constrained access to public transits in low-income areas of Toronto, where there are high concentrations of immigrants (see, Florida, 2011).

2.8 Conclusion: The Immigrant Concentration Effect

The analysis in this paper sits at the juncture of two interrelated issues – immigrant settlement and transportation patterns, which have previously mostly been addressed in silos. Instead, we consider commuting patterns in relation to immigrant residential distribution and the broader metropolitan context, such as the differing availability of public transit in the inner city versus the suburbs. The higher reliance on public transit and carpooling in immigrant intensive tracts meshes with the transportation behaviour of immigrants documented in the literature (Blumenberg & Evans, 2010, 2007; Blumenberg & Shiki, 2008; Blumenberg & Song, 2008; Liu & Painter, 2012; Shin, 2017b).

The data confirm the high suburbanization of immigrants in Toronto; the suburbs account for the overwhelming majority of immigrants in absolute terms, and the suburbs have a higher percentage of immigrants relative to the population than the inner city does. We also confirm the clustering of immigrants in specific parts of the suburban realm (also see Wang & Zhong, 2013). Findings highlight shared socioeconomic features in high immigrant tracts, notably larger household size and lower income.

Regarding commuting patterns, we confirm prior findings pointing to an immigrant effect: Immigrants are less likely to be car-based commuters than the Canadian-born population, in large part due to higher transit shares (and to a lesser extent, more reliance on carpooling). We find that this effect holds regardless of immigrants' housing type or tenure. Driving is higher among immigrants living in owner-occupied single-detached dwellings than among immigrants renting apartments (reflecting locational and socioeconomic conditions that impact commuting patterns). However, when compared to the Canadian-born population in similar types of housing, immigrants still post lower shares of driving.

The spatial data on transportation patterns unequivocally pointed towards higher reliance on public transit and carpooling for commuters in high immigrant-concentration areas irrespective of their CMA zones. The reliance on transit in high immigrant tracts was generally as expected in the inner city, and to some extent in the inner suburb. The dense coverage of subways, busses, and streetcars in the inner city provides more transit options for all residents. Parts of the inner suburb are serviced by subway and others by buses, although many areas in this zone have quite infrequent service levels. The heavier reliance on public transit in outer suburban tracts with high immigrant levels is perhaps more surprising given its low-density and automobile-oriented configuration, and limited transit options. It is important to note that there is a prevalent automobile assimilation tendency among immigrants in Toronto. The difference in the rate of automobile use between immigrants and non-immigrants converges as the duration of stay of the immigrants in Canada lengthens. However, the length-of-stay factor was not incorporated in this research as it

predominantly focuses on a general investigation of the inter-metropolitan-zone variations in immigrant-transportation relationships.

The higher transit shares in high-immigrant tracts also raise inequality concerns. Such tracts in the inner city and inner suburb are predominantly located in areas that have limited public transit access. Even in the inner city, where transit infrastructure is pervasive, we find that the distance between tracts and transit stops is longer for the tracts with large than those with small shares of immigrants. Even if this distance for the high-LQ tracts is less than the zonal average in the outer suburb, residents in these areas still need to travel considerable distances on foot to access transit service. Many of the high-immigrant tracts fall into what prior research has identified as “transit deserts” in Toronto (Florida, 2011). Therefore, we emphasize that the high transit use detected in immigrant intensive tracts in Toronto does not indicate easy and equal access to the public transit system across metropolitan zones. Quite to the contrary, it suggests that some people are relying on transit despite the difficulty of accessing it, in part due to income constraints.

Potentially because of the constrained access to public transit in high-immigrant tracts, carpooling has achieved some popularity. The high-LQ CTs can provide a cohesive ethnic environment conducive to carpooling. Moreover, decentralization of employment has induced job growth in the suburbs, where many immigrants are employed. Since the location offers limited public transportation options, in immigrant neighbourhoods carpooling can arise as a convenient and economical commuting mode.

This said, findings from the research clearly highlight the need for expanding public transit coverage to the suburbs. A demand-led improvement of transit systems would advantage geographic concentrations of immigrants. It would enhance services in transit-reliant but underserved suburbs, where many high immigrant tracts are found. The findings suggest that immigrants rely on transit even when conditions for transit use are less favourable. However, this also points to one of the reasons for the decline of the ‘immigrant effect’ on transportation patterns with length of stay. As immigrants spend more time in Canada, they become just as driving dependent as non-immigrants, likely because they find it difficult to navigate the low-density suburban landscape without a car.

Advantages of public transit improvements would likely be considerably less in the outer suburb. The potential for improving transit-based accessibility is hampered in the outer suburban zone by lower densities and larger monofunctional land use zones in both residential and employment districts, and the poor connectivity among different public transit systems from diverse suburban municipalities. In nearly all parts of the outer suburbs, public transit is a much inferior alternative to the car, adding rapid transit would only marginally improve accessibility because of low densities. To improve the accessibility within the outer suburbs would also involve modifying its land-use

configuration. These proposals would promote mixed-use and high-density developments especially in or close to areas where immigrants concentrate. Interim solutions could focus on ridesharing and/or transit improvements in select higher density nodes.

More generally, the paper points to the ways in which immigrants contribute to more sustainable transport patterns in Canada's largest metropolitan area, even in areas that are not generally believed to be conducive to public transit use. Transit enhancements in areas with high shares of immigrants are likely not only going to improve the service for existing transit users but may also slow the immigrant integration effect on automobile use over time. Immigrants have higher shares of transit use than the Canadian born, even when socio-economic factors are considered. Researchers and policymakers ought to be paying more attention to how to keep existing transit users in the system.

Chapter 3: Ethnoburb as a Spatiotemporal Process: Its Implications for Immigrant Settlements⁴

3.1 Abstract

The paper complements the visual observation and ethnographic emphasis of much of the literature on ethnoburbs by offering a spatial analysis of suburban immigrant settlements. The research focuses on the Greater Toronto and Hamilton Area (GTHA), Canada's most populous urban region. The region is especially well suited to an investigation of the suburban distribution of immigrants because of its exceptionally large and diversified influx of immigrants. The study concentrates on the two largest recent GTHA immigrant groups, Chinese and South Asians, and assesses their spatial evolution between 2006 and 2016. It demonstrates that immigrant suburban spatial patterning can take different spatial forms according to the ethnic groups under consideration – clustering in the case of the Chinese and a blending of clustering and dispersion for the South Asians. It also shows that ethnoburbs come in different guises reflecting the size and composition of different ethnic groups. Another finding concerns the evolution of ethnoburbs. The paper identifies different ethnoburb growth trajectories, but also acknowledges the possibility of a reduced presence of ethnoburbs in the future. Finally, by drawing findings from prior research on ethnoburbs, it elaborates on the gravity effect exerted by large clusters of ethnic retailing, services, and institutions on the different settlements of a given ethnic group.

Keywords: Ethnoburb; immigrant settlement; spatial evolution; Toronto

3.2 Introduction

It is not surprising that, with the growing tendency for immigrants to settle in suburban areas, the ethnoburb phenomenon attracts growing interest. In this paper, ethnoburbs are defined broadly as suburban settlements of immigrants, composed of different ethnic groups or demographically dominated by one such group. Also, as highlighted in the literature, the presence of immigrants sometimes finds expression in the retail, service and activity landscape of ethnoburbs, as well as in their political life. The emphasis of the ethnoburbs literature has mostly been on the identification and description of this phenomenon, on answering questions such as: What are ethnoburbs? What do they look like? Hence a frequent reliance on visual observation and ethnographic methods (Chan, 2012;

⁴ This is a post-peer-review, pre-copyedit version of the article published in *GeoJournal*. The final authenticated version is available online at: <https://doi.org/10.1007/s10708-020-10355-5>

Li, 2005, 2009a). It has shown how the existence of ethnoburbs marks a break from the former immigrant tendency to locate in the inner city and gravitate to the suburbs as assimilation to the host society takes place. Now, the majority of immigrants arrive in the suburbs and their subsequent moves generally also take place within the suburban realm.

The present study takes a spatial distribution approach to the investigation of ethnoburbs, focussing on suburban census tracts posting demographic characteristics consistent with ethnoburbs. The research thus identifies suburban areas that correspond to features associated with ethnoburbs and describes their location, size and distribution within the suburban realm. It specifies three types of ethnoburb-related census tracts – Nascent, Mature and Saturated – based of the size of ethnic group concentrations therein and whether the census tracts host a mixture of groups or are demographically dominated by one such group. The study also brings an evolutionary dimension to the investigation of the ethnoburb phenomenon, whereby the types of ethnoburbs can be interpreted as stages of development from the budding to the complete maturation stages. In sum, this paper is about the spatiotemporal distribution of ethnoburbs and their evolution. It is to be noted that this study focusses on the demographic dimension of ethnoburbs (spatial concentrations of immigrants), rather than on their socioeconomic dynamics (e.g. ethnic employment and retailing and political mobilization).

The object of inquiry is the suburban realm of the Greater Toronto and Hamilton Area (GTHA), the largest Canadian urban region with a population of 6.9 million, approximately 45 percent of whom are immigrants (that is, born outside Canada). Presently, the GTHA attracts over 30 percent of all immigrants to Canada, a proportion that is somewhat lower to levels reached over the past years and decades. Over the last decades, immigration in the GTHA has undergone two important transformations. First, consistent with a nationwide tendency, there has been a movement away from a Euro-centric to a world-wide, with a predominant presence of Asia, immigration in the GTHA. The shift in the origin of immigrants originated with the adoption of a point system to identify qualified immigrants. Second, immigrants within the GTHA have increasingly settled in the suburbs rather than the inner city, an expected transition as the territorial, demographic and economic weight of the suburban realm within this urban region grew rapidly.

In this paper, we concentrate on the two largest groups of GTHA immigrants, the Chinese and South Asians.⁵ We observe their respective spatial distribution within the GTHA suburban realm, and the three types of ethnoburb-related census tracts identified in this study. Findings reveal both

⁵ The Canadian census refers to South Asians as individuals whose ethnic origin can be traced to South Asia, the largest countries of which are India, Pakistan, Sri Lanka, and Bangladesh.

similarities and differences in the spatial evolution of these two groups within the suburban GTHA. We observe in both cases nucleation effects resulting from the gravitation of Nascent and Mature census tracts around clusters of Saturated census tracts. But while Chinese residents display a high level of clustering, South Asian residential patterns tend to be somewhat more dispersed.

Findings do not only concern the ethnic groups under observation, they also pertain to the overall ethnoburb phenomenon. They show that ethnoburbs can follow different trajectories, reflective of immigration tendencies and the economic conditions and preferences of ethnic groups. Depending on the immigration context, they can display intensifying and expanding patterns or a reversed trend resulting in dissipating ethnoburbs. The paper identifies a spatial dynamic based on ethnic nuclei and the gravity effects they exert on the residential location of immigrants belonging to a given ethnic group. The core of nuclei corresponds to the full-fledged ethnoburbs described in the literature, which concentrate ethnic retailing, services and institutions. Among reasons accounting for observed suburban immigrant residential patterns, there is the attempt on the part of certain immigrant households to achieve a balance between accessibility to employment and housing adapted to their needs and means, while maintaining proximity to other ethnic group members and clusters of ethnic activities.

After a brief review of the ethnoburb literature, we describe the methods applied to delineate ethnoburbs, categorize ethnoburb-related census tracts and analyze the data pertaining to each type of census tract. We then explore the spatiotemporal changes and transition patterns of the identified ethnoburbs. The residential trajectories of recent immigrants living in the different ethnoburb categories are also discussed. We then conclude by reflecting on the likely future evolution of GTHA ethnoburbs.

3.3 Defining the Ethnoburb Phenomenon

Almost one hundred years ago, the budding field of urban sociology proposed a model linking the suburbanization of immigrants to their assimilation into American society. Based on an observation of the distribution of socioeconomic groups across the 1920s Chicago metropolitan region, Park & Burgess (1925) contended that the movement of immigrants over time from their dense inner-city points of arrival to suburban neighbourhoods mirrored their assimilation into their host country. In their view, assimilation was at once a social, economic and spatial process. The Park and Burgess perspective was, however, soon challenged by the sectoral and multiple nuclei spatial models (Harris & Ullman, 1945; Hoyt, 1939). The immigrant spatial patterning observed by these models suggested the effects of other location dynamics than those advanced by Park and Burgess. The sectoral model reflected a desire on the part of members of ethnic groups to maintain spatial connections with family, friends and ethnic activities, while climbing the social ladder and accessing higher-income

neighbourhoods. Meanwhile, the multiple-nuclei model recognized the possibility for immigrant groups to cluster in different areas within a metropolitan region, thus challenging the linear centre-periphery interpretation of the Park and Burgess view (Murdie, 1969).

As the suburban realm came to comprise an overwhelming majority of urban regions' area, population and economic activity, and as new immigrants became more affluent and skilled than previous waves, they opted for suburban rather than inner-city neighbourhoods. Highly visible ethnic communities, adopting a multi-nuclei pattern, surfaced in the suburban landscape. The Chinese residential clusters in San Gabriel Valley in California, where new immigrants increasingly settled, bypassing inner-city Chinatowns, provided the empirical substance for the early explorations of the ethnoburbs phenomenon (Li, 1998c). The study of Toronto suburban ethnic clusters also contributed to the advancement of the understanding of ethnoburbs (Wang and Zhong, 2013).

Li (2009a, p. 29) defines ethnoburbs as “multiethnic, multicultural, multilingual, and often multinational suburban communities, in which one ethnic minority group has a significant concentration but does not necessarily comprise the majority”. Li characterizes ethnoburbs as the outcome of a new form of immigrant settlement amid a shifting economy and reforms in immigration policies. Ethnoburbs are distinguished from other forms of immigrant settlement, such as enclaves and ghettos, by their suburban location and the relatively large area they cover, the relatively free location choice of immigrants unconstrained by overt segregation and/or poverty, and the fact that they can register lower ethnic densities than other forms of immigrant clusters (Li, 1998a; 1998b; 2005; 2009, 172). Ethnoburbs are not only the product of residential concentrations of immigrants, they also express the cultural life of ethnic groups populating suburban neighbourhoods. They often constitute hubs of ethnic retailing, services and institutions, giving visibility to the presence of immigrants (Li, 1998a; 2009a; Wang, 2012; Wang & Zhong, 2013).

The ethnoburb concept is fluid, which causes it to be defined in various ways. There are indeed dissonant views about the difference between ethnoburbs and other types of immigrant clusters as well as about whether an ethnoburb must be composed of a mixture of ethnic groups or dominated by one such group (Li, 1998b; Skop & Li, 2010; Slattery, 2012; Wang & Zhong, 2013). But there is agreement over two defining criteria of ethnoburbs: that their population must be composed of a substantial proportion of immigrants and that their activities must give an ethnic flavour to ethnoburbs.

Much of the research on ethnoburbs has relied on observation as well as on methods measuring demographic composition and spatial arrangements. This research has described how the landscape of ethnoburbs expresses the presence of ethnic groups and thereby distinguishes these places from other suburban areas (Chan, 2012; Johnston, Poulsen, & Forrest, 2008; 2011; Li, 1998a;

2009c; Wang & Zhong, 2013). Research has also made use of ethnographic methods to single out the distinctive lifestyles of people living in such areas (Schneider, 2014) .

We take a different approach to the ethnoburb phenomenon by adding a continuum dimension. By continuum we mean that ethnoburbs may appear in different forms. We, therefore, categorize ethnoburbs into three types based on their demographic composition, which can be interpreted as different stages in the evolution of ethnoburbs. Our analysis captures the trajectory of the spatial patterning of ethnoburbs within the suburban realm. It will thus bring a quantitative, spatial and evolutionary dimension to the investigation of the ethnoburb phenomenon. More specifically, the study addresses the following questions:

- 1) How does the combination of varying proportions of immigrants within the population of an area and of different levels of ethnic group mixture result in distinct types of ethnoburbs?
- 2) How do these types of ethnoburbs evolve over time?
- 3) What is the spatial trajectory of the ethnoburb phenomenon?
- 4) What role do the defining features of ethnoburbs highlighted in the literature (e.g., concentration of ethnic retailing, services and institutions) play in the spatial distribution of ethnoburbs?

3.4 Immigration in Canada and in Toronto

The study investigates the ethnoburbs phenomenon in the Greater Toronto and Hamilton Area, which posts the greatest proportion of immigrants relative to population in Canada, itself the G7 country with the highest foreign-born to total population ratio (Morency, Malenfant, & MacIsaac, 2017). Between 1981 and 2016, the immigrant population increased from 3.8 million to 7.5 million in Canada (a surge of 97.4 percent) while the population of the entire country over this period grew from 24.8 to 35.2 million (an increase of 41.9 percent). The number of immigrants is expected to reach 12.3 million by 2036 (Statistics Canada, 2017b). This growth in the number of immigrants will be fuelled by a recommended increased intake bringing the annual total to 300,000, seen as essential to the country's demographic and economic health (El-Assal & Fields, 2017; El-Assal & Fields, 2018). Canada is characterized by the diversity of origin of its immigrants. In 2017, of the 286,476 new permanent residents admitted in the country, 61 percent came from the top ten countries of origin. These countries are (with their respective percentage of all 2017 admitted permanent residents): India (18 percent), Philippines (14 percent), China, (11 percent), Syria (4 percent), USA (3 percent), Pakistan (3 percent), France (2 percent), Nigeria (2 percent), UK (2 percent), Iraq (2 percent) (Government of Canada, 2018).

It is not surprising that with their large immigrant population, Canadian urban regions, notably Toronto and Vancouver, have witnessed the emergence of ethnoburbs (Li, 2009c). This is

especially the case since suburbs attract the vast majority of immigrants.⁶ Nearly 87 percent of all GTHA immigrants resided in the suburbs in 2016; as expected, the more populous outer-suburban zone hosted a larger percentage of GTHA immigrants (55 percent) than the less populous inner-suburban zone (31 percent) (for the delineation of the two suburban zones see Figure 3.1). Most of the attention in the research literature on Canadian ethnoburbs has been directed at Chinese ethnoburbs. Chan (2012) investigated the settlement history of the Chinese in the Toronto region and attributed the evolution of ethnoburbs to the influx of Chinese immigrants with financial clout, who not only settled but also often worked and set up businesses in such neighbourhoods (10). Chan depicted ethnoburbs as suburban Chinatowns hosting businesses that target both the Chinese community and other markets, and that are integrated to the broader Toronto business scene. Zhuang & Chen (2016) described the impact of suburban Chinese commercial activities on urban form. They demonstrated how three large Chinese theme shopping malls stimulated the economy of ethnoburbs and fostered hubs of activity therein. They, however, lamented their poor connection to residential areas and public transit services, and their overall limited, if not adverse, contribution to the walkability of ethnoburbs (Zhuang & Chen, 2016, 18).

Wang & Zhong (2013) delineated ethnoburbs within the Toronto urban region. They applied a fifty percent threshold as the minimal proportion of Chinese and South Asian residents within a suburban census tract as a first criterion for it to be considered as a possible part of a Chinese or South Asian ethnoburb. But to qualify as an ethnoburb, a suburban area further had to provide an ethnic business and institutional ecosystem, and exhibit an active political participation of its immigrant population. There are two issues with this approach to the definition of ethnoburbs. First, reliance on one immigrant group representing at least fifty percent of the population as a criterion to qualify as an ethnoburb reduces the possibility that ethnoburbs be composed of a mixture of ethnic groups. Second, the study assumes a linear trajectory from suburban areas comprising less than fifty percent of immigrants and/or composed of diverse ethnic groups (labelled “multicultural popcorn” by Wang and Zhong) towards full-blown ethnoburbs where one ethnic group constitutes fifty percent or more of the population.

The present study shares the interest of Wang and Zhong for the spatial distribution and patterning of ethnoburbs. Such an approach complements the emphasis the ethnoburb literature gives to ethnographic, economic and visible ethnic features of ethnoburbs, by mapping out the space it occupies and its distribution within the suburban realm, thus setting this phenomenon within its

⁶ Suburbs are defined according to established methods focusing on their period of development (Bunting & Filion, 1996; Skaburskis & Moos, 2008). In the GTHA, they concern areas whose development took place mostly after 1945.

metropolitan spatial context. Similar to Wang and Zhong, our paper also focuses on the two largest recent GTHA immigrant groups: the Chinese and South Asians. But there are important differences between the study reported by Wang and Zhong and the present one. We adopt a more flexible understanding of ethnoburbs, acknowledging that they can be constituted of a mixture of ethnic groups or one dominant group. We also identify different stages of ethnoburb development. Finally, the present study adds a longitudinal dimension by providing empirical evidence on which to ground a consideration of ethnoburbs' possible evolutionary trajectories.

3.5 Methodology

The study considers the ethnoburbs phenomenon within the GTHA, which is composed of the City of Toronto, the City of Hamilton and the regional municipalities of Durham, York, Peel and Halton (Figure 3.1). For the purpose of this study we divide the GTHA into three zones (i.e., inner city, inner suburb, and outer suburb). The inner city, which includes the old City of Toronto, predating the 1997 amalgamation of this jurisdiction as well as five boroughs into the new City of Toronto. The inner city also comprises two smaller former boroughs: those of York and East York. For the most part, the inner city was originally developed before 1946. Because the attention of this study is on ethnoburbs and thus suburban immigrant settlements, it did not collect data from the inner city. The inner suburb was developed mostly from 1946 until 1971. It includes the three large outer boroughs, which are now part of the City of Toronto: Etobicoke, North York and Scarborough. Finally, the outer suburb, which has been mostly developed since 1971, includes the City of Hamilton as well as the regional municipalities of Halton, Peel, York and Durham. At present, Peel and York regions have the highest presence of both immigrant and visible minority population within the GHTA (City of Toronto, 2017). Note that both the inner and the outer suburb zones encompass some areas developed before 1945, most notably inner-city Hamilton as well as the towns and villages encircled by post-WWII suburbanization. As of 2016, 1.7 million and 4.1 million people resided in the inner and outer suburbs of GTHA respectively.

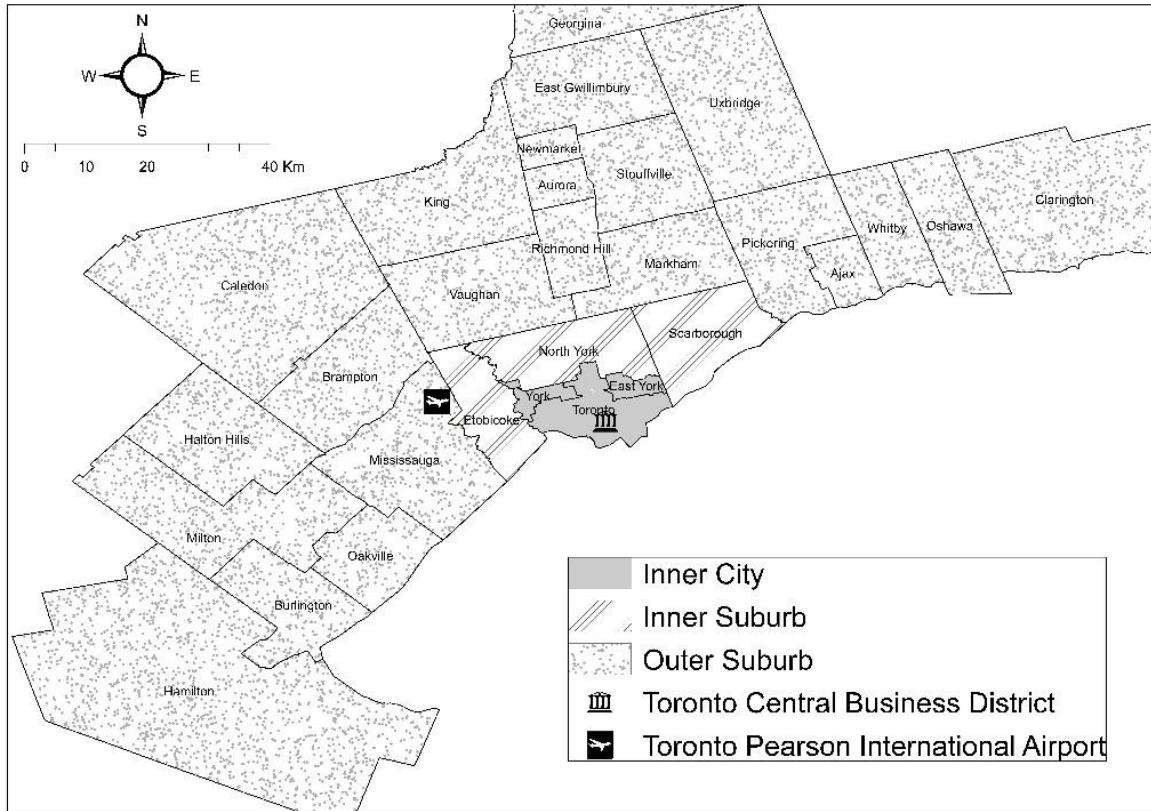


Figure 3.1: The Study Area- Greater Toronto and Hamilton Area (GTHA)

The research relies on census tract (CT) level data from the 2006 and 2016 Canadian censuses. This timeframe was selected for the analysis because ten year is a reasonable period for any demographic change to optimally reflect. The population of CTs hovers between 2,500 and 8,000. They can thus be seen as corresponding broadly to neighbourhoods (Breau, Shin, & Burkhart, 2018). Two variables – visible minority, recent immigrants by places of birth – were selected for the analysis. The visible minority variable records responses from individuals who identify themselves as non-Caucasian and non-Aboriginal.⁷ By selecting the visible minority to which they belong, individuals *de facto* identify their ethnic group, such as Chinese and South Asian. We used the visible minority variable to delineate ethnoburbs for these two visible minorities. Prior studies have relied on this same variable to identify ethnoburbs in the GTHA, which makes the results from this research comparable to those of this earlier research work (e.g., Wang & Zhong, 2013). In addition, the classification of the Chinese and South Asian groups in the “visible minority” variable was consistent in the 2006 and 2016 censuses, which justifies its use as a measurement of the spatial evolution of ethnoburbs over this ten-year period. The other variable, recent immigrants by places of birth, served to evaluate the

⁷ The Canadian census records both single and multiple responses concerning peoples’ ethnicity. This paper only considers single responses.

propensity of recent Chinese and South Asian immigrants to live in ethnoburbs. Using this variable, the total number of recent immigrants who were born in China and South Asian countries (specifically India, Pakistan, Bangladesh, and Sri Lanka) were calculated to perform the analysis.

There are three stages to this research – the delineation of ethnoburbs, the assessment of their spatial evolution patterns and the evaluation of recent immigrant’s propensity to settle in different types of ethnoburbs. We applied a scaled entropy approach to determine the levels of ethnic diversity of CTs and combined these values with the proportion of Chinese and South Asians in these CTs. This process allowed the classification of ethnoburb CTs into three categories – Nascent, Mature, and Saturated. We have adopted Holloway et al.’s (2012) neighbourhood classification approach to delineate ethnoburbs for the Chinese and South Asians in 2006 and 2016. Our three categories of ethnoburbs are based on the combination of the ethnic diversity of CTs and the proportion of their population that is composed of Chinese or South Asians. An entropy index was devised using Equation (1) to determine the level of ethnic diversity. The index explicitly measured both the evenness (the number of groups) and richness (the size of each group).

$$E_i = \frac{\sum_{j=1}^n P_{ij} \ln \left(\frac{1}{P_{ij}} \right)}{\ln(n)} \quad (1)$$

where, E_i is the scaled entropy of census tract i ; P_{ij} is the proportion of group j in census tract i ; and n is the number of ethnic groups.

The index was based on six broad visible minority categories.⁸ The index values ranged between “0” and “1”, where “1” indicated equal representation of all ethnic groups and “0” the exclusive presence of one ethnic group. The CTs were grouped into three categories – low, medium, and high – to represent the level of ethnic diversity. CTs posting values equal to or greater than 0.704 were considered to have high diversity and the ones equal or less than 0.459 qualified as low diversity CTs. For example, if a tract had a dominant ethnic group (i.e., 80% of the total population), it was considered to have a low diversity. In a medium diversity tract, one ethnic group could comprise more than 45 percent of the total population, but two ethnic groups could not constitute more than 80 percent of the population. Tracts where no ethnic group constituted more than 45 percent of the total population were considered to have a high diversity.

The level of ethnic diversity was combined with the proportion of the population of a CT composed of Chinese or South Asians to define the three types of ethnoburbs (Table 3.1). To be

⁸ The six visible minority groups are: Asian, Blacks, Latinos, Arabs, Non-visible minorities, and others. The Chinese and South Asians were aggregated under the Asian group. The reduction by the researchers in the number of groups to six was to ease calculation.

considered as Nascent, a CT Nascent was required to meet either of the two following conditions : i) has a high or medium level of diversity and the Chinese/South Asian comprised 5 to 15 percent of the population, or ii) is dominated by a non-visible minority group, has a low level of diversity, and the Chinese/South Asian comprised 5 to 15 percent of the population. Tracts that had a medium/high level of diversity and where the Chinese/South Asian categories comprised 15 to 50 percent of their population were categorized as Mature. The CTs where 50 percent or more of the population belonged to the Chinese/South Asian categories and demonstrated a medium or low level of diversity were classified as Saturated.

Table 3.1: Definitions of the Three Categories of Ethnoburb Census Tracts (ECTs)

Ethnoburb Type	Level of Diversity	Proportion of the Chinese and South Asians
Nascent ECT	Medium to High level or low level (when dominated by non-visible minority)	5% to 15%
Mature ECT	Medium to high level	15% to 50%
Saturated ECT	Medium or low level	50% or more

We then evaluated the spatiotemporal changes in the distribution of the identified ethnoburbs between 2006 and 2016 and analysed the transition patterns across ethnoburb categories. In so doing, the CTs in 2006 were standardized to their 2016 boundaries to control for the difference in the total number of CTs between the two years. Many CTs in 2006 were split into two or more CTs in 2016 to account for the increased population. When a CT was split between 2006 and 2016, we used the 2016 CT definition for both years and attributed the 2006 CT values to the new 2016 CTs fitting within an original 2006 CT.

Finally, we determined the propensity for new immigrants to live in each ethnoburb type. Location Quotients (LQs) for the recent Chinese and South Asian immigrants were devised to assess their presence in CTs relative to the study area, and the mean LQ values for the three ethnoburb categories were compared through an ANOVA test. The magnitude of difference in the LQ values among the ethnoburb categories was interpreted to assess the propensity of recent immigrants to live in each ethnoburb CT type for both the Chinese and South Asians.

3.6 Ethnoburb Delineation and Spatiotemporal Changes

Table 3.2 summarizes the extent of the presence of the Chinese and South Asians in their corresponding ethnoburb CTs (ECTs). As indicated on Table 3.2, the Chinese show a lower propensity to live in ECTs than South Asians. In 2016, 74 percent of Chinese lived in ECTs, whereas

the equivalent proportion was 85 percent for South Asians. Both visible minorities registered an increase in their propensity to live in ECTs between 2006 and 2016, more pronounced among the Chinese than the South Asians, however. A plurality of both visible minorities lives in Mature ECTs, but more so among South Asians than the Chinese. Note that the percentage of the visible minority living in Mature ECTs has declined among South Asians over the 2006-2016 period, while it has remained relative stable among the Chinese. The proportion of South Asians living in Nascent ECTs has increased more over these years than that of the Chinese living in this type of ECTs. Meanwhile, the increase of proportions of the visible minority population found in Saturated ECTs is about the same for the two groups. The Chinese do post a higher percentage of their population living in these ECTs.

Table 3.2: Composition of the Ethnic Groups Living in Ethnoburbs Relative to their Total Population in the GTHA

	South Asians		Chinese	
	2006	2016	2006	2016
Nascent	14.47%	13.46%	13.67%	14.33%
Mature	53.16%	46.95%	33.06%	32.21%
Saturated	14.64%	24.12%	22.90%	27.47%

Data from Table 3.2 also highlight differences between the two communities with possible implications for their respective distribution pattern within the GTHA suburban realm. While both the Chinese and the South Asians represent a large share of the GTHA population, the size of the South Asian population is 55 percent larger than that of the Chinese. Moreover, the rate of growth of the South Asian population is also considerably higher than that of the Chinese, which is a longer established community within the GTHA.

The spatial distribution of the Chinese ECTs suggests the existence of a clustering trend. The spatial cluster of the Mature and Saturated ethnoburbs extends across Markham, Richmond Hill, Scarborough, North York and Etobicoke in both 2006 and 2016 (Figure 3.2).⁹ The number of Mature ethnoburbs, which comprise the largest proportion of the Chinese ECTs, increased from 141 to 203 between 2006 and 2016 (Table 3.3). Markham, Scarborough, North York, Vaughan and Etobicoke witnessed a substantial growth of these ECTs, with Markham experiencing the highest gain. Saturated ECTs represent the smallest proportion of all Chinese ECTs but their number is increasing. They cluster across Scarborough, Markham, and Richmond Hill, with Markham again registering the highest growth in this category of ECTs.

⁹ The number of CTs between 2006 and 2016 are different due to population increase in the ten-year period. However, the allocation of residents to old and new CTs has been standardized using an approach detailed in the methodology section.

Table 3.3: Composition of Ethnoburbs

City	Chinese Ethnoburbs								South Asian Ethnoburbs							
	2006				2016				2006				2016			
	NAS	MAT	SAT	Total (06)	NAS	MAT	SAT	Total (16)	NAS	MAT	SAT	Total (06)	NAS	MAT	SAT	Total (16)
Scarborough	23	36	19	78	21	40	20	81	66	31	3	100	82	16	8	106
Mississauga	10	47	0	57	12	65	0	77	66	26	6	98	77	36	7	120
North York	36	32	2	70	42	26	1	69	22	52	0	74	16	65	0	81
Markham	21	4	11	36	31	5	23	59	12	8	2	22	18	10	4	32
Richmond Hill	10	2	3	15	15	9	6	30	2	7	0	9	0	15	0	15
Oakville	0	2	0	2	2	17	0	19	1	5	0	6	4	17	0	21
Vaughan	1	7	0	8	5	13	0	18	4	9	0	13	8	23	0	31
Hamilton	1	5	0	6	0	11	0	11	1	3	0	4	3	23	0	26
Etobicoke	0	3	0	3	0	6	0	6	13	15	4	32	14	22	1	37
New Market	0	1	0	1	2	3	0	5	0	1	0	1	0	3	0	3
Stouffville	-	-	-	-	3	1	0	4	-	-	-	-	3	1	0	4
Aurora	-	-	-	-	1	2	0	3	-	-	-	-	0	1	0	1
Brampton	0	1	0	1	0	2	0	2	40	11	10	61	49	9	37	95
Burlington	-	-	-	-	0	1	0	1	-	-	-	-	1	2	0	3
Oshawa	-	-	-	-	0	1	0	1	-	-	-	-	0	3	0	3
Pickering	-	-	-	-	0	1	0	1	3	7	0	10	7	10	0	17
Ajax	0	1	0	1	-	-	-	-	4	9	0	13	15	5	0	20
Whitby	-	-	-	-	-	-	-	-	0	4	0	4	0	13	0	13
Milton	-	-	-	-	-	-	-	-	0	3	0	3	9	0	0	9
Caledon	-	-	-	-	-	-	-	-	-	-	-	-	1	0	0	1
Total	102	141	35	278	134	203	50	387	234	191	25	450	307	274	57	638

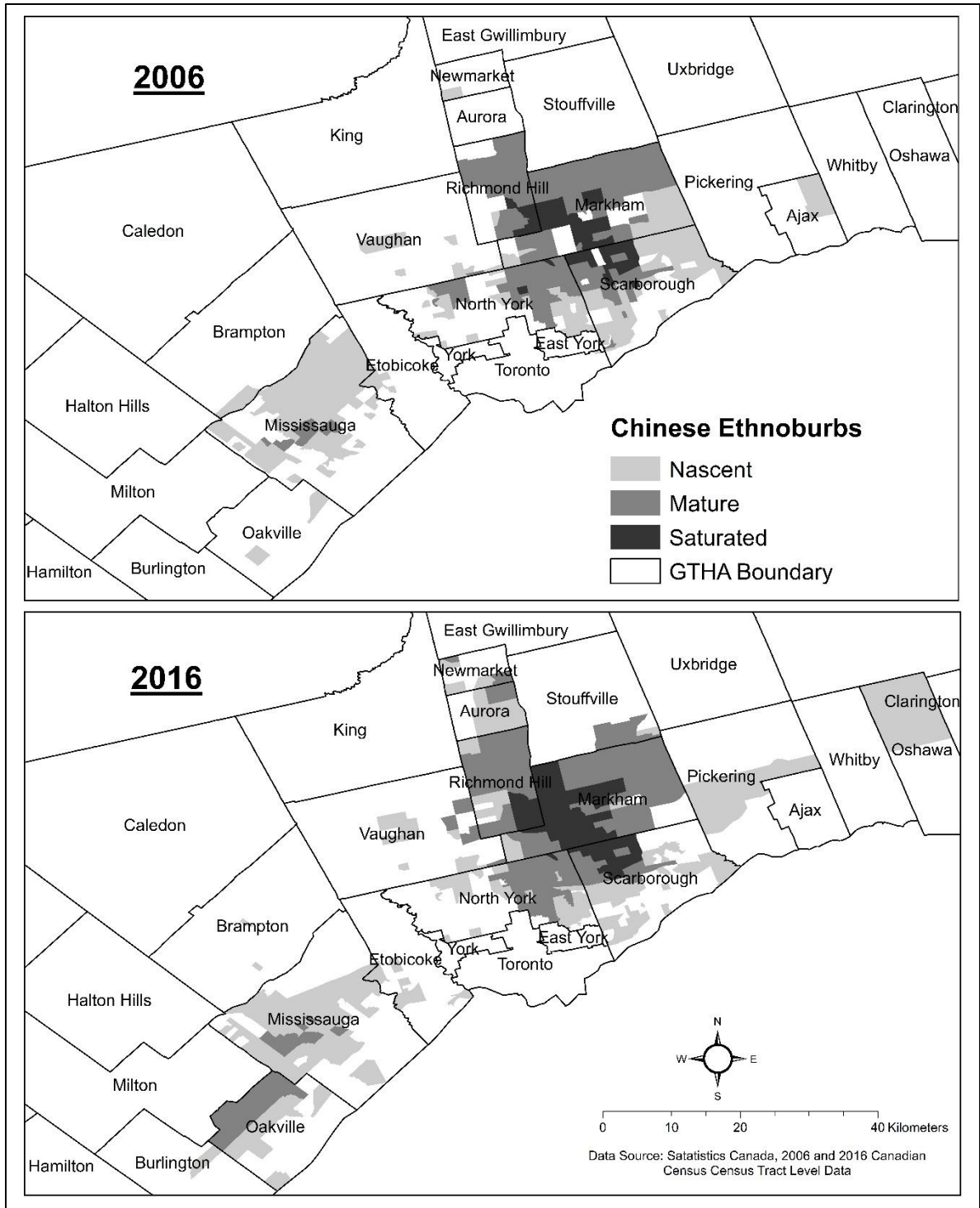


Figure 3.2: Spatial Distribution of Chinese Ethnoburb CTs

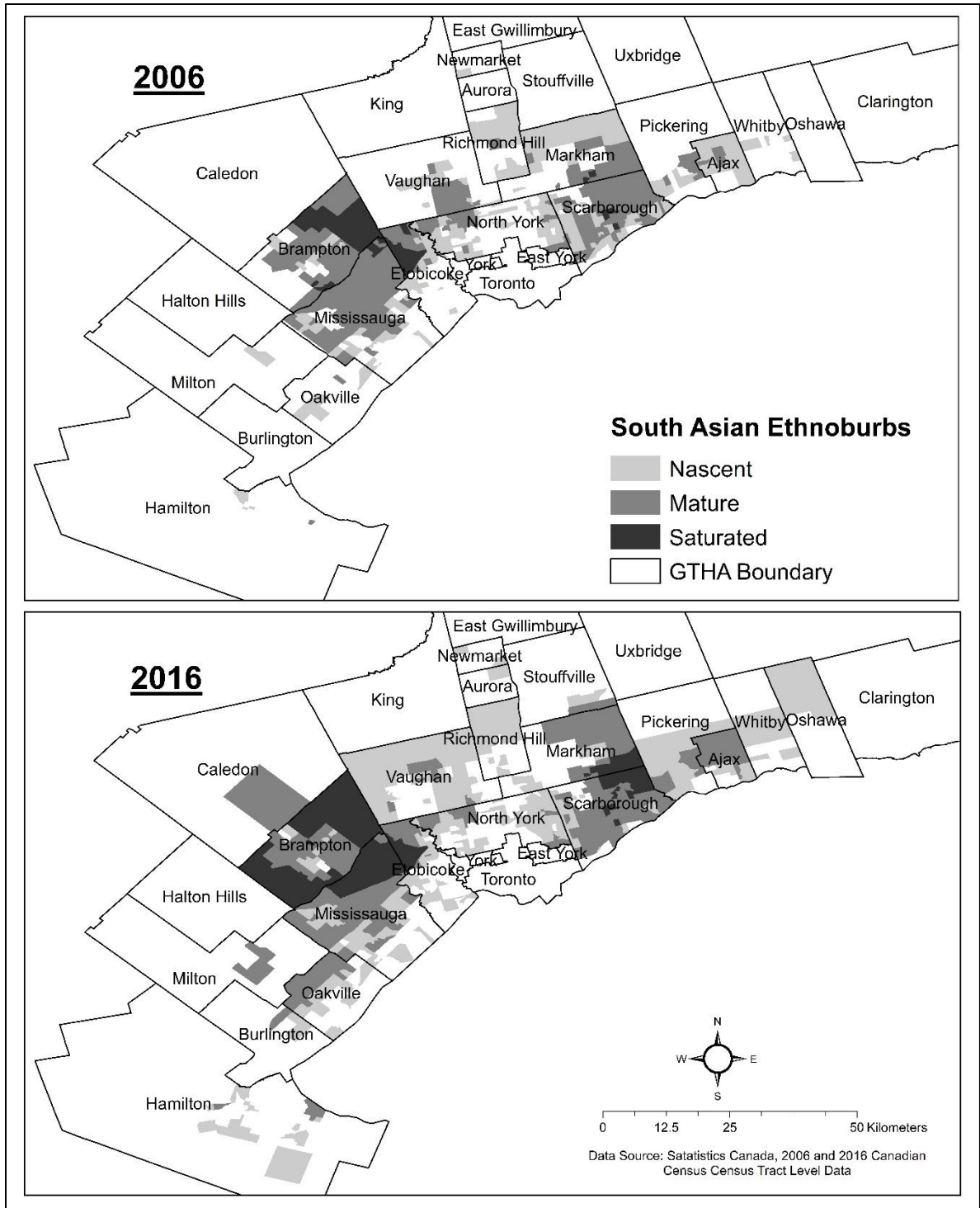


Figure 3.3: Spatial Distribution of South Asian Ethnoburb CTs

Chinese Nascent ECTs also display a spatial clustering pattern. The total number of Nascent ECTs increased from 102 to 134 between 2006 and 2016. Their grouping was apparent in Mississauga causing such ECTs to expand to nearby Oakville and Burlington. Chinese Nascent Oakville and Burlington ECTs maintain contiguity with the Mississauga original ethnoburb nucleus. Meanwhile, the highest growth in Chinese ECTs materialized in Scarborough, Markham and Richmond Hill, mostly in proximity to a large nucleus of Saturated and Mature ECTs. Yet, while the dominant trend clearly points to an increasing number of Chinese ECTs and the progression from nascent to Mature and Saturated ECTs, findings also reveal the existence in some instances of a reversed trajectory, whereby Nascent ECTs detected in 2006 appeared as non-ethnoburb CTs in 2016. This transition has materialized primarily due to the increase in the size of other ethnic groups. ECTs, in this study, are sensitive to the changes in their demographic composition. Any change in the size and/or number of ethnic groups may affect the demographic composition and ethnic mix of the ethnoburb tracts, thereby, causing them to either progress or regress.

The overall spatiotemporal changes in the distribution of Chinese ECTs reveal nucleation patterns. Chinese ECTs concentrate in the northeast of the GTHA and are intensifying while maintaining a strong spatial congruity. A secondary cluster of ethnoburb CTs has also taken shape to the west of the GTHA, concentrating on Mississauga.

The South Asian ECTs are more spread out throughout the GTHA than are the Chinese ECTs. They display a distribution pattern that is at once concentrated and dispersed. Figure 3.3 and Table 3.3 summarize results from the spatial analysis of South Asian ECTs. The total number of South Asian ECTs increased from 450 to 638 between 2006 and 2016, with the Mature and Saturated ECTs registering the highest growth. The increase in South Asian ECTs was predominantly clustered in Brampton, Mississauga, Etobicoke and North York in the west of the GTHA, and in Scarborough in the east of GTHA. Mature and Saturated South Asian ECTs present two contrasting spatial patterning tendencies. There is first a clustering tendency, generating large sectors concentrating such ECTs. At the same time, many Mature and Saturated South Asian ECTs have emerged between 2006 and 2016 in dispersed locations including Hamilton, Milton, Caledon and Ajax. Milton, where no South Asian ECT was detected in 2006, experienced a rapid growth of Mature ECTs between 2006 and 2016. The largest South Asian ethnic clustering process was detected in Brampton as the city hosted 27 of the 35 South Asian Saturated ECTs that emerged between 2006 and 2016.

In contrast with the Chinese ethnoburb experience, for South Asians it was the Nascent ECTs that represented the plurality of ECTs in both 2006 and 2016. These ECTs were spatially dispersed across the GTHA, with Brampton, Scarborough, Mississauga, Markham, Etobicoke, Vaughan, Ajax and Pickering experiencing the largest growth in this category (Table 3.3).

To summarize, the spatial distribution of the South Asian ECTs takes a bifurcated pattern – in the form of both clustering and dispersal. The South Asians have congregated in high proportions both in the east and west of the GTHA, leading to the rise of a dominant eastern and secondary western nuclei. But the growth of ECTs also adopted a dispersed pattern, away from existing clusters.

3.7 Transitions Across Ethnoburb Categories

The 2006-2016 period witnessed substantial growth in the number of ECTs in the case of both the Chinese and South Asians. There was over this time an increase of 109 Chinese ECTs, representing a 39.3 percent growth in this community's overall number of ECTs. In the case of South Asian ECTs, there was an additional 188 ECTs posting a growth of 41.8 percent. As the growth of ethnoburbs progressed in the GTHA, ECTs demonstrated both linear and reverse transitions. Linear transition involves the passage of ECTs from the Nascent to the Mature category or from either of these two categories to the Saturated category, or from a non-ethnoburb status to any ethnoburb type. In contrast, reverse transition either entails the conversion of Saturated to Mature ECTs or either of these two categories to the Nascent category. The reverse transition can also take the form of an ECT being reclassified as a non-ethnoburb CT. Table 3.4 summarizes these transition patterns as it compares the 2016 CT categories to those of 2006. The data indicate that the majority of the CT categories remained unchanged between 2006 and 2016. CT transitions mostly involved the transformation of non-ethnoburb to Nascent ECTs. Another trend depicted by Table 3.4, is the progression of ECTs from Nascent to Mature and from Mature to Saturated. The Nascent to Mature transition was especially frequent among South Asian ECTs, where nearly 4 percent of these ECTs were affected by this evolution.

The transition from non-ethnoburb to ethnoburb CTs, especially for Chinese ethnoburbs, mostly took place near existing concentrations of this ethnic group. Such a tendency was especially pronounced in the case of the conversions of non-ethnoburb to Chinese Mature ECTs, which predominantly took place in Markham, Scarborough, Richmond Hill and Stouffville, which constituted a nucleus of Saturated and Mature ECTs. In contrast, the transition from non-ethnoburb to ethnoburb CTs for South Asians was dispersed across Milton, Caledon, Hamilton, Burlington, Vaughan, Brampton and Mississauga. These non-ethnoburb/ethnoburb transition CTs were more often at a distance from nuclei of Mature and Saturated ECTs than in the case of Chinese ECTs undergoing such a transition.

Table 3.4 also points to the possibility of a reversal of the progression from non-ethnoburb to Nascent, Mature and Saturated ethnoburb CTs. For Chinese and South Asians, 3.78 percent and 2.64 percent of the CTs that were classified as non-ethnoburbs in 2016 were Nascent ECTs in 2006. Regression of Mature to Nascent ECTs accounted for 1.3 percent of the transitions that materialized between 2006 and 2016 for both groups. The reverse transition is the *de facto* outcome of the substantial increase in the size

of other ethnic groups. To illustrate, the Nascent ECTs for the Chinese or South Asian, which are comprised of 5 to 15 percent of the ethnic group of interest and have a high or medium diversity level, can eventually experience a decline in the Chinese or South Asian below the 5 percent mark if the size of other ethnic groups substantially increases. Further, an increase in the proportion of Chinese in South Asian ethnoburbs and South Asians in the Chinese ethnoburbs can affect the ethnic composition and/or diversity of Nascent ECTs, causing them to regress. Mature and Saturated ECTs are also susceptible to the regression effects of such ethnic group redistributions. However, regression of Saturated ethnoburb was rarely detected in this study.

Table 3.4: Transitions Across Ethnoburb Categories (Relative to the Totals in 2016)

	Description of Change	Chinese	South Asian
No Change		84.60%	79.96%
Direct Changes	Nascent to Mature	1.14%	3.99%
	Mature to Saturated	0.93%	1.28%
	Non-ethnoburb to Nascent	5.99%	8.42%
	Non-ethnoburb to mature	1.78%	1.14%
	Non-ethnoburb to Saturated	0.14%	0.21%
Reverse Changes	Mature to Nascent	1.28%	1.36%
	Saturated to Mature	0.29%	0.36%
	Nascent to Non-ethnoburb	3.78%	2.64%
	Mature to Non-Ethnoburb	0.07%	0.64%
Total		100.00%	100.00%

While this reverse transition trend may appear as a statistical artifact, dissipation of ethnic settlements is fairly common across metropolises. Many areas where specific ethnic minorities have traditionally congregated are gentrifying rapidly. For example, the “Little Italy” in Toronto presently has a much higher number of English, Irish, Scottish, and Canadians than Italians because of active gentrification since the 1970s (City of Toronto, 2018; Hackworth & Rekers, 2005b). Similarly, the traditional Chinatown in Toronto now has an almost equal presence of Chinese and non-Chinese population (City of Toronto, 2018). Dissipation of ethnic settlements can also be the outcome of the relocation of members of dominant ethnic groups as their income rises (Hackworth & Rekers, 2005a; Li, 2005).

3.8 Recent Immigrants in Ethnoburbs

The magnitude and direction of the evolution of Chinese and South Asian ethnoburb CTs largely depend on the location decisions of recent immigrants. This section evaluates the propensity of recent immigrants to locate in different ethnoburb categories. Recent immigrants are defined as immigrants who arrived in Canada five years before the census year. Location quotients (LQs) were derived using Equation (2) to assess the proportion recent immigrants found in each CT relative to the GTHA.

$$LQ = \sum_{j=1}^n [(i_{ij} / p_i) / (I_j / P)] \quad (2)$$

where, i_{ij} = total recent immigrants of group “j” in CT “i”; p_{ij} = total recent immigrants in CT “i”; I_j = total recent immigrants of group “j” in the GTHA; and P = total immigrants in the GTHA. An ANOVA test was performed to evaluate the mean difference in the LQ values among the three ethnoburb categories.

Table 3.5: Propensity of Recent Immigrants Living in Ethnoburb CTs (Difference in Mean LQ)

		2006			2016		
		Nascent	Mature	Saturated	Nascent	Mature	Saturated
Chinese	Nascent		1.42*	3.43*		1.89*	4.75*
	Mature	-1.42*		2.01*	-1.89*		2.86*
	Saturated	-3.43*	-2.01*		-4.75*	-2.86*	
South Asian	Nascent		0.78*	1.89*		0.84*	2.18*
	Mature	-0.78*		1.10*	-0.84*		1.34*
	Saturated	-1.89*	-1.10*		-2.18*	-1.34*	

*Significant at 95% Confidence Interval ($p < 0.05$)

The results from the ANOVA test are summarized in Table 3.5. For both the Chinese and South Asians, the findings point towards an increase in the propensity of recent immigrants to live in ethnoburbs as we move from Nascent to Mature and Saturated ECTs. The mean LQ value of recent Chinese immigrants in the Mature ECTs was nearly 1.5 times more than that of Nascent ECTs in 2006 and nearly twice higher in 2016. The difference was much higher between Saturated and Nascent ECTs where the mean LQ value of the former was three to four times higher than that of the latter in both years. Saturated ECTs also had a twice higher presence of recent Chinese immigrants compared to their Mature counterparts. This high propensity among recent immigrants to live in Mature and Saturated ECTs prevailed for the South Asians as well, although the magnitude of difference in LQ values was much less than that of the Chinese. The mean difference in the LQ of recent South Asian immigrants in Saturated ECTs was twice higher than that of the Nascent in 2016, whereas, that difference in the case of Chinese was four time more. The South Asian Nascent and Mature ECTs had minimal difference in their mean LQ values, registering similarity in their attractiveness to recent immigrants.

The findings are generally as expected given the demographic composition of Mature and Saturated ethnoburbs. Co-ethnics, friends and families create a support system for immigrants, which is helpful to immigrants especially in their early settlement days. In addition, in the areas where immigrants reach a critical mass, many ethnic stores, services, businesses, and institutions emerge serving the needs of immigrants and creating networking and employment opportunities. These features make such locations desirable residential areas for recent immigrants. The City of Brampton, which hosts a nucleus of Mature and Saturated ethnoburbs, has witnessed massive growth in South Asian businesses and services in the last decades (Ahmed-Ullah, 2016). Similar clusters of ethnic commerce are visible in Markham as well, which contains a cluster of Chinese Mature and Saturated ethnoburb CTs (Balasubramaniam, 2012). However, the higher magnitude of difference in the recent immigrant LQ values among the Chinese ECTs than those

of South Asians suggests more ethnic cohesion among the Chinese. This phenomenon is consistent with the spatial compactness among Chinese ECTs observed in this study.

3.9 Ethnoburb Configuration and Evolution

In this section, we propose explanations for our findings and consider how they can advance the understanding of the ethnoburbs phenomenon. What can we learn about ethnoburbs from a study of their spatial dynamics within the suburban realm? Can a typology of CTs based on the proportion and mixture of immigrant groups cast light on the dynamics driving the spatial structure and evolution of ethnoburbs?

Figures 3.2 and 3.3 portray a strong ECT multi-nuclei aggregation tendency. More specifically, they show a bi-nuclei pattern for each of the two visible minority groups under investigation. A dominant nucleus in the east for the Chinese focussed on Markham and Scarborough and one in the west for the South Asians centred on Brampton and Mississauga. The figures also reveal the presence of a secondary nucleus for each visible minority group: in Mississauga for the Chinese and in Scarborough for the South Asians. A comparison of the 2006 and 2016 maps on Figures 3.2 and 3.3 reveals ongoing concentration, in terms of number and types of ECTs, around the two dominant nuclei. The most glaring sign of such a concentration is the growing presence of Saturated ECTs in and around the core of these nuclei. A similar phenomenon is observed in the case of the Scarborough South Asian secondary nucleus. Although showing a concentration of Nascent and Mature ethnoburb ECTs, the Chinese Mississauga secondary nucleus has failed to see the emergence of any Saturated ECT. This is perhaps an expression of the lesser demographic dynamism of the Chinese relative to the South Asian group.

The above described configuration and evolution of nuclei bring to light morphological features of ethnoburbs. Figures 3.2 and 3.3 represent ethnoburbs as taking form around a nuclear core composed of Saturated, often mixed with Mature, ECTs. Around this core are found expanses of Mature and Nascent ECTs. There is a logic to this spatial organization. As Saturated ECTs are most likely to concentrate ethnic retailing, services, institutions and seats of political power, members of an ethnic community desiring to maintain connections with its activities will seek locations that are relatively close to these Saturated ECTs. However, for many such members the residential location decision will be a trade-off between proximity to the ethnic scene and other factors such as availability of housing types one prefers and can afford, and accessibility to work and education. Equally important in this trade-off is proximity to members of one's faith and religious institutions in the choice of residential locations (Phillips, 2016). Such rationales for the ethnoburb configuration are consistent with the explanation for the multi-nuclei distribution of ethnic groups Robert Murdie (1969) proposed some fifty years ago.

If the location of the residence of members of ethnic groups relative to their respective ethnoburb is a trade-off, we can expect the attraction of proximity to an ethnoburb for these individuals to be affected

by two categories of factors. There are first factors accounting for attachment to the ethnic life of the ethnoburbs, such as the possibility of using one's native language, participating in the rituals of one's religion and attending cultural events and eating the food of one's ethnic group. The attractive power of these factors varies between individuals and between ethnic groups according to their values, degree of integration to the ethnic community and level of assimilation to the host country. The second category of factors pertains to the concentration of ethnic activities in the core of ethnoburbs. The larger this concentration is, the strongest is the gravity effect on members of an ethnic group and thereby its influence on their residential patterns. These factors may have culminated in the high propensity of recent Chinese and South Asian immigrants to reside in their corresponding Mature and Saturated ethnoburbs as observed in Table 3.5. The large co-ethnic population in such ECTs and the substantial presence of ethnic commerce in the areas are attractive to recent immigrants.

The maps on Figures 3.2 and 3.3 indicate differences in the distribution patterns of Chinese and South Asian ECTs, which show that circumstances associated with different ethnic groups can produce distinct ethnoburb configurations. Chinese ECTs are more concentrated around ethnoburb nuclei than are South Asian ECTs, which show more dispersion across the GTHA suburban realm. The main South Asian cluster of ethnoburb CTs accommodates nearly 40 percent of GTHA South Asians, whereas close to 60 percent of the Chinese of the region resided in the primary Chinese cluster. In relation to the total number of Chinese and South Asians living in ethnoburbs, the Chinese cluster was home for about 80 percent of the Chinese ethnoburb population, and that of the South Asian cluster hosted approximately 50 percent of South Asians living in ECTs. Several circumstances may account for this difference. The higher concentration of Chinese ECTs can be related to the longer presence of this visible minority in the GTHA, which has given it more time to set up and consolidate ethnic activities. What is more, one can argue that this group presents more cultural cohesion than the South Asian community, which contains different national, linguistic and religious groups (Buchignani, 2010; Ghosh, 2007, 2013). Findings from Table 3.5 have already detected the stronger ethnic cohesion among the Chinese than the South Asians through the high propensity of recent immigrants to live in the Saturated and Mature ECTs. A further factor of dispersion for South Asian ECTs is the recent arrival of many members of this group and its large size, comprising over one million people. It follows that with such large numbers, South Asians can be present in both concentrated and dispersed ethnoburb CTs. A final possible explanation for the higher concentration of Chinese ECTs is the attractive effect of ethnic activities in the core of the Markham-Scarborough nucleus, which is boosted by the presence of large Chinese theme shopping malls.

Our findings point to an expansion of the ethnoburb phenomenon in the GTHA, which can be measured both by the increasing number of ECTs and their progression from the Nascent to the Mature and then to the Saturated type. The research linked this expansion with an advancing multi-nuclei configuration

of ethnoburbs. But there is nothing inevitable in this expansionary tendency. The expansion of the Chinese and South Asian ethnoburbs in the GTHA must be set in the context of sustained and substantial entries of immigrants from these two visible minorities. The findings regarding the expansion of GTHA ethnoburbs were largely fuelled by this demographic growth. Indeed, we have attributed to some extent differences in the ethnoburb spatial patterns of the Chinese and South Asians to differences in the respective growth rate of these two visible minorities. There are additional factors explaining the observed features of the GTHA ethnoburb phenomenon. Recent immigrants may enjoy more choice regarding their residential location than previous waves of immigrants did, which explains their presence in different types of suburban housing and locations. Their higher education status and prior work experience can (but not always as the recognition of foreign credentials remains a problem for many immigrants) ease their entry in the labour market. In addition, some immigrants arrive with a substantial amount of money as part of the Investors, Entrepreneurs and Self-employed immigration program.

The study also revealed limited instances indicating a reversal of the evolution of ECTs (Table 3.4). In these cases, the trajectory was from Saturated to Mature, to Nascent and non-ethnoburb CTs. Such an observation challenges the assumption expressed by Wang and Zhong (2013) that the trend is necessarily towards larger and more concentrated ethnoburbs. In our study, the regressive tendency is due to changes in demographic composition and diversity levels of tracts resulting from the growth of other ethnic groups. For example, a South Asian ECT in Mississauga, bounded by Dundas Street East and Queensway East to the north and south and by Cawthra Road and Hurontario Street to the east and west, transitioned from Mature to Nascent category between 2006 and 2016 due to a 3 percent decline in the South Asian population and considerable increase in other ethnic groups, including non-visible minority residents. Indeed, ethnic settlement is a transient phenomenon that may concentrate or dissipate (Li, 2005). Ethnic settlements like Little Italy or Chinatown are changing rapidly through the influx of multiple ethnic groups (Hackworth & Rekers, 2005a; Keung, 2019). Therefore, we can speculate that were the entry of new immigrants to fall substantially, there would be a widespread reversal in the observed GTHA ethnoburb expansion. With a reduced supply of new immigrants and the assimilation of long-term immigrants, ethnoburbs could lose some of their dynamism and appeal. We cannot, however, ignore the possibility that the existence of ethnoburbs can slow the assimilation process, a situation that would contribute to their self-perpetuation.

Chapter 4: Immigrant Suburban Settlement Patterns and Transportation Outcomes: Does Neighbourhood Transit Quality Matter?

4.1 Abstract

It is a well-known fact that in North America, immigrants tend to be more reliant on public transit than non-immigrants. In this paper we verify if this higher transit dependence translates in a higher propensity to live in areas that post high transit quality. The study focusses on the Toronto census metropolitan area. It compares the propensity of non-immigrants and immigrants and of members of two immigrant communities (Chinese and South Asians) to live in transit quality suburban neighbourhoods. Findings point to a higher association between immigrants than non-immigrants and South Asians than Chinese with living in these neighbourhoods. But the association is weak, pointing to a greater influence of other location factors. Moreover, relations between residence in quality transit neighbourhood and transit use are also weak. From a planning perspective, we interpret these findings as further evidence of the difficulties transit-oriented development strategies encounter when trying to assure that transit-reliant populations live close to high quality transit services.

Keywords: Immigrant Suburbanization; Transit Quality; Transportation; Toronto

4.2 Introduction

Over recent decades we have learned that immigrants (defined here as people who were not born in the country where they live) in North America are overwhelmingly attracted to suburbs, often in immigrant clusters such as ethnoburbs, and that they balance attachment to their ethnic community and assimilation when choosing their suburban residential location. Their transportation behaviour reflects the acquisition of mainstream lifestyles, as the longer they live in their host country, the more they rely on driving. Still, they register more reliance on public transit than non-immigrants, overall and at the different stages of their life cycle. Immigrants are thus distinguished from non-immigrants by higher public transit use. In this paper, we explore the relationship between the transit dependence of immigrants and their settlement patterns. More specifically, we verify if they are attracted to neighbourhoods posting high transit quality. We further investigate the extent to which the transportation behaviour of immigrants is influenced by the transit quality of their residential areas. The paper also measures the influence of neighbourhood transit quality relative to other factors affecting the modal choice of immigrants.

Accordingly, the paper sits at the juncture of three themes: the uneven distribution of public transit quality, the modal choice of immigrants and their residential patterns. It addresses a number of questions. How important is transit quality as a factor of immigrant residential location? How does the attraction of transit quality in residential areas vary between immigrants and non-immigrants? To what extent does transit quality influence the modal choice in the areas where immigrants reside? How does transit quality compare to other variables in determining modal choices in immigrant neighbourhoods?

The research focuses on the Toronto census metropolitan area (CMA), Canada's most populated urban region. While our analysis encompasses the entire CMA, our interpretations focus on suburban areas, where we find the largest concentration of immigrants. In order to single out the effects of economic and cultural differences among immigrant communities on their attraction to transit quality neighbourhoods, it concentrates on two such communities: South Asians and Chinese. Not only are these the two largest immigrant groups in the Toronto CMA, but they both experience rapid growth being fed by the arrival of large numbers of new immigrants.

Findings do support the expectation that greater transit reliance on the part of immigrants translates into their attraction to transit quality neighbourhoods. However, the effect of transit quality on immigrants' residential location is weak as is its impact on their modal choice. In the choice of both residential location and mode of transportation, other variables play a much larger role than transit quality. Still, the research has revealed important differences between the Chinese and South Asian communities. There is a much stronger relation between residential location and high-quality transit neighbourhoods among South Asian than Chinese immigrants, especially in outer-suburban neighbourhoods. These findings cannot, however, be transposed to the relation between transit quality neighbourhoods and transit modal choice among the two immigrant groups. For both immigrant communities, this relation is very low, although somewhat higher for Chinese immigrants.

The paper proposes explanations for the findings and explores their policy implications. It attributes the weak relation among immigrants between transit quality and residential location to other variables that come into play when choosing a neighbourhood. Another explanation may have to do with the lack of good transit connection for many journeys that immigrants undertake. Finally, the limited impact of transit quality on the location of immigrants can also be attributed to transit-induced gentrification, making the surroundings of stations unaffordable to low-income transit users such as many new immigrants. Hence, a possible flaw in the transit-oriented development concept. Finally, findings indicate a weak connection between transit use and transit quality neighbourhoods, pointing to the role other factors play in the modal choice of immigrants.

The results from this study must be interpreted with caution. The analysis is performed at the census tract (CT) level and therefore does not reflect the behaviour of individual immigrants. Findings instead

pertain to areas where immigrants are concentrated. It is in this fashion that it is possible to attribute observed residential and modal patterns to the high presence of either South Asian or Chinese immigrants in a CT.

4.3 The Suburbanization of Immigrants and Public Transit Use

Research has identified the role kinship, culture, religion and a shared language have played in fostering residential clusters of immigrants (Li, 2009c; Qadeer, Agrawal and Lovell, 2010). Immigrant concentration is also propelled by the presence of ethnic businesses and services (Lo, 2009; Wang, Shuguang and Zhong, 2013; Zhuang and Chen, 2016). In ethnic neighbourhoods, immigrants can find social support, networking opportunities, access to employment and opportunities to launch businesses.

It is no surprise that immigrants have suburbanized, thereby following the demographic and employment decentralization experienced across North America (Li, Skop and Yu, 2016; Lo, Shalaby and Alshalalfeh, 2011). Departing from the past tendency to first settle in traditional inner-city gateways, new immigrants now massively seek suburban locations when they settle in their host country. In Toronto, 86 percent of immigrants live in suburban sectors (defined as those areas that were first developed after 1945). Therefore, as expected, Toronto suburbs have witnessed the mushrooming of clusters of immigrants containing ethnic businesses, services and institutions, which further raise the appeal of these areas for immigrants (Preston and Lo, 2008; Qadeer, Agrawal and Lovell, 2010; Wang and Zhong, 2013; Zhuang and Chen, 2016).

Studies point to more public transit reliance and less car dependency among immigrants (Heisz and Schellenberg, 2004; Newbold, Scott and Burke, 2017). These transportation patterns are influenced by the lower socioeconomic and precarious employment conditions experienced by many immigrants as well as by habits and preferences imported from their home country (Blumenberg, 2009; Blumenberg and Evans, 2010; Blumenberg and Shiki, 2008; Blumenberg and Song, 2008; Tal and Handy, 2010). True, research has detected that the longer immigrants live in their host country, the more their transportation patterns conform to the national norm, that is, the more they come to rely on the automobile (Asgari, Zaman and Jin, 2017; Chatman and Klein, 2013; Xu, 2018). But findings also reveal that this trend varies according to ethnic groups and that although the transit ridership of immigrants declines as they age (as it does for the population in general), at different stages in their life cycle it remains higher than for non-immigrants (Harun, Filion and Moos 2021; Hu, 2017; Newbold et al, 2017: 192; Tal and Handy, 2010: 85). These trends are confirmed by findings from studies of immigrant and non-immigrant commuting in Toronto (Heisz and Schellenberg, 2004; Newbold et al, 2017).

The suburbanization of immigrants can place those who rely on public transit in a difficult position as public transit service levels are lower and more uneven in suburbs than in more central parts. Research

has linked neighbourhoods offering quality transit with higher transit use and less automobile dependency (Cui et al, 2020; Foth, Manaugh and El-Geneidy, 2014; Manville, Taylor and Blumenberg, 2018). It associates quality transit with availability, accessibility, frequency, reliability, comfort and convenience (Verbich, Badami and El-Geneidy, 2017: 53). Living in the suburban realm thus represents challenges for transit-reliant immigrants (Lo et al, 2011). We can expect that suburban living will cause many immigrants who use public transit to transition more rapidly to the car. Other transit-reliant immigrants may instead be drawn to those suburban residential locations registering transit quality levels above the suburban norm.

The paper investigates whether the transit quality of neighbourhoods influences the residential choice of immigrants living in the suburb. It examines how transit quality rates relative to other factors affecting the residential choice of immigrants. The paper also gauges the relation between the transit quality of an area registering concentrations of immigrants and the level of transit use among residents of this area. Does it make a difference in the modal shares of its residents if a neighbourhood posts a high transit quality level? If detected, such relations could point to the attraction of transit-reliant immigrants to such areas or the capacity such places have of influencing the transportation behaviour of their residents in a way that favours transit.

The paper refines its examination of the adaptation of the residential and modal choice of immigrants to neighbourhood-scale transit quality by analysing the reactions of different immigrant communities. It thus considers if economic, cultural and lifestyle differences between immigrant communities influence their reaction to variations in transit quality. Thus, the paper does not only concern the relation between immigrants and transit quality, but also distinctions in how different immigrant communities respond to transit quality. The paper concentrates on the two largest Toronto CMA immigrant communities: the Chinese and the South Asians. Their selection as objects of inquiry does not only have to do with the fact that together they represent an important proportion of Toronto immigrants, but also that there are important distinctions between these two communities, with the potential of affecting their response to transit quality variations. Notably, South Asian immigrant households are larger and their economic status lower than those of the Chinese immigrant community (Agrawal and Lovell, 2008; Bascaramurty, 2013). The difference in economic status is reflected in the occupations of Chinese and South Asian immigrants: a stronger presence of Chinese in finance and insurance and professional and scientific categories, and more South Asians in manufacturing, transportation and warehousing, and administrative and support occupations (see Figure 4.2; Agrawal and Lovell, 2010).

4.4 The Toronto Urban Region

We selected the Toronto census metropolitan area (CMA) both for its diverse immigrant population and variations in land-use patterns and public transit quality (Figure 4.1). For the purpose of this study we divided the CMA into three zones: 1) the inner-city including former municipalities (the old City of Toronto and the boroughs of York and East York, before their amalgamation into the new City of Toronto in 1997) mostly developed for the first time before 1946; 2) the inner-suburbs composed of former municipalities (boroughs of Etobicoke, North York and Scarborough now also part of the new City of Toronto) mostly developed between 1946 and 1971; 3) the outer-suburbs consisting of the remainder of the CMA, which was built for the most part since 1971 (Figure 4.1). This approach to the definition of metropolitan zones based on their period of development is an established method adopted in earlier studies (Bunting & Filion, 1996; Skaburskis & Moos, 2008). While in some cases, the paper presents statistics for all three zones, its focus is on inner and outer suburbs because our attention is on the relation between transit quality and immigrant location patterns in suburban environments.

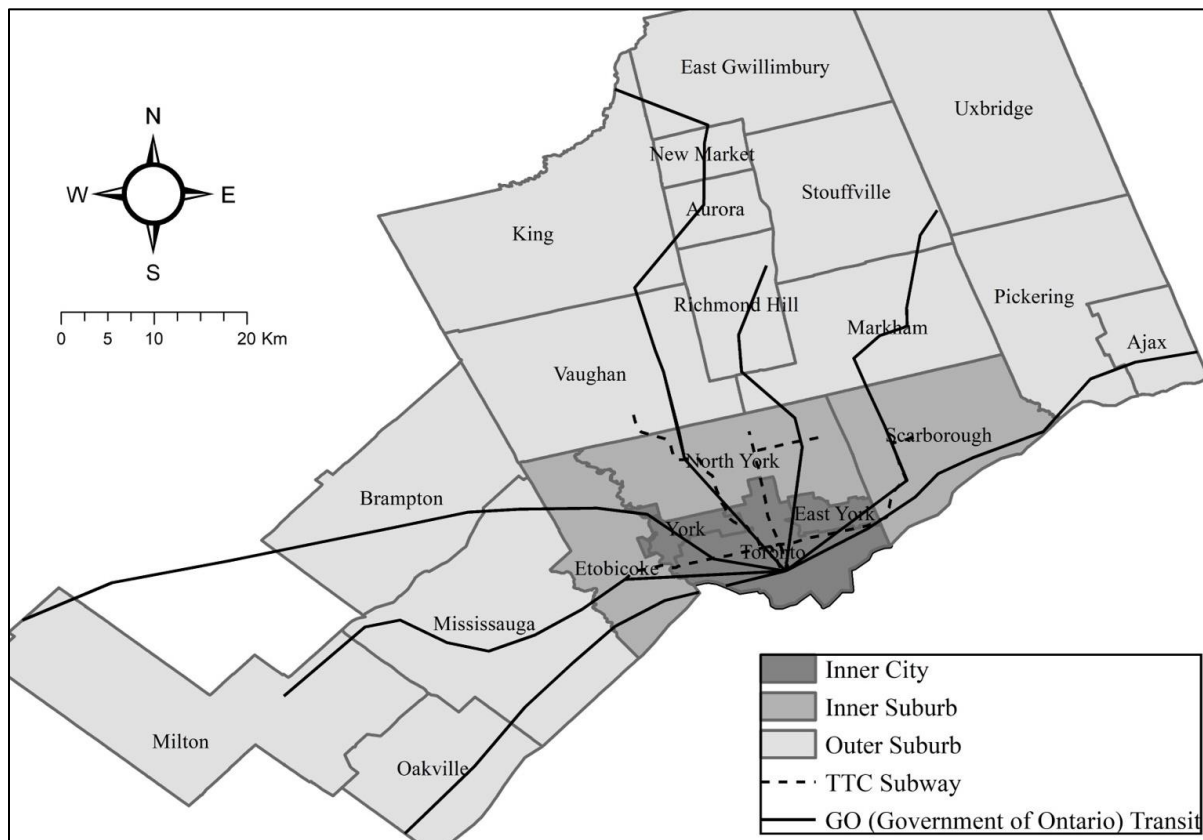


Figure 4.1: The Study Area – Toronto Census Metropolitan Area (CMA)

The inner-city registers a high transit quality level, as it is served by buses, streetcars, subways and commuter trains. Not only do most of its sectors post elevated residential and employment density, but they

also enjoy frequent public transit services. The high transit quality level in the inner-city is also a function of the downtown serving as the hub for metropolitan-wide transit systems – the subway, streetcars and commuter trains. The situation is more uneven in the inner suburbs. Some areas enjoy high transit quality thanks to the presence of subway lines or frequent bus services, while other sectors must contend with infrequent bus services. The outer suburbs are more wanting in terms of transit quality. Notwithstanding two bus rapid transit (BRT) systems and a few frequent bus lines, they are mostly characterized by a sharp discrepancy between areas close to commuter train stations providing connections to downtown Toronto and most of the outer suburbs served at best by infrequent bus services. Efforts by the provincial government over the last fifteen years to expand public transit across the Toronto metropolitan region, may have accentuated transit quality discrepancies by improving commuter rail services while having limited impact on suburban local bus transit.

In Toronto CMA, a majority of immigrants reside in the outer suburbs (51.95 percent), while the inner suburbs and inner city respectively make up 34.09 and 13.96 percent of the CMA’s immigrants. It is in the inner suburbs that immigrants represent the highest percentage (53.08) of the population, followed by outer suburbs (43.88) and the inner city (35.5) (Harun, Filion, & Moos, 2021).

4.5 Methods

Our analysis relies on Toronto CMA CT-level demographic, socioeconomic and journey to work data originating from the 2016 census. The census journey to work data records the utilization of different transportation modes to access work. In this article, we focus on four commuting modes: transit, car, carpool (car travel as a passenger), and active transportation (cycling and walking).

The analysis in this article is divided into three parts: i) the association between transit quality and the residential and modal choices of immigrants; ii) the distribution of suburban residential concentrations of Chinese and South Asian immigrants; and iii) the relation between transit quality and modal share in Chinese and South Asian immigrant suburban settlements.

4.5.1 Measuring Transit Quality and Determining its Association with the Residential and Modal Choice of Immigrants

We began our analysis by devising a day-long transit quality index for the CMA. CT transit quality measurements were based on the frequency and coverage of transit while accounting for differences in capacity and efficacy between subway, streetcar, local bus, bus rapid transit and commuter train services. We used publicly available GTFS (General Transit Feed Specification) data for devising the index using Equation (1).

$$I_{ct} = \sum (s_{st} * f_{ts} * w_{ts}) / a_{ct} \quad (1)$$

where, I_{ct} = transit quality of a census tract; s_{st} = service area around a transit stop; f_{ts} = frequency of service during off peak; w_{ts} = relative weight of transit services reflecting their capacity; and a_{ct} = area of the census tract. Frequency of transit was determined using the BetterBusBuffer toolset, developed by ESRI, in ArcGIS 10.6. The delineation of service areas around transit stops or stations relied on this same toolset.

Service areas are commonly defined as the space surrounding transit stops from where potential passengers are drawn (El-Geneidy et al., 2014: 194). They are based on the distance passengers are willing to walk to access different types of transit services. Research has detected willingness to walk longer distances to reach commuter rail and subways (about 800m) compared to local buses (about 400m) (Brinckerhoff, 2013; Chia, Lee, & Kamruzzaman, 2016; Daniels & Mulley, 2013; El-Geneidy et al., 2014; O’Sullivan & Morrall, 1996). Accordingly, we applied a threshold of 400m to draw service areas for local buses and 800m for subways and commuter rail. Meanwhile, we considered streetcars and BRT as occupying a median position relative to subways/commuter rail and local buses in terms of frequency, rapidity, coverage and comfort, which led us to use a 600m threshold to delineate their service areas. To frame our transit quality index, we relied on off-peak headways. We chose the off-peak service period because it is representative of day-long transit quality (Filion, McSpurren and Appleby, 2006).¹⁰

We applied relative weights when calculating frequencies to account for differences in the efficiency of different types of transit. Florida (2011; 2012) adopted such an approach for an analysis of transit in Toronto. He assigned the highest weight to subways followed by streetcars and then local buses to reflect differences in vehicle size and frequency. In this study, we weighted the transit modes as follows: subways by 2; commuter rail by 1; BRT and streetcars by 0.5; and local buses by 0.25. The highest weight was assigned to subways because of their high frequency and large carrying capacity (TTC, 2018; 2020). Commuter rail was assigned a lower weight than subways because of less frequent headways, which vary widely by the time of the day and location (Metrolinx, 2018a). Also, the range of destinations is far less for commuter rail than for subways. BRT and streetcars are treated equally because they share limited geographic coverage and high frequency. When assigning transit mode weights, we considered local buses as least efficient, due to their slow speed, numerous stops and frequently circuitous routes.

Table 4.1 depicts transit quality index differences between the three zones and the municipalities within these zones. The table clearly indicates the sharp divergence between the inner-city index and that of the two suburban zones. This extreme difference is due to the above-mentioned concentration of transit modes

¹⁰ We are aware that the commuting data used herein correspond to journeys to work, which largely take place during peak hours. However, we wanted a measure of transit quality that best portrays day-long transit availability because we consider that this is likely to be a better factor influencing the choice of a neighbourhood than peak-time transit quality on its own.

in the relatively high-density inner city and especially in downtown Toronto. Meanwhile, the average index values for suburban municipalities range from 0.15 to 8.34. As expected, the closer these municipalities are to the inner-city, the higher is their index. But two large outer suburban municipalities, Brampton and Mississauga, post average index values comparable to those of inner suburban municipalities (Lo at al, 2011; Marshall, 2018).

Table 4.1: Transit Quality in Metropolitan Zones and Municipalities in Toronto

City	Index Value (Mean)
Inner city	123
East York (former borough of)	5.26
Toronto (former city of)	162.82
York (former borough of)	7.63
Inner Suburb	7.2
Etobicoke (former borough of)	7.35
North York (former borough of)	8.34
Scarborough (former borough of)	6.32
Outer Suburb	4.6
Ajax	3.83
Aurora	2.03
Brampton	7.88
East Gwillimbury	0.38
King	0.16
Markham	3.20
Milton	1.81
Mississauga	6.94
New Market	3.32
Oakville	1.72
Pickering	3.24
Richmond Hill	5.25
Stouffville	1.32
Uxbridge	0.15
Vaughan	2.45

After devising the index, we performed a correlation analysis between modal share (transit, car, carpooling and active transportation) and transit quality. We performed the analysis for all tracts and for

the ones with a moderate and high presence of immigrants (see below for the definition of ‘moderate’ and ‘high’ in this context).

We then assessed the level of attraction of immigrants to public transit quality through multiple regression analyses. A number of regression models were developed using transit quality as the dependent variable and the CT concentration of all immigrants and that of Chinese and South Asian immigrants as the independent variables, while controlling for household income and size. A model was also developed for the non-immigrants for comparative purposes. The socioeconomic variables included in the models have been used in prior research distinguishing transit rich from transit poor neighbourhoods (Metrolinx, 2018b; Wang and Woo, 2017). Both the correlation and regression analysis were performed for the CMA and the three metropolitan zones.

4.5.2 Exploring the Spatial Settlements of Chinese and South Asian Immigrants

We evaluated the spatial patterning of Chinese and South Asian immigrants within the CMA based on their concentration levels in CTs. Location quotients (LQ) were devised using Equation 2 to represent the proportions of Chinese and South Asian immigrants in CTs relative to the study area average.

$$LQ = \frac{I_{ij}/P_i}{I_j/P} \quad (2)$$

where, I_i = total immigrants in CT i belonging to group j ; P_i = total population in CT i ; I_j = total immigrants belonging to group j in Toronto; and P = total population in Toronto. The CTs were grouped into three categories (low, medium, and high) based on immigrant levels of concentration. The tracts with LQ values above 1.2 were categorized as posting a high concentration, while the ones with LQ values inferior to 0.8 were considered to have low concentration levels. The tracts with in-between values were classified as having medium concentrations of Chinese and South Asian immigrants.

4.5.3 Evaluating Transit Quality and Modal Share Relative to Chinese and South Asian Immigrant Concentrations

The final part of the analysis assesses modal share differences in CTs with concentrations of Chinese or South Asian immigrants and the role transit quality plays in shaping these differences. We do so by developing two sets of regression models.

The first set of regression models evaluate the difference in commuting modes of medium and high LQ tracts with those of low LQ tracts. We used percentage for the four commuting modes as the dependent variables, while the independent variables consisted of dummy variables representing the medium and high LQ tracts. The low LQ tracts were used as the reference variable.

Through the second set of regression models we evaluate the influence of transit quality on modal shares. We developed models for all the tracts and then for the ones with medium and high Chinese and South Asian immigrant LQs in the inner and outer suburbs. The dependent variables included the level of use of the four transportation modes, while the independent variables comprised transit quality, dwelling density, household size, household income and work location (i.e., percentage of commuters working outside the city where they reside). The choice of the socioeconomic variables was based on the demonstration of their relevance by prior studies (Blumenberg, 2009; Blumenberg & Smart, 2010; Filion, McSpurren and Appleby, 2006; Heisz & Schellenberg, 2004; Lo et al., 2011; Newbold et al., 2017).

4.6 Transit Quality, Modal Choice and Immigrants

4.6.1 Immigrant Concentration and Transit Quality

Table 4.2 presents the association between the presence of immigrants and non-immigrants and the transit quality of CTs in Toronto CMA and its three metropolitan zones, controlling for average household size and income. It is only outer-suburban CTs that yield statistically significant results regarding the association between immigrants and non-immigrants and transit quality. Significantly, the coefficient is negative for non-immigrants and positive for immigrants. Findings indicate that in all cases, except that of outer suburbs in the immigrant model, average household size has more explanatory power than immigrant and non-immigrant status. In all instances, coefficients are negative, probably suggesting that transit quality is generally associated with the presence of smaller residential units. Average household income associations are generally weaker. The immigrant model reveals a positive association for inner-city CTs and a negative association of about equal value for outer-suburban CTs. The difference may reflect the greater choice of destinations that can be reached by public transit in the inner city than in the outer suburbs, in large part a consequence of the inner-city presence of subways (the most efficient form of transit), hence higher residential costs close to inner-city transit stops and stations.

Table 4.2: Association of Non-Immigrants and Immigrants with Transit Quality (Standardized Coefficients)

	Non-Immigrant Model				Immigrant Model			
	Toronto CMA	Inner City	Inner Suburb	Outer Suburb	Toronto CMA	Inner City	Inner Suburb	Outer Suburb
	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>
Proportion of Non-immigrant	-0.029	-0.039	-0.091	-0.156*				
Proportion of Immigrant					0.028	0.098	0.073	0.186*
Average Household size	-0.183*	-0.235*	-0.252*	-0.096*	-0.188*	-0.268*	-0.264*	-0.129*
Average Household Income	0.066*	0.109	0.012	-0.0147*	0.064*	0.144*	0.013	-0.154*

*p < 0.05

Table 4.3: Association of South Asian and Chinese Immigrants with Transit Quality (Standardized Coefficients)

	Chinese Model				South Asian Model			
	Toronto CMA	Inner City	Inner Suburb	Outer Suburb	Toronto CMA	Inner City	Inner Suburb	Outer Suburb
	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>
Proportion of Chinese	0.025	0.059	0.027	-0.052				
Proportion of South Asians					0.132*	0.077	0.117*	0.350*
Average Household size	-0.180*	-0.251*	-0.253*	-0.042	-0.265*	-0.262*	-0.305*	-0.309*
Average Household Income	0.049	0.092	-0.035	-0.234*	0.082*	0.105	-0.003	-0.110*

*p < 0.05

Table 4.3 reproduces Table 4.2's models with the difference that its focus is on distinctions between Chinese and South Asian immigrants. It points to a stronger association between the presence of South Asian than of Chinese immigrants and transit quality. None of the Chinese immigrant coefficients achieve statistical significance, while in the case of South Asians they do in all cases with the exception of inner city CTs. Note that it is outer suburban CTs that post the highest South Asian-transit quality association (0.350). As in Table 4.2, the average household size variable demonstrates much more explanatory capacity than the immigrant community variable. Sole exceptions in this regard are outer-suburban CTs. Finally, the average household income variable also yields findings that resemble those found in Table 4.2. Both immigrant communities register negative values in outer-suburban CTs, but much more so for Chinese than South Asians (-0.234 vs -0.110).

4.6.2 Transit Quality, Immigrant Concentration and Journey Mode

Correlations portrayed on Table 4.4 indicate, as expected, an association between the transit quality of CTs and public transit use. This association is detected analysing all tracts and the one considering only the tracts with a concentration of immigrants. The largest divergence between the transit use coefficient of the two models has to do with CMA-wide CTs (0.122 for all CTs vs 0.87 for immigrant CTs). The higher value for all tracts than for immigrant tracts may have to do with the broader coverage in the first than in the second case (for example, the inner city is under-represented in the second model because of a lower presence of immigrants in this zone). In both models, the inner city and inner suburbs, where transit services and use are higher, register stronger associations than outer suburbs do, where the quality of, and reliance on, transit is generally lower. Coefficients of car use in both models paint a reversed image of transit use values. Carpooling coefficients broadly resemble those of car use whereas those for active transportation tend to reflect public transit use values. Such a correspondence can be explained by the supportive role high density plays for both transit quality and active transportation. Revealingly, in both models, active transportation coefficients fail to achieve statistical significance in outer suburbs, where density is lowest.

Table 4.4: Correlation Analysis of Transit Quality with Transportation Modes

	All tracts				Immigrant Tracts			
	Toronto CMA	Inner City	Inner Suburbs	Outer Suburbs	Toronto CMA	Inner City	Inner Suburbs	Outer Suburbs
Transit	0.122*	0.251*	0.242*	0.156*	0.087*	0.235*	0.237*	0.124*
Car	-0.215*	-0.235*	-0.266*	-0.174*	-0.295*	-0.363*	-0.261*	-0.147*
Carpool	-0.143*	-0.166*	-0.110*	-0.087*	-0.186*	-0.269*	-0.121*	-0.052*
Active Transport	0.409*	0.411*	0.297*	0.066	0.324*	0.487*	0.319*	0.037

*P < 0.05

Table 4.5: Difference in Transportation Patterns of Chinese and South Asian Immigrant Neighbourhoods (Standardized Coefficients)

		Concentration in Tracts	Transit	Car	Carpool	Active Transport
			<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>
Chinese	Inner Suburb	Medium	0.030	-0.037	-0.042	0.120*
		High	-0.076	0.059	0.076	0.014*
	Outer Suburb	Medium	0.045	-0.010	-0.133*	0.070
		High	0.034	-0.007	-0.027*	-0.220
South Asian	Inner Suburb	Medium	0.068*	-0.156*	0.026*	-0.102*
		High	0.198*	-0.173*	0.030*	-0.150*
	Outer Suburb	Medium	0.120*	-0.106*	0.141*	-0.139*
		High	0.129*	-0.076**	0.317*	-0.343*

*P < 0.05 | **P < 0.1

Note: The Values in the table correspond to difference in medium or high LQ CTs relative to the Low LQ CTs

Table 4.5 further investigates the association between immigrants and transit use by considering the modal shares identified in four categories of CTs- those with medium and high concentrations of Chinese and South Asian immigrants. Data from the regression analysis point to sharp distinctions between the two communities. Results show statistically significant associations between South Asian medium and high concentration CTs and higher

transit use, less driving, more carpooling and lower active transportation. It is noteworthy that contrary to Table 4.4 results, there is a difference within this category of CTs between a negative association with car use and a positive one with carpooling. These results can point to more need to rely on carpooling among low income members of this immigrant community and the frequent location of their employment in sectors that are poorly serviced by public transit. The relatively strong relation between high South Asian immigrant concentration in outer-suburban CTs and carpooling is consistent with employment statistics presented in Figure 4.2. These data denote high South Asian immigrant employment in manufacturing as well as transportation and warehousing, sectors whose facilities are generally poorly accessible by transit. The

configuration of the neighbourhoods posting concentrations of South Asian immigrants could account for low or negative active transportation scores. These would be neighbourhoods where density is low and most activities poorly accessible on foot or on bike. These explanations of reliance on carpooling and low active transportation score would pertain most to outer suburban CTs with high concentrations of South

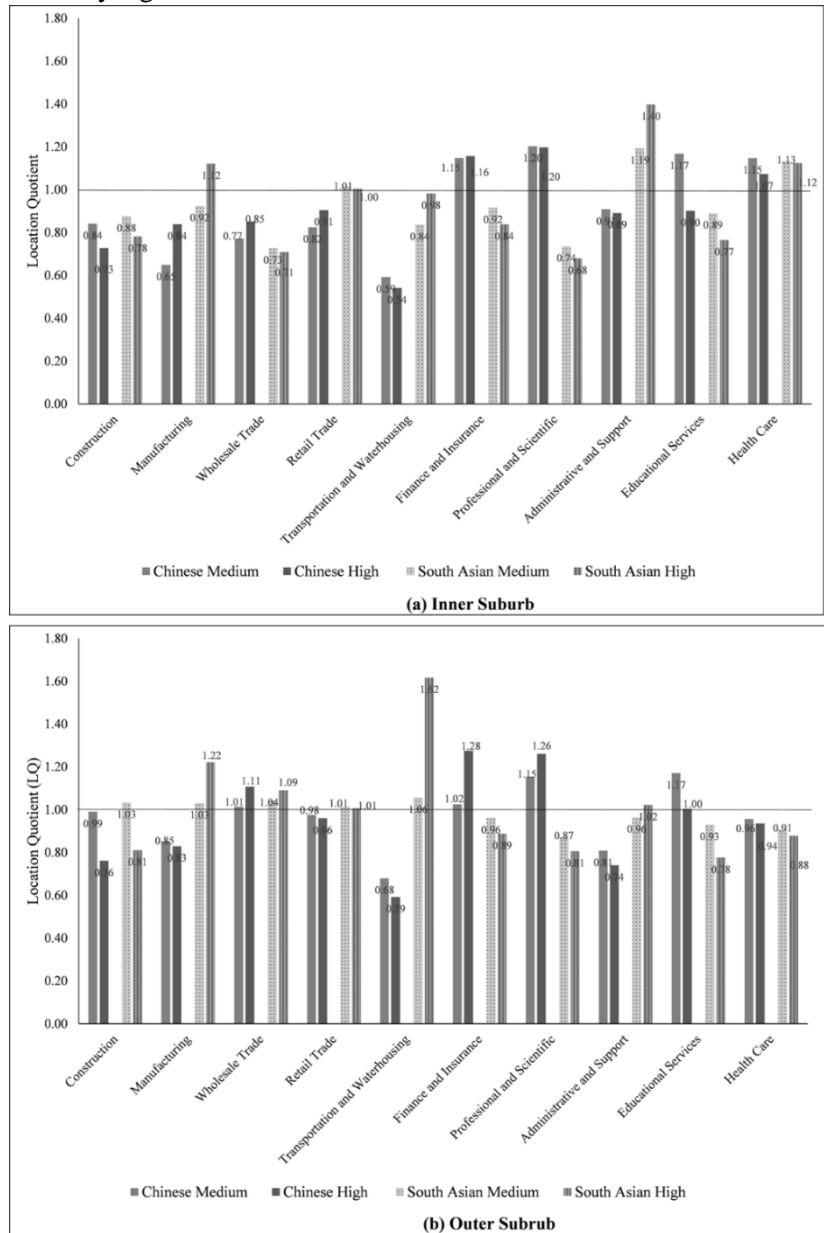


Figure 4.2: Employment by Industry

Asian immigrants, as evidenced by the relatively high positive carpooling and negative active transportation coefficients (0.317 and -0.343) of these CTs. In the case of CTs with concentrations of Chinese immigrants, associations are registered only in the case of carpooling in outer suburbs and active transportation in inner suburbs. In the first instance, this association can be attributed, as in the case of CTs with concentrations of South Asians, to location patterns of activities and employment requiring reliance on the car for all, including people who do not drive. On the other hand, the detected association between active transportation and inner suburban CTs with a medium and high Chinese immigrant presence can be linked to high density mixed use CTs, such those found around North York subway stations.

4.7 Chinese and South Asian Immigrants' Residential Patterns

To better understand the relation between the residential location of Toronto CMA Chinese and South Asian immigrants and transit quality, we first look at the distribution of residential concentrations of these two communities and then at the association between these concentrations and different levels of transit quality. The vast majority of Chinese and South Asian Toronto CMA immigrants, 89 and 94 percent respectively, live in the suburbs, the outer suburbs accounting for 49 and 64 percent of the former and latter groups. Figure 4.3 portrays a large nucleus of Chinese immigrant high and medium LQ CTs in the north east of the CMA, covering a large portion of inner and outer suburbs (the inner-suburban former boroughs of North York and Scarborough and the outer-municipalities of Markham, Richmond Hill and Stouffville) (Lo et al., 2011; S. Wang & Zhong, 2013). Lesser concentrations are detectable close to central Toronto in the inner city and in the outer-suburban municipalities of Mississauga and Oakville. However, high and medium South Asian immigrant LQ CTs adopt a clear dual nuclei pattern. By far, the largest nucleus is to the west of the CMA covering the outer-suburban municipality of Brampton and with a strong presence in Mississauga and a lesser one in Oakville. The other nucleus, to the east of the CMA, comprises the southeast portion of the inner-suburban former borough of Scarborough and the outer-suburban municipalities of Pickering and Ajax.

The spatial clustering identified in Figure 4.3 confirms the attraction family ties, social networks, cultural affinity, ethnic businesses and institutions exert on immigrants (Balasubramaniam, 2012; Li, 2009c; Murdie, 2008; Newbold, 1996; Wang & Zhong, 2013). These factors explain the congregation of CTs registering concentrations of immigrants into nuclei. They also account for the tendency for immigrants to seek proximity to their own community, which explains the very rare occurrence of CTs with a high presence of both Chinese and South Asian immigrants (Fong & Chan, 2010; Ghosh, 2007, 2013; Xue, Friesen, & O'Sullivan, 2012).

Figure 4.4 suggests explanations for the difference in transit quality coefficients between Chinese and South Asian immigrants identified in Table 4.5. It exposes a more frequent association between high

transit quality and CTs containing concentrations of South Asian than Chinese immigrants. This trend can be linked to differences in the quality transit index of the municipalities in which concentrations of the two communities of immigrants are found.

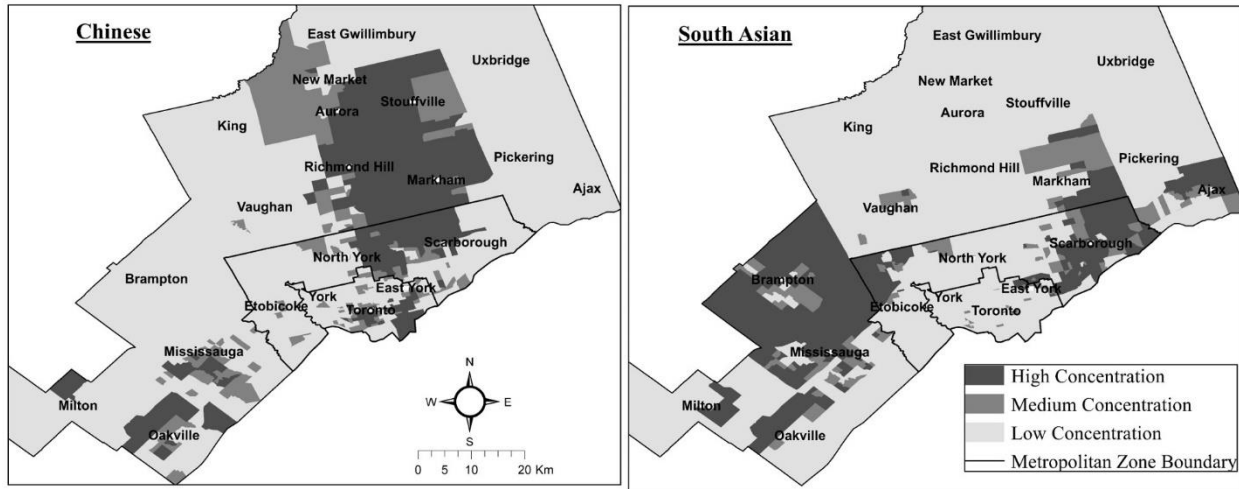


Figure 4.3: Concentrations of Chinese and South Asian Immigrants

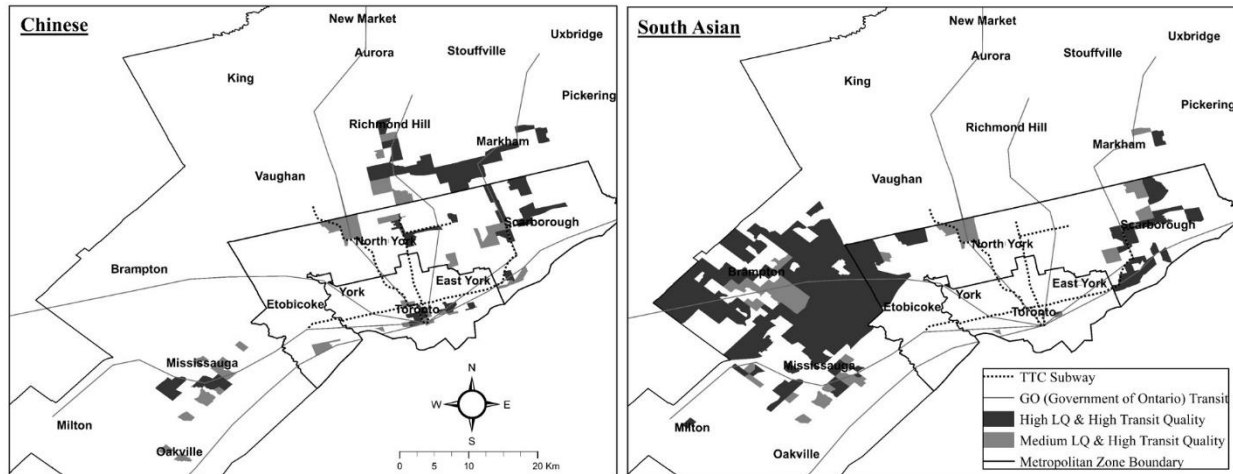


Figure 4.4: Quality Transit in Medium and High Concentration Immigrant Neighbourhoods

To be sure, the Chinese immigrant community access to quality transit benefits from the presence of concentrations of its members in central Toronto and in inner-suburban former boroughs of North York and Scarborough (with transit quality indexes of 162.82, 8.34 and 6.32) (Table 4.1). Note that North York registers a higher quality transit index than Scarborough, which scores below the inner-suburban average of 7.2. But two of the outer-suburban municipalities, Markham and Soutffville, present within the Chinese immigrant community nucleus, post transit quality indexes below the outer-suburban average (respectively 3.2 and 1.32. vs a 4.6 outer-suburban average). Markham represents the largest outer-suburban

concentration of Chinese immigrants. Richmond Hill, the third outer-suburban municipality within the Chinese immigrant nucleus, shows an index that is slightly superior to its CMA zone average (5.25).

The situation is different for CTs posting concentrations of South Asian immigrants. They are nearly absent from the inner city and their presence in the inner suburbs is found in Scarborough, which registers the lowest transit quality index in this zone. On the other hand, their main nucleus is found in the outer-suburban municipalities (Brampton and Mississauga) scoring highest in terms of transit quality (7.88 and 6.94) (Table 4.1). The high transit quality index in these two municipalities can be attributed to frequent commuter train services and a more developed local bus service than in other outer-suburban municipalities. Also, there is the BRT line Mississauga operates.

4.8 Transit Quality, Modal Choice and Concentrations of Chinese and South Asian Immigrants

Having considered the association between Chinese and South Asian immigrant concentrations and transit quality, we now explore the effect of transit quality on modal shares. Table 4.6 presents the results of two models considering this relation at the scale of all CMA CTs and at that of those tracks registering a concentration of Chinese and South Asian immigrants. To control for the effects of other variables commonly linked to modal choice, the model includes dwelling density, household size, household income and distance from work. One model analyses these variables at the scale of inner-suburban CTs and the other at that of outer-suburban tracts.

The main finding emerging from Table 4.6 is the relatively weak association between transit quality and modal shares. Still, this association is stronger among inner-suburban than outer-suburban CTs, and among tracks with concentrations of Chinese than South Asian immigrants. Indeed, the highest modal share coefficients are registered by Chinese inner-suburban CTs: 0.179 (transit use), -0.215 (car driving) and 0.225 (active transportation). In most instances, other variables than transit quality perform better, sometimes much better, explaining modal shares.

On the surface, higher transit quality coefficients for Chinese than South Asian immigrant CTs are unexpected given previous results pointing to a much higher presence of South Asian immigrants in quality transit CTs. The effect of larger households and lower income within the South Asian compared to the Chinese immigrant community CTs may account for observed findings. We indeed detect a strong negative association between South Asian household income and transit use (-0.525 and -0.528 for inner suburban and outer suburban CTs). These values are reversed in the case of driving (0.626 and 0.620). The relation

Table 4.6: Commuting Modal Shares in Toronto Suburbs and in the Chinese and South Asian Suburban Neighbourhoods (Standardized Coefficients)

	Transit			Car			Carpool			Active Transport		
	All Tract	Chinese	SA	All Tract	Chinese	SA	All Tract	Chinese	SA	All Tract	Chinese	SA
	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>	<i>Coeff</i>
INNER SUBURB												
Transit Quality	0.131*	0.179*	0.009	-0.158*	-0.215*	-0.047	-0.023	-0.104	0.011	0.162*	0.225*	0.029*
Dwelling Density	0.248*	0.273*	0.041	-0.305*	-0.387*	-0.019	-0.122*	-0.174**	-0.012	0.337*	0.498*	0.157**
Average Household Size	-0.079**	-0.145**	-0.211*	0.023*	0.050*	0.139*	0.288*	0.118*	0.494*	-0.288*	-0.267*	-0.127*
Average Household Income	-0.365*	-0.382*	-0.525*	0.379*	0.384*	0.626*	-0.052*	-0.251*	-0.236*	0.143*	0.243*	0.340*
Working Outside CSD	-0.243*	-0.181*	-0.102*	0.235*	0.167*	0.068*	0.073	0.064	-0.008	-0.051	-0.024	0.145
OUTER SUBURB												
Transit Quality	0.114*	0.048	0.034	-0.098*	-0.024	-0.021	0.044	0.044	0.011	0.014	0.091	0.013
Dwelling Density	0.301*	0.461*	0.088**	-0.242*	-0.405*	-0.010	-0.037	-0.016	-0.140*	0.034	0.081	0.064
Average Household Size	-0.037	-0.035**	-0.136*	0.140*	0.108**	0.143*	0.399*	0.457*	0.386*	-0.026	-0.089	-0.024
Average Household Income	-0.159*	-0.027**	-0.528*	0.257*	0.164*	0.620*	-0.130*	-0.287*	-0.429*	0.084	0.105	0.074
Working Outside CSD	-0.296*	-0.339*	-0.198*	0.260*	0.373*	0.172*	0.044	0.036	.014	-0.026	-0.161	-0.077

*p < 0.05 | ** p < 0.1

between household size and transit use and driving is also higher for CTs with concentrations of South Asian immigrants than it is for those with concentrations of Chinese immigrants and for all CMA CTs. Albeit, the difference in the association between household size and transit use between the two immigrant communities is less, and the overall relationships are weaker than for the household income-transit use association. On the other hand, variables related to urban form and the location of activities (dwelling density and working outside of one's municipality) score higher for all CTs and for those with concentrations of Chinese immigrants than they do for those with concentrations of South Asian immigrants. As expected, in all categories of CTs, carpooling is positively associated with household size (household members indeed share rides) and negatively with income. Finally, none of the coefficients for active transportation achieve statistical significance in the case of outer-suburban CTs. In contrast, in inner-suburban CTs, they associate positively with transit use, density and household income. The relation with household size is negative. The picture to arise regarding active transportation is one where the configuration of CTs plays an important role. These are likely high-density CTs with activities that are accessible on foot. The dwelling density variable explains smaller household size and the attractiveness of the pedestrian-friendly land use of these CTs can account for the positive household income relation with active transportation. Note that of all the coefficients measuring the relationship between transit quality and modal shares, it is the one gauging the association between Chinese immigrant inner-suburban CTs and active transportation that scores the highest (0.225). Also notable is the high value of the association between dwelling density and active transportation among Chinese immigrant inner-suburban CTs (0.498).

The picture that Table 4.6 projects is one whereby higher income and smaller households provide more opportunities for Chinese than South Asian immigrants to adapt their location and modes of transportation to urban form, the location of the activities they frequent and the availability of modes. Hence, the higher association within CTs containing a concentration of Chinese immigrants between transit and driving, on the one hand, and dwelling density and location of work, on the other, than with the other Table 4.6 variables. The adaptation of modal shares within Chinese immigrant CTs to their local environment is also brought to light by the association between density and active transportation in inner-suburban CTs. Meanwhile, for CTs with concentrations of South Asian immigrants, it is household income and household size that are most strongly associated with transit use and driving.

4.9 Discussion: Limited Attraction to, and Impact of, Transit Quality Among Immigrants

The paper intended to verify the hypothesis whereby if immigrants are more reliant on public transit than non-immigrants, we can expect them to settle disproportionately in places offering quality transit services. Such a distinct location patterns would become even more apparent with the large-scale suburbanization of immigrants. We could then expect to find concentrations of immigrants in the infrequent suburban locations with quality transit. On the basis of this hypothesis we would have expected the following findings: 1) immigrants concentrate in quality transit areas; 2) transit quality is a key factor in their residential location choice; 3) immigrants in such locations are highly reliant on public transit.

Our research did detect an association between transit quality and the residential location of immigrants, but it was not a very powerful one even if higher than in the case of non-immigrants (for whom the relation was negative). In addition, this association pertained to only one of the two immigrant communities under investigation. Such a finding likely points to the more important role among immigrants of other locational factors such as income, the size of housing and attraction to one's ethnic community. Perhaps most unexpected was the weak relation between transit quality CTs and transit use. And surprisingly this relationship was higher for CTs with concentrations of Chinese than for those with South Asian immigrants, who are more attracted to locations offering transit quality.

To cast a sharper light on the weak association between transit quality and the residential location of immigrants and between transit quality and transit use (especially in the case of South Asians), we turn to the South Asian immigrant nucleus to the west of the CMA. The identified relation between concentrations of South Asian immigrants and quality transit in this nucleus may be more a matter of happenstance than of residential location decisions driven by proximity to frequent and efficient transit services. The clustering of this immigrant community in Brampton and Mississauga would be due to other factors than the high transit quality index (by outer-suburban standards) of these two municipalities. The high index is largely a function of the presence of three commuter train lines, with frequent daylong services. While these commuter train services are certainly beneficial to those South Asian immigrants who work downtown Toronto, they are of little use to the vast majority of members of this community. As shown in Figure 4.2, outer-suburban South Asian immigrants are often employed in job categories that are poorly suited to public transit access. South Asian immigrants may have been attracted to Brampton and Mississauga more by their ethnic life, job opportunities and the presence of large houses, which are more affordable than those in more central parts of the CMA, than by quality transit.

Turning to the policy implications of the findings, they can be interpreted within the broader planning context of the difficulty experienced when trying to match proximity to quality public transit with

populations relying heavily on this mode. This problem confronts transit-oriented development strategies, whose housing is often targeted at well-to-do small households, which tend to patronize public transit less than larger lower income households (Kramer, 2018). More so than Chinese immigrants, South Asians have been victims of transit-induced gentrification. While Chinese immigrants are present in central Toronto and inner-suburban locations abutting subway stations, in both cases, places offering a mixture of high-level transit accessibility and pedestrian conducive environments, South Asian immigrants are mostly absent from these locations. We note here the greater ability of the wealthier Chinese immigrant community to take advantage of these locations, than South Asian immigrants. Chinese immigrants are also advantaged in this regard by their smaller households. A related policy dimension of the findings pertains to the future trajectory of transit use among immigrants. Findings do not suggest the existence of circumstances favourable to the maintenance of transit reliance among immigrants. From a transit policy point of view, this could be seen as a missed opportunity to retain the transit loyalty of immigrant patrons or even increase the size of this potential transit market.

Chapter 5: Conclusion

This dissertation is comprised of three stand-alone manuscripts that cumulatively shed light on the transportation implications of immigrants' spatial settlement patterns in the Toronto metropolitan region. The dissertation evaluates transportation outcomes relative to the spatial arrangements of immigrants in general, as well as those for the Chinese and South Asian immigrants more specifically. By investigating relationships between the spatial concentration of immigrants and commuting modal shares in the neighbourhoods of three metropolitan zones (inner city, inner suburb, and outer suburb), the research explored spatial variations in the travel patterns of the immigrant population. When examining similar relationships in the Chinese and South Asian settlements, the research first applied a novel methodological approach to delineate ethnoburbs for these two groups, and determined their spatial settlement trends. Based on the apparent spatial settlement trends, Chinese and South Asian neighbourhoods were identified, and travel patterns in the neighbourhoods of the two minority groups were compared and contrasted. In so doing, this dissertation unravels the dynamic relationship between immigrants' settlement and their travel patterns, and thereby, contributes to the immigrant settlement and transportation literature, as well as urban planning scholarship more broadly.

In this chapter, I summarize the major findings of three research articles and discuss their contributions to the literature, as well as their planning implications. This chapter also identifies limitations of the dissertation and outlines potential future research directions to further explore immigrant settlement and transportation relationships.

5.1 Key Findings

The first research article, titled "The immigrant effect on commuting modal shares: Variation and consistency across metropolitan zones", investigated inter-metropolitan-zone differences in the relationships between immigrants' spatial arrangement and their use of commuting modes within the Toronto metropolitan region (Chapter 2). This article identified considerable spatial variations in the immigrant-transportation associations. Multiple regression models were developed for the whole CMA and for each metropolitan zone (inner city, inner suburbs, and outer suburbs). The models measured how commuting modes vary with the concentration of immigrants within census tracts, while accounting for socioeconomic and built environment factors. Findings from this study demonstrated that there is a higher use of transit and carpooling, and a lower car use by immigrants, compared to non-immigrants. This phenomenon was found both at the CMA level and in each of its metropolitan zones. However, results from the models pointed towards strongest transit dependency among immigrants in the outer suburbs followed

by the inner suburbs and the inner city. They also identified substantial influence of the large household size and low income of immigrants on the transportation outcomes. While the findings justified the need for expanding transit services beyond the inner city to the suburbs in Toronto, they also raised inequality concerns given the mismatch between spatial arrangements for the transit-dependent immigrants and their access to quality transit services.

The second research article, titled “Ethnoburb as a spatiotemporal process: Its implications for immigrant settlements”, evaluated the spatial evolution patterns of Chinese and South Asian immigrants in the extended Toronto metropolitan region using the ethnoburb model (Chapter 3). The article highlighted distinct settlement preferences among minority groups, and also identified how there is some degree of uncertainty involved in the future evolution trajectories of ethnoburbs. The article developed a new method for classifying ethnoburbs into three categories (‘Nascent’, ‘Mature’, and ‘Saturated’), representing distinct stages of ethnoburb development. Spatiotemporal changes in the delineated ethnoburbs were also evaluated in order to determine their evolution trends. The study determined that there is a multi-nuclei aggregation tendency among both minority groups. However, the difference in the geographic location between the Chinese and South Asian ethnoburb clusters highlighted the respective settlement preferences between these groups. The higher spatial dispersal in the South Asian clusters compared to that of the Chinese, provided additional evidence of the differences in residential preferences for the two groups. Meanwhile, the study identified considerable uncertainty about the future evolution patterns for Toronto’s ethnoburbs. While the majority of ethnoburbs demonstrated linear progression by evolving from ‘Nascent’ to ‘Mature’, and ‘Mature’ to ‘Saturated’ categories, many of them regressed to their previous stages due to the changes in the demographic composition of the neighbourhoods.

The third research article, titled “Immigrant suburban settlement patterns and transportation outcomes: Does neighbourhood transit quality matter?”, compared and contrasted transportation patterns in Chinese and South Asian neighbourhoods, and also assessed the impact of the transit quality of those neighbourhoods in relation to commute mode preferences (Chapter 3). The article identified distinct travel patterns for the Chinese and South Asian neighbourhoods, as well as detected a minimal influence of quality transit on the choice of commuting modes in those neighbourhoods. Findings from an array of regression models pointed towards greater transit orientation for residents of the South Asian neighbourhoods compared to those of the Chinese neighbourhoods. The models also determined a low significance of proximity to quality transit, and high significance of socioeconomic factors, on the choice of commuting modes in the immigrant neighbourhoods. Additionally, the study identified some seemingly paradoxical relationships. Irrespective of the high transit quality in the South Asian neighbourhoods, proximity to quality transit did not significantly impact transportation outcomes in those areas. The article regarded this

high transit quality in South Asian settlements as a matter of happenstance, rather than residential location decisions driven by proximity to efficient and frequent transit services. Socioeconomic and employment factors, such as income, household size, and work locations, were identified to have a stronger influence on driving immigrants' residential and transportation decisions.

As a whole, this dissertation substantiates the notion that there are unfavourable conditions for maintaining transit reliance among immigrants in the Toronto metropolitan region. It emphatically points to the dissonance which exists among immigrants' spatial settlement patterns, their transportation outcomes, and contemporary urban planning approaches. The dissertation highlights the need for expanding transit services beyond the inner city to the suburbs by taking into account the rapid suburbanization trends of immigrants, and their strong inclination towards transit use. At the same time, it speculates how a simple expansion of transit services to the suburbs may not necessarily patronize transit use among immigrants. This reality stems from the complex interactions of a myriad of socioeconomic factors in shaping immigrant-transportation relationships. Proximity to quality transit alone does not always guarantee the use of the service in immigrant neighbourhoods. Contemporary urban planning approaches, which, for promoting transit use, heavily rely on increasing frequency and availability of transit services, and also transit-oriented developments, are not necessarily compliant with immigrants' unique socioeconomic dynamics and lifestyles. Thus, in order to help ensure sustainable urban development, this dissertation recommends resilience in urban planning approaches to accommodate for the diversity of immigrants' preferences and needs, owing to their dynamic settlement patterns, socioeconomic configurations, and employment conditions.

5.2 Contributions

This dissertation makes three major contributions, among others, to the immigrant settlement and transportation research literature. First, it presents a novel approach for delineating ethnoburbs along a continuum, contrasting with prior research that viewed the 'ethnoburb' form as a stand-alone spatial outcome. Emphasis is placed on the notion that the spatial evolution of ethnoburbs is a complex process which varies considerably among immigrant groups.

Second, the dissertation adds a spatial dimension to the immigrant-transportation relationship that is largely ignored in the existing literature. This dimension illustrates how immigrant-transportation relationships not only vary across the three metropolitan zones in Toronto, but how they also differ according to the spatial arrangements of minority immigrant groups.

Third, the research points to the notion that proximity to quality transit has a relatively minimal effect on the choice of commuting modes in immigrant neighbourhoods. At the same time, it highlights the

significant impact of socioeconomic factors on the mobilization of immigrants’ residential and transportation choices. These findings hint at the inefficacy of existing urban planning approaches within the Torontonion context. Current urban planning approaches predominantly focus on expanding existing transportation infrastructure and promoting transit-oriented developments in order to encourage transit use. This occurs without having much understanding of the unique needs and wants of the diverse immigrant population.

All of these points offer new perspectives to the understanding of immigrant settlement and transportation relationships, and related policy implications. This section outlines the contributions that this dissertation provides to the immigrant settlement and transportation literature and urban planning scholarship (Table 5.1).

Table 5.1: Contributions of the Dissertation

Research Domains	Contributions
Immigrant Settlement Literature	<p>Theoretical:</p> <ul style="list-style-type: none"> • Immigrant settlement patterns cannot be generalized as settlement preferences vary between immigrant groups. • While some immigrant groups tend to demonstrate strong co-ethnic affinity in making residential location decisions, other are more flexible. • The evolution of ethnoburbs is a complex process. While ethnoburbs may progress over space and time, they may regress as well. <p>Methodological:</p> <ul style="list-style-type: none"> • A novel approach to delineate ethnoburb in three distinct categories is devised, representing stages of ethnoburb development. • The new classification method succinctly incorporates the ethnic mix factor, which is a fundamental characteristic of ethnoburbs, yet it is rarely included in previous studies. • Utilization of the three types of ethnoburbs to assess spatiotemporal changes in immigrant settlements will reveal the incremental process of the evolution in immigrants’ spatial settlement patterns in metropolitan regions
Immigrant Transportation Literature	<p>Theoretical:</p> <ul style="list-style-type: none"> • Immigrant-transportation relationships vary over space and by ethnicity. • Immigrants’ inclination towards transit cannot be generalized as it varies among immigrant groups. • Immigrants’ residential location decisions and choice of commuting modes are de facto outcomes of immigrants’ socioeconomic circumstances, and less motivated by the access to quality transit. <p>Methodological:</p> <ul style="list-style-type: none"> • A day-long transit quality index is devised that represents frequency and availability of all types of transit services available in Toronto. • Contrasting the devised indices in prior studies for Toronto, this index incorporates information on GO services and bus rapid transits available in the suburbs, which appropriates its use to study transportation dynamics in the suburban realm.
Urban Planning	<ul style="list-style-type: none"> • Immigrants’ choice of residential locations and commuting modes are inconsistent with contemporary urban planning approaches

Research Domains	Contributions
	<ul style="list-style-type: none"> • Current urban planning approaches that heavily rely on expanding existing transit infrastructure and transit-oriented developments for promoting transit use, do not create favourable circumstances for immigrants' transit use. • Transit-oriented developments are particularly disadvantageous for immigrants since they do not meet immigrants' socioeconomic needs.

5.2.1 Immigrant Transportation Literature

This dissertation makes both theoretical and methodological contributions to the immigrant-transportation literature. From the theoretical perspective, a key contribution is the addition of spatial dimension to the understanding of immigrant-transportation relationships. While the first research article empirically shows inter-metropolitan-zone variations in the relationships between the concentration of immigrants in the CTs and the use of commuting modes, the third research article reveals that travel patterns also differ between the Chinese and South Asian immigrant settlements. Findings from both research articles conform to those of prior studies which identified high transit dependence and low car use among the immigrant population (Blumenberg, 2009; Blumenberg & Smart, 2009; Heisz & Schellenberg, 2004). However, the first research article contributes to the advancement of this knowledge by demonstrating that immigrants register stronger transit reliance in suburbs (where they predominantly congregate as well) as compared to in the inner city, irrespective of the lower quality transit that exists in the suburbs. From this standpoint, the research findings support Lo, Shalaby, & Alshalalfeh's (2011) work which suggests high transit reliance among the suburbanizing immigrants in Toronto, but certainly with stronger empirical evidence and methodological robustness. Meanwhile, the third research article adds the spatial dimension to immigrant-transportation relationships by demonstrating that differences in the relationships are not limited only to inter-metropolitan-zone variations, but also depend on the spatial arrangement of immigrant groups. Based on an array of regression models, the article demonstrated that divergence in transportation outcomes stems from the distinct spatial settlement patterns of the Chinese and South Asian immigrants in Toronto. These spatial understandings of the immigrant-transportation relationships are indeed novel additions to the scholarship since previous research has rarely considered spatial aspects (Lo et al., 2011).

Another significant theoretical contribution to immigrant transportation literature that this dissertation makes is the inclusion of the transit quality dimension to understanding immigrant-transportation relationships, as presented in the third research article. This article is the first of its kind that empirically determines the effects of day-long frequency and availability of transit services in immigrant neighbourhoods on their transportation outcomes. It challenges the common understanding that proximity to quality transit augments transit use, by providing contradictory evidence that there is in fact minimal

influence of quality transit on the choice of commuting modes in Toronto's immigrant neighbourhoods (especially in the case of South Asians) (Filion, McSpurren, & Appleby, 2006).

The present research also suggests that proximity to quality transit does not necessarily determine residential choice for immigrants. This phenomenon is clearly detectable from the poor spatial overlap between neighbourhoods with a high proportion of Chinese immigrants and the ones with high transit quality. Additionally, the third research article finds that irrespective of high transit quality in South Asian neighbourhoods, quality transit does not have a significant influence on the choice of commuting modes in those areas. The high quality of transit in the South Asian neighbourhoods appears to be a matter of happenstance. Residential location decisions of the South Asians in those neighbourhoods are not particularly driven by proximity to quality transit. Since transit quality has never been considered in prior studies that explored immigrants' travel behaviour in Canada, these findings add a new dimension to our understanding of the immigrant-transportation relationship.

This dissertation also offers a new perspective on the inter-immigrant-group differences for transportation outcomes. Previously, Heisz & Schellenberg (2004) have descriptively highlighted differences in the choice of transportation mode among immigrant groups within the three major Canadian metropolitan regions (Toronto, Montreal, and Vancouver). Similarly, Newbold, Scott, & Burke (2017) incorporated information about the ethnic backgrounds of immigrants in their study of commuting distances within the greater Toronto metropolitan region, in order to highlight inter-ethnic differences. However, neither of the studies had explicitly considered the spatial settlement patterns of immigrants with respect to evaluating their transportation outcomes. The third research article bridges this gap in the literature by revealing higher dependence on transit in the South Asian neighbourhoods, as compared to the Chinese neighbourhoods in Toronto.

In addition to these theoretical contributions, this dissertation makes methodological contributions to the immigrant-transportation literature. The third research article introduces a new transit quality index which is devised based on the day-long frequency and availability of transit services in the Toronto metropolitan region. This index is an addition to the genre of transportation studies that stress an importance on considering hourly variations in services as a means of determining transit quality for neighbourhoods (Allen & Farber, 2019; Boisjoly & El-Geneidy, 2016; El-Geneidy et al., 2016). Additionally, the devised transit quality index is the first of its kind to incorporate all types of transit services that are available in Toronto, such as subway, streetcar, local buses, bus rapid transit, and GO services. Prior indices developed for Toronto do not account for all of these transit services. For example, Florida (2012) assessed transit quality in Toronto by including information on subways, streetcars, and local buses, but not bus rapid transit or GO services. However, GO transit services are responsible for the vast majority of transit ridership in

the Toronto suburbs (Metrolinx, 2018). That the index presented in this dissertation integrates information about GO transit services, this index is certainly more suitable for studying transportation dynamics in the Toronto suburbs.

5.2.2 Immigrant Settlement Literature

This dissertation makes substantial methodological contributions to the ethnoburb and immigrant settlement literature. The second research article introduces a novel approach for delineating ethnoburbs into three different categories. This methodological approach advances ethnoburb and immigrant settlement research in a number of ways. First, in contrast to prior studies, which treated ethnoburbs as a segregated form of immigrant settlement, this dissertation delineates ethnoburbs based on the concept of ‘ethnic mix’. While this notion of ethnic mix is considered the fundamental characteristic of this settlement form, it is rarely incorporated into quantitative evaluations (Li, 1998; Slattery, 2012; Wang & Zhong, 2013). The ‘ethnic mix’ component was incorporated by determining the level of ethnic diversity in neighbourhoods using a scaled entropy approach.

Second, the classification of ethnoburbs into three distinct categories (Nascent, Mature, and Saturated), which can also be considered as stages of ethnoburb development, provides a quantitative outlook on Wei Li's (2009b) explanation of the different stages of ethnoburb development (budding, blooming, maturation) (79:97).

Third, this classification of ethnoburbs into different categories, if used for evaluating changes in immigrant settlement patterns, can reveal the incremental process by which immigrant settlements evolve in metropolitan regions. Prior studies that investigated such changes in immigrant settlement patterns had predominantly focussed on areas where immigrants were present in a particularly high concentration (e.g., Wang & Zhong, 2013). In contrast, as shown in the second research article, the evaluation of immigrant settlement changes using distinct ethnoburb categories includes neighbourhoods that have both high and low immigrant concentrations. As a result, the analysis of immigrant settlement patterns based on the introduced ethnoburb classification approach, provides a more comprehensive outlook on the direction and magnitude of changes in immigrant settlements.

Finally, the ethnoburb delineation method developed in this dissertation is flexible and can be applied, with minor adjustments, to examine the ethnoburb phenomenon and immigrant settlement trends in metropolitan regions well beyond the Torontonians context.

From a theoretical perspective, this dissertation adds new dimensions to the understanding of immigrant settlement dynamics. It substantiates the complexity and uncertainty involved in the immigrant settlement process by highlighting differences in settlement preferences between Chinese and South Asians,

and by their distinct spatial evolution trajectories in Toronto. The multi-nuclei aggregation patterns of the Chinese and South Asian ethnoburbs, as revealed in the second research article, are consistent with the findings from prior studies that identify a high tendency among immigrants to form spatial clusters (Li, 2009b; Qadeer, Agrawal, & Lovell, 2010; Wang & Zhong, 2013). At the same time, the study points to considerable differences in settlement preferences between the South Asian and Chinese, by, first, identifying their spatial clusters in distinct geographic locations, and second, detecting higher spatial dispersal in the evolution patterns of South Asian ethnoburbs as compared to those of the Chinese ethnoburbs. While these findings advance the array of research aiming to understand differences in settlement patterns among diverse immigrant groups (Ghosh, 2007, 2013), they also raise concerns regarding the uncertainty of future spatial evolution patterns for ethnoburbs, as well as about the social and economic changes the latter may bring to metropolitan regions. The research introduces additional complexity in the ethnoburb evolution process by providing evidence that different ethnoburb categories do not always progress in a linear developmental set of stages, as they may regress as well. These uncertainty and complexity issues, related to the evolution of ethnoburbs addressed in this dissertation, advance our knowledge of the ethnoburb and immigrant settlement dynamics in the Toronto metropolitan region (Lo & Wang, 1997; Qadeer et al., 2010; Wang & Zhong, 2013).

5.2.3 Urban Planning Policy

This dissertation contributes to urban planning policies and strategies by identifying the dissonance between existing planning approaches and the settlement and transportation dynamics of immigrants in the Toronto metropolitan region. Both the first and third research articles identify inefficacy in the existing transportation planning approach, as the findings indicate unfavourable circumstances for transit use in areas where immigrants congregate in large proportions. The first research article demonstrates that irrespective of the limited transit options that exist in the suburbs, transit reliance among immigrants is much stronger in the suburbs, as compared to in the inner city. By concentrating on the disconnect between the availability of transit and the need for the service among the suburban immigrants, this study (in agreement with previous research), recommends the expansion of existing transit services beyond the inner city to the suburbs (Lo et al., 2011). The third research article, however, highlights some reservations surrounding the above recommendation as it suggests that a simple expansion of transit services into the suburbs may not necessarily guarantee transit use. This assertion is based on the finding that proximity to quality transit does not significantly influence commute mode choice in immigrant neighbourhoods. Socioeconomic factors and employment locations significantly impact the transportation outcomes in those areas. Based on these findings, this dissertation infers that contemporary transportation planning approaches

in Toronto are largely ineffective. Planning approaches primarily focus on improving the interconnectivity between the inner city and suburbs, while the suburbs, where a large proportion of transit-dependent immigrants reside and work, remain poorly interconnected (Blais, 2016; Filion & Kramer, 2012). It also highlights that even though immigrants comprise nearly half of Toronto's population, the unique relationship between immigrants and transit is not sufficiently considered in the transportation planning process. Thus, this research recommends that urban planning policies and strategies must adapt to the varied needs and wants of Toronto's diverse immigrant populations.

Findings from this dissertation also raise some reasons for skepticism about the efficacy of the transit-oriented development strategies in Toronto. Transit-oriented development strategies predominantly encourage the establishment of medium- and high-density residential areas, targeting mostly affluent, smaller size households that opt for an urban lifestyle and shorter commutes to core urban areas (Huang, 2020). This phenomenon is particularly disadvantageous for immigrants. Previous research has found that proximity to quality transit decreases access to larger size accommodations and housing affordability (Kramer, 2018). However, immigrants generally trend toward having a large household size and low-income characteristics, both of which restrict their access to quality transit neighbourhoods. The third research article has clearly highlighted a more pronounced negative impact of transit-induced gentrification on South Asian immigrants compared to Chinese immigrants, largely because of the limited market resources that the former group has (Block, Galabuzi, & Tranjan, 2019; Lindsay, 2001). The fact that transit-reliant immigrant groups are all too often limited in having as much access to the benefits of transit-oriented developments, is a missed opportunity to retain transit loyalty of immigrant patrons further or even expand the size of the existing immigrant transit market. This dissertation recommends modifications in transit-oriented development strategies by considering the unique configurations and needs of immigrant families in order to create conditions that are more favourable to immigrants' transit use.

5.3 Limitations

This dissertation is not exempt from limitations. The major limitation of this dissertation stems from the data used for analysis. CT-level aggregated census data are used in this research instead of individual-level datasets. Although some descriptive analyses have been performed with the individual-level census datasets using "census analyzer", the relationships that are derived in this research are based on CT-level socioeconomic and commuting data from the Canadian census. The selection of the CT-level data is motivated by the spatial nature of this research. The objective was to investigate spatial variations in immigrant-transportation relationships. The individual-level data accessed in the "census analyzer" does not provide information below the metropolitan level. However, due to the use of aggregated datasets, it

was not possible to segregate the immigrant population based on their socioeconomic characteristics. Previous research has demonstrated that recent immigrant population groups tend to have a stronger affiliation to transit, as compared to their earlier counterparts (Heisz & Schellenberg, 2004). Also, immigrants with lower income are more likely to show higher transit reliance than more affluent immigrants because of their limited market resources (Allen & Farber, 2019). If individual-level data were used in this research, it would have been possible to segregate the immigrant population based on their socioeconomic conditions. The segregation would have helped in investigating how the difference in socioeconomic conditions of immigrants unfolds in the residential and transportation choices they make.

The reliance on the CT-level data has also limited the possibility of introducing additional perspectives to the examination of the ethnoburb phenomenon. The delineation of three types of South Asian and Chinese ethnoburbs in Toronto is solely based on demographic compositions. It does not account for socioeconomic dynamics of the residents even though they are essential attributes of ethnoburbs (Li, 2009c). As mentioned earlier, using individual-level data would have enabled the segregation of the immigrant population based on their socioeconomic conditions, and this information would have then been easily incorporated into the delineation of the ethnoburbs examined in this study. Analysis based on such data would have provided additional insights into the differences in settlement patterns among immigrants from diverse socioeconomic strata.

Associated with the scale of data analysis are limitations affecting the interpretation of results. Due to the fact that this study was performed at the CT-level, the relationships derived in this dissertation do not correspond to individual immigrants. Instead, they are spatial relationships referring to the areas where immigrants have congregated in considerable proportions. The inability to establish such distinctions while interpreting the results may commit an ecological fallacy. The findings from this dissertation correspond to the spatial settlements of various immigrant groups, however, despite this, at times some speculative conclusions were drawn about individual immigrants using supportive sources from existing research.

Another limitation of this dissertation is its strong focus on the Toronto metropolitan region. All relationships derived in this study are specific to Toronto. These findings may change if similar research is conducted in other metropolitan regions because of the likely differences in contexts. Therefore, the associations derived in this dissertation need to be approached cautiously when considering their applicability to other locations.

5.4 Future Research

Building on the theoretical and methodological contributions of this dissertation, and considering its limitations, future research exploring immigrant-transportation relationships should focus on improving the

understanding for how immigrants negotiate the process of making residential and transportation choices. Additionally, future studies should place more attention on people- and place-based research approaches. Such research should also retain enhanced focus on planning implications. Concerning ethnoburbs, research should investigate new dimensions, such as consequences of immigration policy changes, to understand the evolution patterns of ethnoburbs in metropolitan regions. Below are a few suggested areas on which future research studies may benefit from focusing on.

5.4.1 Negotiations of Immigrants' Residential and Transportation Choices

Findings from this dissertation pointed to a lack of association between quality transit and both immigrants' transportation and residential outcomes. Accordingly, future research may further seek to investigate how immigrants navigate the process of making residential and transportation choices. The research literature has predominately evaluated immigrants' settlement and their transportation dynamics in silos, such that the nexus between the two is poorly understood. Immigrant settlement literature for explaining immigrants' spatial settlement patterns has emphasized the importance of the proximity to family, friends, and co-ethnics, as well as the presence of ethnic businesses, services, and institutions (Li, 2009a; Massey, 1985; Wang & Zhong, 2013). It has also highlighted the significant role of socioeconomic conditions, housing availability and affordability, and also decentralization of employment locations in urban regions, on the settlement decisions that immigrants make (Agarwal, 2010; Lo et al., 2011; Massey & Denton, 1985). This same set of variables is commonly used to understand immigrants' transportation behaviour as well (Blumenberg, 2009; Blumenberg & Smart, 2009; Heisz & Schellenberg, 2004; Newbold et al., 2017). Irrespective of the similarity in factors determining immigrant's settlement and transportation patterns, research has not yet evaluated how these factors interact to help immigrants decide on the priorities and trade-offs in making their residential settlement and transportation choices. Future research should investigate the phenomenon with consideration of immigrants' socioeconomic dynamics, and built environment conditions, possibly with better datasets, and by applying mixed-method research approaches. Formulating an in-depth understanding of these issues are critical for devising effective urban planning policies and strategies.

5.4.2 People- and Place-based Research

Considering the limitations of this dissertation, research exploring immigrant settlement and transportation dynamics should consider using individual-level datasets and investigate smaller geographic areas (i.e., subsets of metropolitan regions). Analysis based on individual-level datasets could help better capture immigrants' spatial mobility and their commuting trends, compared to one based on CT-level data. As

previously mentioned, such datasets will enable segregating the immigrant population based on their ethnicity and socioeconomic status. Using the data to investigate immigrants' settlement and transportation patterns will provide a stratified understanding of this phenomenon. Similarly, by using individual-level datasets, studies can also delineate ethnoburbs of immigrant groups based on their diverse socioeconomic backgrounds. The evaluation of those ethnoburbs can help clarify whether the settlement trajectories of minority immigrant groups in a metropolitan region differ based on their socioeconomic circumstances. Such knowledge is much needed for the advancement of immigrant settlement scholarship.

Research should also concentrate on smaller geographic areas within large metropolitan regions for a place-specific understanding of immigrant-transportation relationships. To illustrate, findings from this dissertation suggests that transit quality was relatively higher in the western suburbs of Toronto, where South Asian immigrants have predominantly settled. Despite this, proximity to quality transit did not have a significant impact on the choice of commuting modes. It is plausible that the findings have been influenced by the larger sample size of extremely poor transit quality of South Asian neighbourhoods in other parts of Toronto. Instead of investigating the entire Toronto metropolitan region, if the study had focused only on the South Asian neighbourhoods in the west of Toronto, the relationships could have appeared differently. Modifying the scale of analysis can indeed reveal different results (Harun & Ogneva-himmelberger, 2013; Kwan, 2012). Thus, for a better understanding of the immigrant-transportation relationships for specific ethnic groups, future research should focus on smaller areas within metropolitan regions.

5.4.3 Policy-Oriented Research

Existing research on immigrant transportation has predominantly focused either on differentiating travel behaviours of immigrants from non-immigrants, or identifying socioeconomic correlates of immigrants' commuting patterns (Blumenberg & Shiki, 2008; Blumenberg, 2009; Blumenberg & Evans, 2007; Heisz & Schellenberg, 2004). Particular attention to planning and policy factors is substantially lacking in those studies. While transportation policies play important roles in shaping travel behaviour for residents of metropolitan regions, they may also raise social inequality concerns if those policies (intentionally or unintentionally) limit access for disadvantaged individuals to transit services (see Florida, 2011, 2012 for example). The evaluation of transportation planning instruments mostly relies on strict mobility-based measures and less on social variables (Manaugh, Badami, & El-Geneidy, 2015). Limited studies that have identified social inequality issues related to the access to transit services among socioeconomically disadvantaged population do not necessarily discuss the policy implications of the phenomenon (El-Geneidy et al., 2016; Foth, Manaugh, & El-Geneidy, 2013; Legrain, Buliung, & El-Geneidy, 2016). Future research must evaluate the advantages and disadvantages for specific planning policies and strategies on

immigrants' transportation outcomes, in order to understand the present situation comprehensively, and suggest future improvements. For example, studies could focus on South Asians living in Brampton to assess the efficacy of the city's bus rapid transit system on residents' capacity to access jobs both in the suburbs and the inner city of Toronto. Studies could also concentrate on evaluating the effects of proposed/commencing transportation projects on immigrant groups. For instance, research can explore the implications of the Yonge North Subway Extension (YSNE) to Richmond Hill and Markham project for Chinese immigrants, who comprise a large proportion of the total population in these cities. Such studies will bring forward the interests of immigrant groups which may serve to better ensure resilience in Toronto's urban planning approaches.

5.4.4 Ethnoburb Evolutions amid Immigration Policy Changes

This dissertation provides a linear perspective on ethnoburbs, as it solely focuses on the demographic aspects for understanding evolution patterns of ethnoburbs in Toronto. However, prior research attests to the importance of immigration policies on the formation and evolution of ethnoburbs in metropolitan regions (Li, 2009b). In Canada, immigration policies have considerably changed over the last few decades. For example, the Canadian government's federal entrepreneur and investor program was terminated in 2014 and replaced by a new version of the Business Immigration Program (BIP). Studies have identified that the immigrants arriving under BIP have established businesses and created job opportunities in Canada, mostly in real estate, renting and leasing, and sales and service industries (CIC 2014). Such investments have substantially increased Vancouver's real-estate prices, making the city unaffordable for the general population (Ley et al., 2020). However, little is understood about the consequences of such investment patterns on the future growth (or dissipation) of ethnoburbs. Future research can focus on associating immigration policy changes with the spatial patterning of ethnoburbs in major Canadian metropolitan regions, thereby providing additional insights into the phenomenon.

5.5 Conclusion

In summary, this dissertation facilitates a more comprehensive understanding of the implications of immigrant settlement patterns on transportation outcomes. By investigating the Toronto metropolitan region, it demonstrates that immigrant-transportation relationships do not only vary across the three metropolitan zones, but also that they differ among the settlement of various immigrant groups. It also highlights how immigrants' residential and transportation choices are influenced to a greater degree by socioeconomic factors than by proximity to quality transit. Additionally, the research develops a novel approach to delineate ethnoburbs into three distinct categories, and the assessment of their spatiotemporal

changes reveals considerable differences in the spatial evolution patterns of immigrant groups in Toronto. Overall, this dissertation finds complex interactions and inherent uncertainties in immigrants' settlement patterns and their transportation outcomes, while also shedding light on their deviation from existing urban planning approaches. Thus, this research, for ensuring sustainable urban development, recommends adaptability of urban planning policies and strategies to the varied wants and needs of the diverse immigrant population in Toronto.

References

- Abenzoza, R. F., Cats, O., & Susilo, Y. O. (2017). Travel satisfaction with public transport: Determinants, user classes, regional disparities and their evolution. *Transportation Research Part A: Policy and Practice*, 95, 64–84. <https://doi.org/10.1016/j.tra.2016.11.011>
- Addie, J. P. D. (2013). Metropolitics in motion. *Urban Geography*, 34(2), 188–217. <https://doi.org/10.1080/02723638.2013.778651>
- Agrawal, S., & Lovell, A. (2008). *Indian Immigrants in Canada : The Shades of Economic Integration Landing Records and Census Public Use*. Retrieved from http://www.touchdown-media.com/wp-content/uploads/2018/01/indo-cdn_economic_integration_report.pdf
- Agrawal, S., & Lovell, A. (2010). High-income Indian immigrants in Canada. *South Asian Diaspora*, 2(2), 143–163. <https://doi.org/10.1080/19438192.2010.491295>
- Ahmed-Ullah, Noreen. (2016, June). How Brampton, a town in suburban Ontario, was dubbed a ghetto. *The Globe and Mail*, pp. 1–15. Retrieved from <http://www.theglobeandmail.com/news/toronto/brampton-a-story-of-political-importance-power-and-ethnic-enclaves/article30273820/>
- Alba, Richard, & Logan, J. (1993). Minority Proximity to Whites in Suburbs: An Individual-Level Analysis of Segregation. *American Journal of Sociology*, 98(6), 1388–1427. <https://doi.org/10.1086/230193>
- Alba, Richard, Logan, J., Stults, B., Marzan, G., & Zhang, W. (2016). Immigrant Groups in the Suburbs : A Reexamination of Suburbanization and Spatial Assimilation, 64(3), 446–460.
- Allen, J., & Farber, S. (2019). Sizing up transport poverty: A national scale accounting of low-income households suffering from inaccessibility in Canada, and what to do about it. *Transport Policy*, 74(November 2018), 214–223. <https://doi.org/10.1016/j.tranpol.2018.11.018>
- Amar, A., & Teelucksingh, C. (2015). Environmental justice, transit equity and the place for immigrants in Toronto. *Canadian Journal of Urban Research*, 24(2), 43–63.
- Annen, S. (2019). Measuring labour market success: a comparison between immigrants and native-born Canadians using PIAAC. *Journal of Vocational Education and Training*, 71(2), 218–238.
- Angus Reid Institute. (2015). *Prescription drug access and affordability an issue for nearly a quarter of all Canadian households*. Vancouver, BC. Retrieved from <http://angusreid.org/wp-content/uploads/2015/07/2015.07.09-Pharma.pdf>
- Asgari, H., Zaman, N., & Jin, X. (2017). Understanding immigrants' mode choice behavior in Florida: analysis of neighborhood effects and cultural assimilation. *Transportation Research Procedia*, 25,

- 3083–3099. <https://doi.org/10.1016/j.trpro.2017.05.319>
- Aulakh, R. (2011, May 28). ‘Colony of wives’ thrives in Mississauga. *Toronto Star*. Retrieved from https://www.thestar.com/news/gta/2011/05/28/colony_of_wives_thrives_in_mississauga.html
- Balsa, A., & McGuire, T. (2003). Prejudice, clinical uncertainty and stereotyping as sources of health disparities. *Journal of Health Economics*, 22(1), 89–116. [https://doi.org/10.1016/S0167-6296\(02\)00098-X](https://doi.org/10.1016/S0167-6296(02)00098-X)
- Balasubramaniam, Nishanthan. (2012). The making of a multi-ethnic ethnoburb: a case study of Markham, Ontario. Retrieved August 17, 2017, from <http://suburbs.info.yorku.ca/2012/10/the-making-of-a-multi-ethnic-ethnoburb-a-case-study-of-markham-ontario/>
- Bascaramurty, D. (2013, May 31). In Brampton, three generations, one house. *The Globe and Mail*, pp. 2–3. Retrieved from <https://www.theglobeandmail.com/news/national/in-brampton-three-generations-one-house/article12295651/>
- Beattie, S. (2017, March 27). Waterloo’s Muslim prayer centre proposal met with ‘unreasonable’ opposition. *Waterloo Chronicle*. Retrieved from <https://www.waterloochronicle.ca/news-story/7211206-waterloo-s-muslim-prayer-centre-proposal-met-with-unreasonable-opposition/>
- Beckman, J. D., & Goulias, K. G. (2008). Immigration, residential location, car ownership, and commuting behavior: A multivariate latent class analysis from California. *Transportation*, 35(5), 655–671. <https://doi.org/10.1007/s11116-008-9172-x>
- Behrens, J., & Köhl, K. (2011). The changing face of migration: Opportunities for urban planners in the American suburb. *Berkeley Planning Journal*, 24(1), 131–138. <https://doi.org/10.5070/bp324111869>
- Belgrave, R. (2017, February 16). Peel takes steps to drop affordable housing applicants if home offer declined. *Brampton Guardian*, pp. 16–18. Retrieved from <https://www.bramptonguardian.com/news-story/7144073-peel-takes-steps-to-drop-affordable-housing-applicants-if-home-offer-declined/>
- Biggar, M., & Ardoin, N. M. (2017). Community context, human needs, and transportation choices: A view across San Francisco Bay Area communities. *Journal of Transport Geography*, 60, 189–199. <https://doi.org/10.1016/j.jtrangeo.2017.03.005>
- Blais, P. (2015). *Planning for prosperity: Globalization, competitiveness, and growth plan for the Greater Golden Horseshoe*. Toronto, ON. Retrieved from http://www.neptis.org/sites/default/files/planning4prosperity/p4p_neptis_report_nov19_2015.pdf
- Blais, P. (2016). *Unlocking the potential of the airport megazone*. Toronto, ON. Retrieved from <http://www.neptis.org/publications/unlocking-potential-airport-megazone>
- Block, S., Galabuzi, G., & Tranjan, R. (2019). *Canada’s Colour Coded Income Inequality*. Ottawa, ON.

Retrieved from [https://www.policyalternatives.ca/sites/default/files/uploads/publications/National Office/2019/12/Canada%27s Colour Coded Income Inequality.pdf](https://www.policyalternatives.ca/sites/default/files/uploads/publications/National%20Office/2019/12/Canada%27s%20Colour%20Coded%20Income%20Inequality.pdf)

- Blumenberg, E., & Shiki, K. (2008). Immigrants and resource sharing: the case of carpooling. In *Transportation Research Board Annual Meeting, Paper 08-2965*. Washington D.C., USA.
- Blumenberg, Evelyn. (2009). Moving in and moving around: immigrants, travel behavior, and implications for transport policy. *Transportation Letters*, 1(2), 169–180.
<https://doi.org/10.3328/TL.2009.01.02.169-180>
- Blumenberg, Evelyn, & Evans, A. (2010). Planning for Demographic Diversity: The Case of Immigrants and Public Transit. *Journal of Public Transportation*, 13(2), 23–45. <https://doi.org/10.5038/2375-0901.13.2.2>
- Blumenberg, Evelyn, & Evans, E. (2007). *Growing the immigrant transit market: public transit use and California immigrants (No. 07-1678)*. Washington DC.
- Blumenberg, E., & Shiki, K. (2008). *Immigrants and resource sharing: the case of carpooling. (No. 08-2965)*. Washington DC.
- Blumenberg, Evelyn, & Smart, M. (2009). Travel in the 'Hood: ethnic neighbourhoods and mode choice. Washington D.C: The Transportation Research Board. Retrieved from <https://escholarship.org/uc/item/1km3w4k8>
- Blumenberg, Evelyn, & Smart, M. (2010). Getting by with a little help from my friends...and family: Immigrants and carpooling. *Transportation*, 37(3), 429–446. <https://doi.org/10.1007/s11116-010-9262-4>
- Blumenberg, Evelyn, & Song, L. (2008). *Travel behavior of immigrants in California: trends and policy implications (No. 08-2838)*. Washington DC.
- Boisjoly, G., & El-Geneidy, A. (2016). Daily fluctuations in transit and job availability: A comparative assessment of time-sensitive accessibility measures. *Journal of Transport Geography*, 52, 73–81.
<https://doi.org/10.1016/j.jtrangeo.2016.03.004>
- Breau, S., Shin, M., & Burkhart, N. (2018). Pulling apart: new perspectives on the spatial dimensions of neighbourhood income disparities in Canadian cities. *Journal of Geographical Systems*, 1–25.
<https://doi.org/10.1007/s10109-017-0255-0>
- Brinckerhoff, P. (2013). *Transit Capacity and Quality of Service Manual, Third Edition. Transit Capacity and Quality of Service Manual, Third Edition*. <https://doi.org/10.17226/24766>
- Buchignani, Norman. (2010). South Asian Canadians. Retrieved May 5, 2020, from <https://www.thecanadianencyclopedia.ca/en/article/south-asians#>

- Bunting, T., & Filion, P. (1996). The dispersed city: Its spatial and temporal dynamics. In *The Dynamics of the Dispersed City: Geographic and Planning Perspectives on Waterloo Region* (pp. 9–54). Waterloo: Department of Geography, University of Waterloo.
- Burchfield, M., & Kramer, A. (2015). *Growing Pains: Understanding the New Reality of Population and Dwelling Patterns in the Toronto and Vancouver Regions*. Toronto. Retrieved from https://www.neptis.org/sites/default/files/growing_pains/growingpains_neptisreport_final.pdf
- Burian, J., Zajíčková, L., Ivan, I., & Macků, K. (2018). Attitudes and Motivation to Use Public or Individual Transport: A Case Study of Two Middle-Sized Cities. *Social Sciences*, 7(6), 83. <https://doi.org/10.3390/SOCSCI7060083>
- Caudle, P. (1993). Providing culturally sensitive health care to Hispanic clients. *Nurse Practitioner*, 18(12), 40–51.
- Cervero, R. (2009). Public transport and sustainable urbanism: global lessons. In C. Curtis, J. Renne, & L. Bertolini (Eds.), *Transit Oriented Development: Making it Happen* (1st ed.). London, UK: Routledge.
- Chan, A. (2012). From Chinatown to ethnoburb: the Chinese in Toronto. In *World Conference of Institutes and Libraries in Chinese Overseas Studies 5th (WCILCOS) International Conference* (pp. 1–11). Vancouver, BC: University of British Columbia Library and Ohio University Libraries. Retrieved from <http://wcilcos.library.ubc.ca/about/wcilcos/>.
- Chatman, D. (2014). Explaining the “immigrant effect” on auto use: The influences of neighborhoods and preferences. *Transportation*, 41(3), 441–461. <https://doi.org/10.1007/s11116-013-9475-4>
- Chatman, D. G., & Klein, N. J. (2013). Why do immigrants drive less? Confirmations, complications, and new hypotheses from a qualitative study in new jersey, USA. *Transport Policy*, 30, 336–344. <https://doi.org/10.1016/j.tranpol.2013.10.002>
- Chatman, D., & Klein, N. (2009). Immigrants and Travel Demand in the United States: Implications for Transportation Policy and Future Research. *Public Works Management & Policy*, 13(4), 312–327. <https://doi.org/10.1177/1087724X09334633>
- Chia, J., Lee, J., & Kamruzzaman, M. D. (2016). Walking to public transit: Exploring variations by socioeconomic status. *International Journal of Sustainable Transportation*, 10(9), 805–814. <https://doi.org/10.1080/15568318.2016.1156792>
- CIC. (2014). *Evaluation of the Federal Business Immigration Program*. Ottawa. Retrieved from https://www.canada.ca/content/dam/ircc/migration/ircc/english/pdf/pub/e2-2013_fbip.pdf

- City of Toronto. (2018). Kensington-Chinatown Neighbourhood Profile. Retrieved April 17, 2020, from <https://www.toronto.ca/city-government/data-research-maps/neighbourhoods-communities/neighbourhood-profiles/>
- City of Toronto. (2017). Backgrounder: 2016 Census - Housing, Immigration and Ethnocultural Diversity, Aboriginal Peoples (Vol. October). Toronto. Retrieved from <https://www.toronto.ca/wp-content/uploads/2017/12/8ca4-5.-2016-Census-Backgrounder-Immigration-Ethnicity-Housing-Aboriginal.pdf>
- City of Toronto. (2018). Palmerston-Little Italy. Retrieved April 17, 2020, from <https://www.toronto.ca/city-government/data-research-maps/neighbourhoods-communities/neighbourhood-profiles/>
- Clark, W., & Wang, W. (2010). The automobile, immigrants, and poverty: Implications for immigrant earnings and job access. *Urban Geography*, 31(4), 523–540.
- Criscione, P. (2017, May 2). Brampton targets 'illegal multi-family residences': city wants greater legislative tools to crack down on properties converted illegally. *Brampton Guardian*, pp. 1–2. Retrieved from <https://www.bramptonguardian.com/news-story/7273041-brampton-targets-illegal-multi-family-residences-/>
- Crossman, E. (2013). *Low-income and Immigration: An Overview and Future Directions for Research*. Ottawa. Retrieved from <https://www.canada.ca/en/immigration-refugees-citizenship/corporate/reports-statistics/research/low-income-immigration-overview-future-directions-research.html%0Ahttp://files/829/low-income-immigration-overview-future-directions-research.html>
- Cui, B., Boisjoly, G., Miranda-Moreno, L., & El-Geneidy, A. (2020). Accessibility matters: Exploring the determinants of public transport mode share across income groups in Canadian cities. *Transportation Research Part D: Transport and Environment*, 80(July 2019), 102276. <https://doi.org/10.1016/j.trd.2020.102276>
- Daniels, R., & Mulley, C. (2013). Explaining walking distance to public transport: The dominance of public transport supply. *Journal of Transport and Land Use*, 6(2), 5–20. <https://doi.org/10.5198/jtlu.v6i2.308>
- De Oña, J., & De Oña, R. (2015). Quality of service in public transport based on customer satisfaction surveys: A review and assessment of methodological approaches. *Transportation Science*, 49(3), 605–622. <https://doi.org/10.1287/trsc.2014.0544>

- Dean, J., Regier, K., Patel, A., Wilson, K., & Ghassemi, E. (2018). Beyond the cosmopolis: Sustaining hyper-diversity in the suburbs of peel region, Ontario. *Urban Planning*, 3(4), 38–49. <https://doi.org/10.17645/up.v3i4.1700>
- Drolet, J. L., & Teixeira, C. (2019). Fostering immigrant settlement and housing in small cities: Voices of settlement practitioners and service providers in British Columbia, Canada. *The Social Science Journal*, xxx(xxxx).
- Eboli, L., & Mazzulla, G. (2011). A methodology for evaluating transit service quality based on subjective and objective measures from the passenger's point of view. *Transport Policy*, 18(1), 172–181. <https://doi.org/10.1016/j.tranpol.2010.07.007>
- El-Assal, Kareem, & Fields, D. (2017). *450,000 immigrants annually?* Ottawa, ON. Retrieved from http://www.conferenceboard.ca/temp/870e7748-421b-4f20-8f6d-bfe67d7bb7d6/9131_450_000_Immigrants_Anually_RPT.pdf
- El-Assal, Kareem, & Fields, D. (2018). *Canada 2040. No immigration versus more immigration.* Ottawa. Retrieved from https://www.conferenceboard.ca/temp/04552b1a-6fe1-4831-91d3-db024083d585/9685_Canada2040_NIC_RPT-FR.pdf
- El-Geneidy, A., Buliung, R., Diab, E., van Lierop, D., Langlois, M., & Legrain, A. (2016). Non-stop equity: Assessing daily intersections between transit accessibility and social disparity across the Greater Toronto and Hamilton Area (GTHA). *Environment and Planning B: Planning and Design*, 43(3), 540–560. <https://doi.org/10.1177/0265813515617659>
- El-Geneidy, A., Grimsrud, M., Wasfi, R., Tétreault, P., & Surprenant-Legault, J. (2014). New evidence on walking distances to transit stops: Identifying redundancies and gaps using variable service areas. *Transportation*, 41(1), 193–210. <https://doi.org/10.1007/s11116-013-9508-z>
- Ewing, R., & Cervero, R. (2010). Travel and the Built Environment: A Synthesis. *Journal of American Planning Association*, 1780(Summer), 265–294. <https://doi.org/10.3141/1780-10>
- Filion, P. (1991). The gentrification-social structure dialectic: a Toronto case study. *International Journal of Urban and Regional Research*, 15(4), 553–574.
- Filion, P., & Kramer, A. (2012). Transformative Metropolitan Development Models in Large Canadian Urban Areas: The Predominance of Nodes. *Urban Studies*, 49(10), 2237–2264. <https://doi.org/10.1177/0042098011423565>
- Filion, Pierre, Bunting, T., Pavlic, D., & Langlois, P. (2010). Intensification and Sprawl: Residential Density Trajectories in Canada's Largest Metropolitan Regions. *Urban Geography*, 31(4), 541–569. <https://doi.org/10.2747/0272-3638.31.4.541>
- Filion, Pierre, McSpurren, K., & Appleby, B. (2006). Wasted density? the impact of Toronto's

- residential-density-distribution policies on public-transit use and walking. *Environment and Planning A*, 38(7), 1367–1392. <https://doi.org/10.1068/a37414>
- Florida, R. (2011). Transit deserts and Hulchanski's three cities. *Martin Prosperity Insights*, 3-5.
- Florida, R. (2012). The Many Cities of Toronto's Public Transit. *Martin Prosperity Insights*. Retrieved from <http://martinprosperity.org/the-many-cities-of-torontos-public-transit/>
- Fong, E., & Berry, B. (2017). The Residential Patterns of Immigrants in Cities. In *Immigration and the City* (pp. 6–26). Malden: Polity Press.
- Forth, N., Manaugh, K., & El-Geneidy, A. M. (2013). Towards equitable transit: Examining transit accessibility and Social Need in Toronto, Canada, 1996 - 2006. *Journal of Transport Geography*, 29, 1–10.
- Foth, N., Manaugh, K., & El-Geneidy, A. M. (2014). Determinants of mode share over time: How changing transport system affects transit use in Toronto, Ontario, Canada. *Transportation Research Record*, 2417, 67–77. <https://doi.org/10.3141/2417-08>
- Ghosh, S. (2007). Transnational ties and intra-immigrant group settlement experiences: A case study of Indian Bengalis and Bangladeshis in Toronto. *GeoJournal*, 68(2–3), 223–242. <https://doi.org/10.1007/s10708-007-9072-1>
- Ghosh, Sutama. (2013). “Am I a South Asian, really?” Constructing “South Asians” in Canada and being South Asian in Toronto. *South Asian Diaspora*, 5(1), 35–55. <https://doi.org/10.1080/19438192.2013.724913>
- Goddard, J. (2010, November 8). Where address No. 4 can lower a value by thousands. *The Star*. Retrieved from https://www.thestar.com/news/gta/2010/11/08/where_address_no_4_can_lower_a_homes_value_by_thousands.html
- Goffin, P. (2017, March 3). Brampton mayor condemns “hateful” campaign against Muslim prayer in Peel schools. *The Star*. Retrieved from <https://www.thestar.com/news/gta/2017/03/13/brampton-mayor-condemns-hateful-campaign-against-muslim-prayer-in-peel-schools.html>
- Gordon, D., & Janzen, M. (2013). Suburban nation? Estimating the size of Canada's suburban population. *Journal of Architectural and Planning Research*, 30(3), 197–220.
- Government of Canada. (2017). Health Care in Canada. Retrieved September 19, 2017, from <http://www.cic.gc.ca/english/newcomers/after-health.asp>
- Government of Canada. (2018). 2018 Annual Report to Parliament on Immigration. Ottawa, ON. Retrieved from <http://www.cic.gc.ca/English/resources/publications/annual-report-2015/index.asp>

- Grisé, E., & El-Geneidy, A. (2018). Where is the happy transit rider? Evaluating satisfaction with regional rail service using a spatial segmentation approach. *Transportation Research Part A: Policy and Practice*, 114(November 2017), 84–96. <https://doi.org/10.1016/j.tra.2017.11.005>
- Guo, S. (2009). Difference, Deficiency, and devaluation: tracing the roots of non-recognition of foreign credentials for immigrant professionals in Canada. *Canadian Journal for the Study of Adult Education*, 37–52.
- Hackworth, Jason, & Rekers, Josephine. (2005a). *Ethnic Identity, Place Marketing , and Gentrification in Toronto. Research Paper 203*. Toronto. Retrieved from [https://tspace.library.utoronto.ca/bitstream/1807/94376/1/203 Hackworth 2005 Ethnic Identity Place.pdf](https://tspace.library.utoronto.ca/bitstream/1807/94376/1/203%20Hackworth%202005%20Ethnic%20Identity%20Place.pdf)
- Hackworth, J., & Rekers, J. (2005b). Ethnic packaging and gentrification: The case of four neighborhoods in Toronto. *Urban Affairs Review*, 41(2), 211–236. <https://doi.org/10.1177/1078087405280859>
- Hansen, W. G. (1959). How Accessibility Shapes Land Use. *Journal of the American Planning Association*, 25(2), 73–76. <https://doi.org/10.1080/01944365908978307>
- Hansson, J., Pettersson, F., Svensson, H., & Wretstrand, A. (2019). Preferences in regional public transport: a literature review. *European Transport Research Review*, 11(1), 38. <https://doi.org/10.1186/s12544-019-0374-4>
- Harris, Chauncy., & Ullman, Edward. (1945). The nature of cities. *The Annals of the American Academy of Political and Social Science*, 242 (1), 7–17. Retrieved from <https://www.jstor.org/stable/1026055>
- Harun, R., & Ogneva-himmelberger, Y. (2013). Distribution of Industrial Farms in the United States and Socioeconomic, Health, and Environmental Characteristics of Counties. *Geography Journal*, 2013, 12. <https://doi.org/10.1155/2013/385893>
- Harun, R., Filion, P., & Moos, M. (2021). The immigrant effect on commuting modal shares: Variation and consistency across metropolitan zones. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*.
- Heisz, A., & Schellenberg, G. (2004). Public transit use among immigrants. *Canadian Journal of Urban Research*, 13(1), 170–191.
- Hiebert, D. (1999). Immigration and the Changing Social Geography of Greater Vancouver. *BC Studies*, 121, 35–82. <https://doi.org/10.14288/bcs.v0i121.1487>
- Hiebert, D. (2000). Immigration and the changing Canadian city. *The Canadian Geographer*, 44(1), 25–43. <https://doi.org/10.1111/j.1541-0064.2000.tb00691.x>

- Hiebert, D. (2015). *Ethnocultural Minority Enclaves in Montreal Toronto and Vancouver. IRPP Study.*
- Hiebert, D. (2016). *What's So Special about Canada? Understanding the Resilience of Immigration and Multiculturalism.* Washington DC.
- Hiebert, D. (2017). Immigrants and Refugees in the Housing Markets of Montreal, Toronto and Vancouver, 2011. *Canadian Journal of Urban Research*, 26(2), 52–78.
- Hoalst-Pullen, N., Slinger-Friedman, V., Trendell, H., & Patterson, M. (2013). Spatial and temporal patterns of an ethnic economy in a suburban landscape of the Nuevo South. *Southeastern Geographer*, 53(3), 310–327. <https://doi.org/10.1353/sgo.2013.0019>
- Holloway, S. R., Wright, R., & Ellis, M. (2012). The Racially Fragmented City? Neighborhood Racial Segregation and Diversity Jointly Considered. *Professional Geographer*, 64(1), 63–82. <https://doi.org/10.1080/00330124.2011.585080>
- Hong, S., & Yoon, H. (2014). Ethno-economic satellite : the case of Korean residential clusters in Auckland. *Population, Space and Place*, 20, 277–292.
- Hoyt, Homer. (1939). *The Structure and Growth of Residential Neighbourhoods in American Cities.* Washington DC: Federal Housing Administration.
- Hu, L. (2017). Changing travel behavior of Asian immigrants in the U.S. *Transportation Research Part A: Policy and Practice*, 106, 248–260. <https://doi.org/10.1016/j.tra.2017.09.019>
- Huang, Y. (2020). *Analyzing Housing Market Dynamics and Residential Location Choices Concurrent with Light-Rail Transit Investment in Kitchener-Waterloo, Canada.* University of Waterloo.
- Hulchanski, J. D. (2007). *The three cities within Toronto: income polarization among Toronto's neighbourhoods , 1970-2005. Research Bulletin 41.* Toronto, ON. Retrieved from <http://www.urbancentre.utoronto.ca/pdfs/curp/tnrn/Three-Cities-Within-Toronto-2010-Final.pdf>
- Irwin, E. G., & Geoghegan, J. (2001). Theory, data, methods: developing spatially explicit economic models of land use change. *Agriculture, Ecosystems & Environment*, 85(1–3), 7–24. [https://doi.org/10.1016/S0167-8809\(01\)00200-6](https://doi.org/10.1016/S0167-8809(01)00200-6)
- Ishizawa, H., & Arunachalam, D. (2014). Ethnic Neighbourhoods in Auckland, New Zealand. *Urban Policy and Research*, 32(4), 417–436. <https://doi.org/10.1080/08111146.2013.877391>
- Jackson, J. (2017, June 8). Petition and flyers go out in opposition to Muslim community centre. *Waterloo Chronicle*. Retrieved from <https://www.waterloochronicle.ca/news-story/6712429-petition-and-flyers-go-out-in-opposition-to-muslim-community-centre/>
- John, S. (2015). Cycles of investment: Bicycle infrastructure, gentrification, and the restructuring of the San Francisco bay area. *Environment and Planning A*, 47(1), 121–137.

- Johnston, Ron;, Poulsen, M., & Forrest, J. (2008). Asians, Pacific Islanders, and Ethnoburbs in Auckland, New Zealand. *The Geographical Review*, 98(2), 214–241. <https://doi.org/10.1111/j.1931-0846.2008.tb00297.x>
- Johnston, Ron;, Poulsen, M., & Forrest, J. (2011). Using spatial statistics to identify and characterise ethnoburbs: Establishing a methodology using the example of Auckland, New Zealand. *GeoJournal*, 76(5), 447–467. <https://doi.org/10.1007/s10708-010-9366-6>
- Johnston, Ron, Paulsen, M., & Forrest, J. (2008). Asians, Pacific Islanders, and Ethnoburbs in Auckland, New Zealand. *Geographical Review*, 98(2), 214–241.
- Jones, C., & Ley, D. (2016). Transit-oriented development and gentrification along Metro Vancouver’s low-income SkyTrain corridor. *Canadian Geographer*, 60(1), 9–22.
- Kaplan, D. (2018). Contextualizing Ethnicity. In *Navigating Ethnicity: Segregation, Placemaking, and Difference* (pp. 43–62). New York: Rowman and Littlefield.
- Kataure, V., & Walton-Roberts, M. (2015). The good, the bad and the suburban: tracing North American theoretical debates about ethnic enclaves, ethnic suburbs, and housing preference. In C. Teixeira & W. Li (Eds.), *The Housing and Economic Experiences of Immigrants in North American Cities* (pp. 102–136). Toronto: University of Toronto Press.
- Kaushal, N., Lu, Y., Denier, N., Wang, J. S. H., & Trejo, S. J. (2016). Immigrant employment and earnings growth in Canada and the USA: evidence from longitudinal data. *Journal of Population Economics*, 29(4), 1249–1277.
- Keung, Nicholas. (2019, August 25). “Its a place where you connect with your culture”: Toronto’s Chinatown has become more mixed in its demographics and businesses than ever before. The Star. Retrieved from <https://www.thestar.com/news/gta/2019/08/25/chinatown-bends-without-breaking-to-newcomers-and-gentrification.html>
- Kim, J., & Lee, B. (2019). More than travel time: New accessibility index capturing the connectivity of transit services. *Journal of Transport Geography*, 78(May), 8–18. <https://doi.org/10.1016/j.jtrangeo.2019.05.008>
- Kivisto, P. (2017). The origins of “new assimilation theory.” *Ethnic and Racial Studies*, 40(9), 1418–1429. <https://doi.org/10.1080/01419870.2017.1300299>
- Knowles, V. (2016). *Strangers at our gates: Canadian immigration and immigration policy* (4th ed.). Toronto, ON: Dundurn Toronto.
- Kramer, A. (2018). The unaffordable city: Housing and transit in North American cities. *Cities*, 83, 1-10. <https://doi.org/10.1016/j.cities.2018.05.013>
- Kramer, A. (2013). Divergent affordability: Transit access and housing in North American cities, 306.

- Kwan, M.-P. (2012). The Uncertain Geographic Context Problem. *Annals of the Association of American Geographers*, 102(5), 958–968. <https://doi.org/10.1080/00045608.2012.687349>
- Levinson, D. M. (1997). Job and housing tenure and the journey to work. *Annals of Regional Science*, 31(4), 451–471.
- Lawson, J. (2015). *Transportation Policy and Planning in Canada Política y Planificación del Transporte en Canadá Transportation Policy and Planning in Canada*. Ottawa, ON.
- Legrain, A., Buliung, R., & El-Geneidy, A. M. (2016). Travelling fair: Targeting equitable transit by understanding job location, sectorial concentration, and transit use among low-wage workers. *Journal of Transport Geography*, 53, 1–11. <https://doi.org/10.1016/j.jtrangeo.2016.04.001>
- Ley, D., Mountz, A., Mendez, P., Lees, L., Walton-Roberts, M., Helbrecht, I., ... Mountz, A. (2020). Housing Vancouver, 1972–2017: A personal urban geography and a professional response: Forum with David Ley and his former students. *Canadian Geographer*, 64(4), 438–466. <https://doi.org/10.1111/cag.12663>
- Li, W. (1998a). Anatomy of a New Ethnic Settlement: The Chinese Ethnoburb in Los Angeles. *Urban Studies*, 35(3), 479–501. <https://doi.org/10.1080/0042098984871>
- Li, W. (1998b). Ethnoburb versus Chinatown : Two types of urban ethnic communities in Los Angeles. *European Journal of Geography*, 8–11. Retrieved from <http://cybergeog.revues.org/1018?lang=es&la>
- Li, W. (1998c). Los Angeles's Chinese ethnoburb: from ethnic service center to global economy outpost. *Urban Geography*, 19(6), 502–517.
- Li, W. (2005). Beyond Chinatown, beyond enclave: Reconceptualizing contemporary Chinese settlements in the United States. *GeoJournal*, 64(1), 31–40. <https://doi.org/10.1007/s10708-005-3921-6>
- Li, W. (2006a). Introduction: Asian immigration and community in the Pacific Rim. In W. Li (Ed.), *From Urban Enclave to Ethnic Suburb: New Asian Communities in Pacific Rim Countries* (1st ed., pp. 1–22). Honolulu: University of Hawai'i Press.
- Li, W. (2006b). Spatial transformation of an urban ethnic community: from Chinatown to ethnoburb in Los Angeles. In W. Li (Ed.), *From Urban Enclave to Ethnic Suburb: New Asian Communities in Pacific Rim Countries* (pp. 74–94). Honolulu: University of Hawaii Press.
- Li, W. (2009a). Ethnoburb: an alternative ethnic settlement. In *Ethnoburb: The New Ethnic Community in Urban America* (pp. 29–53). Honolulu: University of Hawai'i Press.
- Li, W. (2009b). *Ethnoburb: The new ethnic community in urban America*. Honolulu: University of Hawaii Press.
- Li, W. (2009c). *Ethnoburb. Ethnoburb*. Honolulu: University of Hawai'i Press.
- Li, W. (2009d). Opportunities and challenges for ethnoburbs. In *Ethnoburb* (pp. 171–185). Honolulu:

University of Hawai'i Press.

- Li, W., Skop, E., & Yu, W. (2016). Enclaves, ethnoburbs, and settlement. In M. Zhou & A. Ocampo (Eds.), *Contemporary Asian America* (3rd ed., pp. 193–213). New York, NY: New York University Press.
- Library of Congress. (2020). Point-Based and Family Immigration: Canada. Retrieved July 2, 2020, from https://www.loc.gov/law/help/points-based-immigration/canada.php#_ftn8
- Lieu, N. (2013). Disrupting nostalgic scenes of Whiteness: Asian immigrant bridal shops and racial visibility in the ethnoburbs. *Spaces and Flows: An International Journal of Urban and ExtraUrban Studies*, 3.
- Lindsay, C. (2001). *Profiles of Ethnic Communities in Canada: The South Asian Community in Canada. Analytical paper* (Vol. Catalogue). Ottawa. Retrieved from <https://www150.statcan.gc.ca/n1/en/pub/89-621-x/89-621-x2007006-eng.pdf?st=7UP2jSEQ>
- Litman, T. (2020). *Transportation Affordability: Evaluation and Improvement Strategies*. Victoria. Retrieved from <https://vtpi.org/affordability.pdf>
- Liu, C. (2009). Ethnic enclave residence, employment, and commuting of Latino workers. *Journal of Policy Analysis and Management*, 24(4), 600–625. <https://doi.org/10.1002/pam>
- Liu, C., & Painter, G. (2012). Travel behavior among Latino immigrants. *Journal of Planning Education and Research*, 32(1), 62–80. <https://doi.org/10.1177/0739456X11422070>
- Lo, L. (2006). Suburban housing and indoor shopping: the production of the contemporary Chinese landscape in Toronto. In W. Li (Ed.), *From Urban Enclave to Ethnic Suburb* (pp. 134–154). Honolulu: University of Hawai'i Press.
- Lo, L. (2009). The Role of Ethnicity in the Geography of Consumption. *Urban Geography*, 30(4), 391–415. <https://doi.org/10.2747/0272-3638.30.4.391>
- Lo, L., Shalaby, A., & Alshalalfeh, B. (2011). Relationship between immigrant settlement patterns and transit use in the Greater Toronto Area. *Journal of Urban Planning and Development*, 137(4), 470–476. [https://doi.org/10.1061/\(ASCE\)UP.1943-5444.0000080](https://doi.org/10.1061/(ASCE)UP.1943-5444.0000080)
- Lo, L., Wang, L., Wang, S., & Yinhan, Y. (2007). *Immigrant Settlement Services in the Toronto CMA: A GIS-Assisted Analysis of Supply and Demand* (CERIS Working Paper No. 49). Toronto.
- Lo, L., & Wang, S. (1997). Settlement patterns of Toronto's Chinese immigrants : Convergence or Divergence? *Canadian Journal of Regional Science*, 20(12), 49–72.
- Logan, J., Alba, R., & Zhang, W. (2002). Immigrant enclaves and ethnic communities in New York and Los Angeles. *American Sociological Review*, 67(2), 299–322.
- Logan, J., Zhang, W., & Alba, R. (2002). Immigrant enclaves and ethnic communities in New York and

- Los Angeles. *American Sociological Review*, 67(2), 299–322.
- Lovejoy, K., & Handy, S. (2008). A case for measuring individuals' access to private-vehicle travel as a matter of degrees: Lessons from focus groups with Mexican immigrants in California. *Transportation*, 35(5), 601–612. <https://doi.org/10.1007/s11116-008-9169-5>
- Mamun, S. A., Lownes, N. E., Osleeb, J. P., & Bertolaccini, K. (2013). A method to define public transit opportunity space. *Journal of Transport Geography*, 28, 144–154. <https://doi.org/10.1016/j.jtrangeo.2012.12.007>
- Manaugh, K., Badami, M. G., & El-Geneidy, A. M. (2015). Integrating social equity into urban transportation planning: A critical evaluation of equity objectives and measures in transportation plans in north america. *Transport Policy*, 37, 167–176. <https://doi.org/10.1016/j.tranpol.2014.09.013>
- Manville, M., Taylor, B., & Blumenberg, E. (2018). *Falling Transit Ridership: California and Southern California*. California. Retrieved from https://www.scag.ca.gov/Documents/ITS_SCAG_Transit_Ridership.pdf
- Marshall, S. (2018). Analysis : Public transit ridership is stagnating across North America , but in Brampton , it ' s on the rise . Here ' s why. Toronto: TVO.
- Martin, E., Shaheen, S., Zohdy, I., Chan, N., Bansal, A., Bhattacharyya, A., ... Wah, C. (2016). *Understanding Travel Behavior*. Washington D.C., USA. Retrieved from https://www.fhwa.dot.gov/policy/otps/travel_behavior_research_scan.pdf
- Martin Prosperity Institute. (2011). Transit deserts and Hulchanski's three cities. *Martin Prosperity Insights*, 3–5.
- Massey, D. (1985). Ethnic residential segregation: A theoretical synthesis and empirical review. *Sociology and Social Research*, 69(3), 315–350.
- Massey, D., & Denton, N. (1985). Spatial Assimilation as a Socioeconomic Outcome. *American Sociological Review*, 50(1), 94–106.
- Metrolinx. (2018a). *GO Transit: Fact Sheet*. Toronto. Retrieved from https://www.gotransit.com/static_files/gotransit/assets/pdf/AboutUs/WhatIsGO/GO_InfoToGo_06-21-ENG.pdf
- Metrolinx. (2018b). *Transit Access and Social Equity in the Greater Toronto and Hamilton Area: Background Paper to the 2041 Regional Transportation Plan*. Toronto. Retrieved from [http://www.metrolinx.com/en/regionalplanning/rtp/background/Transit Access and Equity 2018.pdf](http://www.metrolinx.com/en/regionalplanning/rtp/background/Transit%20Access%20and%20Equity%202018.pdf)
- Metrolinx. (2018c). *2041 Regional Transportation Plan*. Toronto, ON. Retrieved from [http://www.metrolinx.com/en/regionalplanning/rtp/Metrolinx 2041 Regional Transportation](http://www.metrolinx.com/en/regionalplanning/rtp/Metrolinx%202041%20Regional%20Transportation)

Plan.pdf

- Ministry of Transportation. (2017). *Greater Golden Horseshoe Transportation Plan. Transportation Profile*. Retrieved from https://www.gghtransport2051.ca/wp-content/uploads/sites/18/2016/10/11.29.2017.TransportationProfile_AODA-1.pdf
- Miller, E., & Soberman, R. (2003). *Travel Demand and Urban Form*. Toronto, ON. Retrieved from http://www.neptis.org/sites/default/files/smart_growth_issue_papers_travel_demand_and_urban_for_m/travel_demand_nip9.pdf
- Moos, M. (2014). Generationed space: Societal restructuring and young adults changing residential location patterns. *Canadian Geographer*, 58(1), 11–33. <https://doi.org/10.1111/j.1541-0064.2013.12052.x>
- Moos, M., & Walter-Joseph, R. (2017). *Still Detached and Subdivided? Suburban Ways of Living in 21st-Century North America*. (M. Moos & R. Water-Joseph, Eds.). Berlin: Jovis Verlag.
- Moos, M., Woodside, J., Vinodrai, T., & Yan, C. (2018). Automobile commuting in suburban high-rise condominium apartments: Examining transitions toward suburban sustainability in Toronto. *Urban Planning*, 3(4), 15–28. <https://doi.org/10.17645/up.v3i4.1645>
- Morency, Jean-Dominique., Malenfant, Caron., & MacIsaac, Samuel. (2017). Immigration and Diversity: Population Projections for Canada and its Regions, 2011 to 2036. Ottawa, ON. <https://doi.org/91-551-X>
- Morency, J.-D., Malenfant, É. C., & MacIsaac, S. (2017). *Immigration and Diversity: Population Projections for Canada and its Regions, 2011 to 2036*. Ottawa, ON. <https://doi.org/91-551-X>
- Muñoz, S.-A. (2011). Ethno-faith-burbs: Religious Affiliation and Residential Patterns of the Indian Ethnic Populations of Dundee and Glasgow. *Journal of Intercultural Studies*, 32(2), 115–131. <https://doi.org/10.1080/07256868.2011.547172>
- Muñoz, S. A. (2011). Ethno-Faith-Burbs: Religious Affiliation and Residential Patterns of the Indian Ethnic Populations of Dundee and Glasgow. *Journal of Intercultural Studies*, 32(2), 115–131. <https://doi.org/10.1080/07256868.2011.547172>
- Murdie, Robert. (1969). *The Factorial Ecology of Metropolitan Toronto, 1951 - 1961*. Chicago: Department of Geography, University of Chicago.
- Murdie, R. (2008). Diversity and concentration in Canadian immigration: trends in Toronto, Montreal, Vancouver, 1971 - 2006. Toronto, ON: Centre for Urban and Community Studies, Cities Centre, University of Toronto. Retrieved from <http://www.urbancentre.utoronto.ca/pdfs/researchbulletins/CUCSRB42-Murdie-Cdn-Immigration3->

2008.pdf

- Murdie, R., & Teixeira, C. (2011). The impact of gentrification on ethnic neighbourhoods in Toronto: a case study of little Portugal. *Urban Studies*, 48(1), 61–83.
<https://doi.org/10.1177/0042098009360227>
- Newbold, B. (1996). Spatial Distribution and Redistribution. *Economic Geography*, 75(3), 254–271.
- Newbold, B., & Scott, D. (2018). Insights into public transit use by Millennials: The Canadian experience. *Travel Behaviour and Society*, 11, 62–68.
- Newbold, B., Scott, D., & Burke, C. (2017). Immigrant status and commute distance: an exploratory study based on the Greater Golden Horseshoe. *Transportation*, 44(1), 181–198.
<https://doi.org/10.1007/s11116-015-9633-y>
- Newport, A. (2017, March 26). Are high rents driving people out of Brampton? *In Brampton*, pp. 1–3. Retrieved from <https://www.inbrampton.com/are-high-rents-driving-people-out-of-brampton>
- Ontario Ministry of Municipal Affairs and Housing. (2017). *Greenbelt plan*. Ottawa. Retrieved from <https://www.library.yorku.ca/find/Record/2368168>
- Ontario Ministry of Public Infrastructure. (2019). *A Place to Grow: Growth Plan for the Greater Golden Horseshoe*. <https://doi.org/10.1093/geront/25.3.326>
- O’Sullivan, S., & Morrall, J. (1996). Walking distances to and from light-rail transit stations. *Transportation Research Record*, (1538), 19–26. <https://doi.org/10.3141/1538-03>
- Pais, J., South, S., & Crowder, K. (2012). Metropolitan heterogeneity and minority neighbourhood attainment: spatial assimilation or place stratification? *Social Problems*, 59(2), 258–281.
<https://doi.org/10.1525/sp.2012.59.2.258>. Metropolitan
- Park, R., & Burgess, E. (1925). *The City: Suggestions for Investigation of Human Behavior in the Urban Environment*. Chicago: University of Chicago Press.
- Phillips, B. (2016). Not quite white: the emergence of jewish ethnoburbs in Los Angeles, 1920 - 2010. *American Jewish History*, 100(1), 73–104.
- Pih, K., Hirose, A., & Mao, K. (2012). The invisible unattended: Low-wage chinese immigrant workers, health care, and social capital in southern California’s San Gabriel Valley. *Sociological Inquiry*, 82(2), 236–256. <https://doi.org/10.1111/j.1475-682X.2012.00408.x>
- Pottie-Sherman, Y., & Hiebert, D. (2013). Authenticity with a bang: exploring suburban culture and migration through the new phenomenon of the Richmond Night Market. *Urban Studies*, 52(3), 538–554. <https://doi.org/10.1177/0042098013510954>
- Premji, S., & Shakya, Y. (2017). Pathways between under/unemployment and health among racialized

- immigrant women in Toronto. *Ethnicity and Health*, 22(1), 17–35.
- Preston, Valerie, & Lo, L. (2000). 'Asian theme' malls in suburban Toronto: land use conflict in Richmond Hill. *The Canadian Geographer*, 44(2), 182–190. <https://doi.org/10.1111/j.1541-0064.2000.tb00701.x>
- Preston, V., & Lo, L. (2008). Ethnic enclaves in multicultural cities: new retailing patterns and new planning dilemmas. *Plan Canada*, 48(SPEC. ISS.), 72–74.
- Preston, Valerie, Kobayashi, A., & Siemiatycki, M. (2006). Transnational Urbanism: Toronto at a Crossroads. In V. Satzewich & L. Wong (Eds.), *Transnational Identities and Practices in Canada* (pp. 91–110). Vancouver, BC: UBC Press.
- Qadeer, M., Agrawal, S., & Lovell, A. (2010). Evolution of ethnic enclaves in the Toronto Metropolitan Area, 2001-2006. *Journal of International Migration and Integration*, 11(3), 315–339. <https://doi.org/10.1007/s12134-010-0142-8>
- Reitz, J. (1998). *Warmth of the Welcome: The Social Causes of Economic Success for Immigrants in Different Nations and Cities*. New York: Taylor and Francis.
- Rosen, G., & Walks, A. (2015). Castles in Toronto's sky: Condo-ism as urban transformation. *Journal of Urban Affairs*, 37(3), 289–310. <https://doi.org/10.1111/juaf.12140>
- Schneider, Jason. (2014). From Urban Enclave to Ethnoburb: Discourse, Space, and Community in Polish Chicago. *Iowa Journal of Cultural Studies*, 15(1), 80–102. <https://doi.org/10.17077/2168-569x.1442>
- Shin, E. (2017a). Ethnic neighborhoods, social networks, and inter-household carpooling: A comparison across ethnic minority groups. *Journal of Transport Geography*, 59, 14–26.
- Shin, E. (2017b). Unraveling the effects of residence in an ethnic enclave on immigrants' travel mode choices. *Journal of Planning Education and Research*, 37(4), 425–443. <https://doi.org/10.1177/0739456X16663309>
- Siemiatycki, M. (2011). Governing immigrant city: Immigrant political representation in Toronto. *American Behavioral Scientist*, 55(9), 1214–1234. <https://doi.org/10.1177/0002764211407840>
- Skaburskis, A., & Moos, M. (2008). The redistribution of residential property values in Montreal, Toronto, and Vancouver: Examining neoclassical and Marxist views on changing investment patterns. *Environment and Planning A*, 40(4), 905–927. <https://doi.org/10.1068/a39153>
- Skop, E. (2002). *Saffron suburbs: Indian immigrant community formation in Metropolitan Phoenix*. Arizona State University.
- Skop, E., & Li, W. (2010). From the ghetto to the invisiburb: shifting patterns of immigrant settlement in

- contemporary America. In J. Frazier & F. Margai (Eds.), *Multicultural Geographies: The Changing Racial/Ethnic Patterns of the United States* (pp. 113–125). Albany, NY: State University of New York Press.
- Slattery, G. (2012, May 29). In defence of the ethnic enclave. *Harvard Political Review*. Retrieved from <http://harvardpolitics.com/covers/in-defense-of-the-ethnic-enclave/>
- Smart, M. J. (2014). A nationwide look at the immigrant neighborhood effect on travel mode choice. *Transportation*, 42(1), 189–209. <https://doi.org/10.1007/s11116-014-9543-4>
- Statistics Canada. (2013). *Immigration and Ethnocultural Diversity in Canada. National Household Survey, 2011. National Household Survey, 2011* (Vol. 99-010-X20). <https://doi.org/99-010-X2011001>
- Statistics Canada. (2017a). Education in Canada: Key results from the 2016 Census. *The Daily*. Ottawa, ON.
- Statistics Canada. (2017b). Number and proportion of foreign-born population in Canada, 1871 to 2036. Retrieved January 24, 2019, from <https://www.statcan.gc.ca/eng/dai/btd/othervisuals/other006>
- Statistics Canada. (2018). 150 Years of Immigration in Canada. Retrieved October 30, 2020, from <https://www150.statcan.gc.ca/n1/pub/11-630-x/11-630-x2016006-eng.htm>
- Statistics Canada. (2019a). Census Profile, 2016 Census. Retrieved February 10, 2020, from <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=POPC&Code1=0944&Geo2=PR&Code2=35&Data=Count&SearchText=toronto&SearchType=Begins&SearchPR=01&B1=All&TABID=1>
- Statistics Canada. (2019b). Focus on Geography Series, 2016 Census. Retrieved July 2, 2020, from <https://www12.statcan.gc.ca/census-recensement/2016/as-sa/fogs-spg/Facts-can-eng.cfm?Lang=Eng&GK=CAN&GC=01&TOPIC=7>
- Statistics Canada. (2019c). Immigration and ethnocultural diversity. Retrieved February 10, 2020, from <https://www12.statcan.gc.ca/census-recensement/2016/as-sa/fogs-spg/Facts-cma-eng.cfm?LANG=Eng&GK=CMA&GC=535&TOPIC=7>
- Statistics Canada. (2019d). Definitions, Data Sources, and Methods. Retrieved November 20, 2020, from <https://www23.statcan.gc.ca/imdb/p3Var.pl?Function=Unit&Id=85107>
- Tal, G., & Handy, S. (2010). Travel behavior of immigrants: An analysis of the 2001 National Household Transportation Survey. *Transport Policy*, 17(2), 85–93. <https://doi.org/10.1016/j.tranpol.2009.11.003>

- Taylor, Z., & Burchfield, M. (2010). *Growing Cities: Comparing Urban Growth Patterns and Regional Growth Policies in Calgary, Toronto, and Vancouver*. Toronto: The Neptis Foundation.
- Terzano, K. (2016). Commodification of transitioning ethnic enclaves. *Behavioral Sciences*, 4(4), 1–17.
- The Fifth Estate. (2017). The high cost of Pharmaceuticals: Canada's Drug Problem. Canada: Canadian Broadcasting Corporation (CBC). Retrieved from <http://www.cbc.ca/fifth/episodes/2016-2017/the-high-cost-of-phamaceuticals-canadas-drug-problem>
- TTC. (2018). *Toronto Transit Commission Subway ridership - 2018*. Toronto.
- TTC. (2020). *Service summary. Toronto Transit Commission Service Summary for March 29, 2020 to May 9, 2020*. Toronto. Retrieved from http://www.ttc.ca/Routes/General_Information/Service_Details.jsp
- van Lierop, D., Badami, M. G., & El-Geneidy, A. M. (2018). What influences satisfaction and loyalty in public transport? A review of the literature. *Transport Reviews*, 38(1), 52–72. <https://doi.org/10.1080/01441647.2017.1298683>
- Verbich, D., Badami, M. G., & El-Geneidy, A. M. (2017). Bang for the buck: Toward a rapid assessment of urban public transit from multiple perspectives in North America. *Transport Policy*, 55(December 2016), 51–61. <https://doi.org/10.1016/j.tranpol.2016.12.002>
- Vézina, M., & Houle, R. (2017). *Settlement patterns and social integration of the population with an immigrant background in the Montréal, Toronto and Vancouver metropolitan areas*. Ottawa, ON. Retrieved from <http://www.statcan.gc.ca/pub/89-657-x/89-657-x2016002-eng.pdf>
- Walks, A. (2013). Suburbanism as a way of life, slight return. *Urban Studies*, 50(8), 1471-1488.
- Walks, R. A., & Bourne, L. S. (2006). Ghettos in Canada's cities? Racial segregation, ethnic enclaves and poverty concentration in Canadian urban areas. *Canadian Geographer*, 50(3), 273–297. <https://doi.org/10.1111/j.1541-0064.2006.00142.x>
- Walton, E. (2015). Making Sense of Asian American Ethnic Neighborhoods: A Typology and Application to Health. *Sociological Perspectives*, 58(3), 490–515. <https://doi.org/10.1177/0731121414568568>
- Wang, Y. (2012). *From urban enclave to ethnoburb: changes in residential patterns of Chinese immigrants*. University of Maryland, USA.
- Wang, K., & Woo, M. (2017). The relationship between transit rich neighborhoods and transit ridership: Evidence from the decentralization of poverty. *Applied Geography*, 86, 183–196.

<https://doi.org/10.1016/j.apgeog.2017.07.004>

- Wang, Shuguang, Hii, R., Zhong, J., & Du, P. (2013). Recent trends of ethnic Chinese retailing in Metropolitan Toronto. *International Journal of Applied Geospatial Research*, 4(1), 49–66. <https://doi.org/10.4018/jagr.2013010104>
- Wang, S., & Zhong, J. (2013). *Delineating ethnoburbs in metropolitan Toronto* (The CERIS Working Paper Series No. 100). Toronto, ON.
- Waters, J. (2003). Flexible citizens? Transnationalism and citizenship amongst economic immigrants in Vancouver. *Canadian Geographer*, 47(3), 219–234. <https://doi.org/10.1111/1541-0064.00019>
- Wen, Ming, Lauderdale, D., & Kandula, N. (2009). Ethnic Neighborhoods in Multi-Ethnic America, 1990-2000: Resurgent Ethnicity in the Ethnoburbs? *Social Forces*, 88(1), 425–460. <https://doi.org/10.1353/sof.0.0244>
- Wen, Ming, Lauderdale, D., & Kandula, N. (2009). Ethnic Neighborhoods in Multi-Ethnic America, 1990-2000: Resurgent Ethnicity in the Ethnoburbs? *Social Forces*, 88(1), 425–460. <https://doi.org/10.1353/sof.0.0244>
- Wilkinson, L., Bhattacharyya, P., Bucklaschuk, J., Shen, J., Chowdhury, I., & Edkins, T. (2016). Understanding Job Status Decline among Newcomers to Canada. *Canadian Ethnic Studies*, 48(3), 5–26.
- Wright, R., Holloway, S., & Ellis, M. (2011). Reconsidering both diversity and segregation: A reply to Poulsen, Johnston and Forrest, and to peach. *Journal of Ethnic and Migration Studies*, 37(1), 167–176. <https://doi.org/10.1080/1369183X.2011.523865>
- Xu, D. (2018). Transportation assimilation revisited: New evidence from repeated cross-sectional survey data. *PLoS ONE*, 13(4), e0194296. <https://doi.org/10.1371/journal.pone.0194296>
- Xue, J., Friesen, W., & O’Sullivan, D. (2012). Diversity in Chinese Auckland : hypothesising multiple ethnoburbs. *Population, Space and Place*, 18, 579–595.
- Yu, W. (2015). Housing experiences and trajectories among ethnoburbian Chinese in Los Angeles: achieving Chinese immigrants’ American dream. In C. Teixeira & W. Li (Eds.), *The Housing and Economic Experiences of Immigrants in US and Canadian Cities* (pp. 177–204). Toronto, ON: University of Toronto Press.
- Zanchetta, M., & Poureslami, I. (2006). Health literacy within the reality of immigrants’ culture and language. *Canadian Journal of Public Health*, 97(2), 26–30.
- Zhou, Y. R., Watt, L., Coleman, W. D., Micollier, E., & Gahagan, J. (2019). Rethinking “Chinese Community” in the Context of Transnationalism: the Case of Chinese Economic Immigrants in

Canada. *Journal of International Migration and Integration*, 20(2), 537–555.

<https://doi.org/10.1007/s12134-018-0622-9>

Zhuang, Z. C. (2013). Rethinking multicultural planning: An empirical study of ethnic retailing.

Canadian Journal of Urban Research, 22(2), 90–116.

Zhuang, Z., & Chen, A. (2016). The role of ethnic retailing in retrofitting suburbia: case studies from

Toronto, Canada. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*, (December), 1–21. <https://doi.org/10.1080/17549175.2016.1254671>