Are Immigrants Buying to Get In?: The Role of Ethnic Clustering on the Homeownership Propensities of 12 Toronto Immigrant Groups, 1996-2001

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Abstract:

Numerous studies equate immigrant homeownership with assimilation into the residential mainstream, though only rarely is this claim verified by studying the ethnic character of neighbourhoods where immigrants actually buy homes. In this paper I use the 1996 and 2001 census of Canada master files and bivariate probit models with sample selection corrections (a.k.a. Heckman probit models) to assess the neighbourhood-level ethnic determinants of homeownership in Toronto, Canada. By determining whether low levels of ethnic concentration accompany a home purchase, I can assess whether immigrants exit their enclaves in search of a home in the 'promised land', as traditional assimilation theory suggests, or if some now seek homes in the 'ethnic communities' that Logan, Alba and Zhang (2002) recently introduced in this journal. Assessing the role of concentration under equilibrium conditions, I find evidence that same-group concentration affects the propensity to buy homes for members of several groups.

Around 20 years ago Doug Massey and his colleagues argued that tangible benefits, such as improvements in health, education, employment opportunities, crime rates, and social prestige, could be enjoyed through integration into the residential mainstream (Massey and Denton 1985; Massey and Denton 1993; Massey and Mullan 1984). As this relates to immigrants, the stylized account that can be derived from Massey's work – and the ecological tradition of the Chicago School he continues – is that new immigrants

initially concentrate into reception areas, or 'ethnic enclaves', as survival strategies.[1]

Their reasons for clustering may be factors external to the group (like discrimination or the low availability of viable employment opportunities) or from within-group characteristics (such as a common language, ties of consanguinity, shared income limitations, or the need to pool market resources, etc.).

Whatever the reasons, barring structural impediments – like those restricting the residential mobility of African Americans in many U.S. cities (Alba and Logan 1993; Flippen 2001) – ethnic concentration should be temporary and of declining utility, and once an immigrant family's socioeconomic status improves, that family should eventually merge into the residential mainstream by moving to a better, typically less segregated, neighbourhood (Massey and Denton 1985). Massey et al. termed this process 'spatial assimilation', and described it as a model of status attainment that links together the spatial and social positions of minority group members (Massey and Denton 1985).

Homeownership and Spatial Assimilation

Although housing tenure is not an explicit dimension of spatial assimilation theory, given the well-established relationship between income, human capital and homeownership (Balakrishnan and Wu 1992; Laryea 1999), and the importance of homeownership as an indicator of wellbeing and residential assimilation (Alba and Logan 1992), a reasonable extension of Massey's canon is that part of an immigrant family's socioeconomic ascent will be a shift from tenant to homeowner (Alba and Logan 1992). Extending this further, under spatial assimilation theory same-group concentration should be inversely related to homeownership, and once a family can afford to improve their living arrangements, they

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[1] Logan, Alba and Zhang (2002) point out that this stylized account overshadows a voluntary component of clustering that was recognized by early Chicago School ecologists, due to an overarching interest in identifying the structural components of segregation.

should want to 'stake a claim' in their new neighbourhood by buying or building a home there. Consequently, if mainstream neighbourhoods attract families seeking comfortable, owner occupied homes, ethnic enclaves – which, under spatial assimilation theory, are usually conceived as poor rental zones (Fong and Gulia 1999; Myles and Hou 2004) – should repel them.

Some recent research, coming from what might be deemed a 'new assimilation' perspective (Alba and Nee 2003; Logan, Alba, and Zhang 2002), finds that this is not always the case, and that some immigrant groups are maintaining their enclaves longer than what assimilation theory leads us to expect. If this is true, then some groups are choosing *against* spatial assimilation by forming more durable 'ethnic communities' with same-group members (Logan, Alba, and Zhang 2002), giving rise to a positive and growing 'enclave effect' on homeownership (Borjas 2002).

In this paper I evaluate the prospect of an enclave effect as an explanation for the 1996-2001 homeownership patterns of Toronto's 12 largest recent immigrant groups. Using longitudinally consistent and temporally antecedent 1996 neighbourhood ethnic composition data[2], I identify whether immigrants from Toronto's largest ethnic groups buy homes outside of their enclaves, in line with spatial assimilation theory, or if some now consider the 'promised land' to be an owner-occupied neighbourhood of same-group members.

Below I review some of the potential benefits of living and buying in an enclave; I then develop a predictive framework for determining which groups might be expected to benefit by forming owner-occupied ethnic communities. Next, the problem of

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[2] Observations in tracts without a 1996 designation are deleted. Many thanks to Feng Hou of Statistics Canada for providing the longitudinally-consistent census tract codes necessary for this merge.

'neighbourhood disequilibrium' is introduced, followed by an analysis that uses a sample of recent (1996-2001) movers, their 1996 neighbourhood ethnic characteristics, and bivariate probit models with sample selection corrections (Van de Ven and Van Praag 1981) to evaluate the enclave effect on homeownership for Toronto's 12 largest ethnic groups.

New Assimilation Theory: The New Residential Pathways of Recent U.S. Immigrants

Most researchers agree that spatial assimilation theory approximated the residential patterns of the largely impoverished European migrants of yesteryear (Fong and Wilkes 1999). In a process identified nearly a century ago in Chicago by Park and Burgess (1925), the poor, low-quality neighbourhoods where immigrants first landed upon entry are best conceived as residential 'start points'. By living beside co-ethnics, it was possible to replicate many of the goods and services of their previous countries, and immigrants could grow accustomed to life in their new environment. Since many had few resources, these neighbourhoods were often also poor, and many families could only afford to rent their dwellings in these neighbourhoods.

Over time, as levels of familiarity, comfort and socioeconomic status improved, families no longer required the comfort of their 'mini-homeland' and would one-by-one flee their 'slums' and migrate towards single family dwellings in the suburbs (Burgess 1925). The new neighbourhoods would contain members of higher socioeconomic standing, and were more likely to be filled with owner-occupied housing (Alba and Logan 1992). Doug Massey and his colleagues later embellished this early Chicago

School account by demonstrating that the process of suburb succession was usually accompanied by a decline in racial segregation (Massey and Denton 1985).

Since the time of Park, Burgess, and even Massey's early work, shifts in the immigration policies of intake countries like Australia, Canada, and the United States, have changed the face of immigration and, perhaps, of immigrant assimilation (Massey 1995; Nee and Sanders 2001). Today's immigrants no longer invariably begin their journey in the impoverished underclass, but now immediately span the socioeconomic hierarchy of their host society (Alba and Nee 2003). Consequently, many new arrivals do not satisfy one of the initial conditions of spatial assimilation theory, entry at the bottom of a society's socioeconomic hierarchy (Massey 1981). It follows then that the neighbourhoods where these immigrants live are not necessarily the poor rental zones they were under assimilation theory.

As this pertains to homeownership, the increase in immigrant diversity presents at least three plausible residential pathways for new immigrants. Immigrants can now choose to 1) remain segregated by creating high quality, owner-occupied neighbourhoods; 2) merge directly into the mainstream with a home purchase; 3) follow a process of spatial assimilation similar to that of earlier arrivals, starting in a poor rental neighbourhood alongside same group members then eventually buying a home away from same-group members.

In the United States, instances of all three outcomes have surfaced, and researchers are now identifying the conditions under which each occurred. Logan, Alba and Zhang (2002), for example, find that for some groups (Koreans and Filipinos in New York, the Vietnamese in Los Angeles), economic advancement did not always increase

physical distance from same-group members. Furthermore, they find that homeownership was positively correlated with living in ethnic enclaves for three groups (Afro-Caribbeans, Indians and Filipinos in New York). Given that homeowners stay in their homes nearly four times as long as do renters (Hansen, Formby, and Smith 1998; Rohe and Stewart 1996), this finding suggests that some families intentionally bought in their enclave, and that homeownership was a mechanism they used to preserve self-segregation.

Of all the groups Logan et al study, these few were exceptional. Most others displayed more traditional patterns of locational attainment, starting their journey in an immigrant enclave and gradually moving into the broader society over time. Logan et al. interpret the anomalies they do find as inconsistent in spirit with spatial assimilation, and believe they have found evidence for a change in the residential patterns of some immigrant groups. They end their discussion with a call to develop a theory of ethnic diversity under which seemingly contradictory settlement patterns can be reconciled beneath an overarching explanatory rubric, and invite researchers to determine the conditions under which ethnic neighbourhoods act as starting points for some groups, and destinations for others. [3]

To Enclave or not to Enclave?: The Allure of Socioeconomic Spillovers

In an earlier article, George Borjas (1998) provides some clues about the anomalies in Logan et al.'s study, by positing that a group's 'ethnic capital' – or the average human capital of a particular ethnic group – will determine the centripetal pull of an enclave.

[3] This invitation was actually anticipated much earlier by Breton (1964), whose theory of institutional completeness provides key insights into why groups might be inclined to maintain social boundaries. Nee and Sanders (2001) make a similar argument with their 'forms-of-capital' model. The Borjas predictive framework is instead used due to its transparency and ease of operationalization.

Focusing on the role of ethnic capital in creating intergenerational human capital transfers (and therefore on the attributes of the parent's generation in transmission to children), Borjas contends that the average utility-maximizing household seeks to optimize neighbourhood quality by living around people with the highest levels of human capital possible/affordable. For earlier European working-class immigrants, this entailed spatial assimilation; for some more recent groups, Logan et al.'s results suggest that for some immigrants it does not.

Borjas believes that highly skilled members of high ethnic capital groups will want to live beside co-ethnics in the longer term, and that both high and low skilled members of low ethnic capital groups will choose to live outside their enclave. Borjas cites the somewhat vague notion of resource 'spillovers' as the primary benefit of living beside high human capital members, although more tangible examples might include neighbourhood safety, social prestige, positive peer-group effects, reductions in crime rates, and other factors associated with neighbourhood quality – in other words, many of the benefits that spatial assimilation conferred on earlier immigrants. Borjas does not mention the tenure of the dwellings that people choose – it is in his more recent work (2002) that he finds the immigrant enclave effect on homeownership – but given the strong relationship between homeownership and socioeconomic status, it follows that immigrants who buy homes have done so because they anticipate positive benefits, like spillovers, from their neighbours in the longer term.

Presumably, these benefits could be received in any good neighbourhood, regardless of ethnic character, but as Coleman (1988) argues in his discussion of social capital, a necessary precursor for social transfers is the degree of interconnectedness

between the members of a community. This is something that is more likely to be high in an ethnic enclave than in an ethnically-heterogeneous neighbourhood (Qadeer 2003), so it seems likely that, if given the opportunity, an immigrant family would choose the 'ethnic option' due to the accessibility of spillovers. Additionally, remaining in an enclave has always conferred additional benefits, such as cultural preservation, access to ethnic goods and services, greater support network, and various other elements of what Bourdieu has referred to as cultural capital (Bourdieu 1986).

Based on the preceding discussion, the benefits of an ethnic enclave alongside the attenuation of negative consequences may have altered the incentive structure for some immigrant groups seeking a good neighbourhood in which to live. In the past, improvements in spatial position almost necessarily entailed an increase in physical distance from same-group members, but given the changes in immigration, below I determine if an ethnic enclave now acts a 'homeownership magnet' for some groups.

Identifying High and Low Levels of Ethnic Capital: The Hypotheses

To predict when an enclave will attract same-group homebuyers, I use two socioeconomic indicators, income and education, to proxy ethnic capital. Borjas (1998) uses only the mean educational attainment of the parent's generation, but I also include income here, since financial capital is likely to be as attractive for members seeking spillovers as education, plus it proxies numerous other unobserved benefits, such as access to credit, affluence and good social standing.

The general argument I propose is that the direction of the enclave effect on homeownership will be a function of the human and financial capital, or ethnic capital, of an ethnic group. More specifically, I hypothesize that if a group has either above-median

income or more members with a university diploma than the city average, then members of these groups will look within their group to seek spillovers, and will therefore be more likely to buy a home in an ethnic enclave (hypothesis 1). If, conversely, a group has both below-median income and a smaller proportion of university graduates, members from these groups will be more likely to convert their socioeconomic achievements into a home outside of their enclave, consistent with spatial assimilation theory (hypothesis 2). Although 3 residential options were presented earlier, since the tenure of the previous dwelling can not be identified, the distinction between options 2 + 3 (immediate versus more gradual integration) can not be measured here, and hypothesis 2 subsumes both of these residential options. Table 1 below provides the classification schema used to designate high and low ethnic capital groups.[4]

Table 1: Ethnic Capital of Toronto's Ethnic Groups

Ethnic Group	U.Degree (%)	Income (median)
China	*34*	$31,602
Jew	*46*	**$50,884**
India	*31*	$32,572
Iran	*37*	$22,217
Italy	8	***$38,539***
Philippines	*38*	$29,572
Ukraine	*32*	**$38,235**
Toronto	**23**	**$35,852**
Jamaica	6	$25,326
Poland	23	$30,855
Portugal	4	$33,192
Sri Lanka	11	$18,620
Vietnam	12	$23,252

Source: 2001 Census of Canada Economic Family File. Income refers to Adult-Equivalent-Adjusted Income. Figures above refer only to the highest earners in the economic family.

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[4] Identifying the groups for analysis was done by using an ethnicity indicator derived by Statistics Canada. Groups needed to have at least two enclaves in the Toronto CMA to be included in this study.

If we accept that income and education together approximate ethnic capital, then over half of Toronto's ethnic groups listed above would receive greater neighbourhood spillovers by *not* spatially assimilating with a home purchase (Table 1). For the groups with below-average levels of ethnic capital, it would be advantageous to flee co-ethnic counterparts when searching for spillovers, leading to higher homeownership probabilities outside of their enclave.

What is an Enclave?

The requisite degree of clustering for constituting an ethnic enclave varies widely across studies. In a recent investigation of the role of same-group member concentration on homeownership in American cities, Borjas (2002) uses the percent of an ethnic group at the metropolitan level to measure the enclave effect on homeownership. Although the presence of a large number of same-group members appears to prompt the initial move to a city for many immigrants (Statistics Canada 2002b), his use of a CMA-level measure implies that it also continues to shape behaviour well after arrival. More consequentially, he must assume that a sizeable number of co-ethnics in a city represents the development and maintenance of ethnic enclaves, and that members who own a home in a CMA are actually living beside co-ethnic group members, and bought as a result of presumed proximity. Since several studies show wide differences in the propensity to cluster (Alba and Logan 1993; Balakrishnan and Hou 1999; Fong 1997; Massey and Denton 1987; Myles and Hou 2004), this assumption of ethnic concentration as a constant almost certainly introduces an element of error – and the prospect of ecological fallacy.[5]

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[5] It is possible for a group to have high homeownership rates in a city but have no contact with same-group members. Borjas (2002) himself admits that ideally enclave would be measured more locally, but states that this information is not available on the public use census files.

I instead measure enclaves at the more intuitive neighbourhood (census tract[6])

level. Neighbourhoods are the microcosms where stores, schools, community centres, and

other ethnic services are located; they are also where languages are preserved, where

contact with friends, families and co-ethnics is maintained, and where employment

connections are built. Lastly, and most importantly, neighbourhoods are the forum where

socioeconomic spillovers are most likely to occur.

Despite its appropriateness, however, measuring enclaves at the neighbourhood

level introduces other conceptual issues, particularly, determining the point at which a

'neighbourhood' becomes an 'enclave'. Some (Hou and Picot 2003) use a continuous

exposure measure, which has merit in that it does not impose a binary opposition on an

inherently continuous concept. More commonly, however, an enclave/non-enclave

distinction is made, since a threshold is likely necessary to maintain an element of

'institutional completeness' (Breton 1964). Alba, Logan and Crowder (1997) require a

census tract to have at least 40% and contiguous tracts to have 35% of a single group to

be deemed an ethnic neighbourhood. The groups they study are quite large (the Italian

group in their study formed 28% of all New York whites), making this threshold easily

obtainable. When groups are smaller, as is the case in Toronto (no ethnic group exceeds

10% of the total CMA population), this requirement is much too high to capture most

clustering. Other studies, where thresholds are much smaller include Bobo et al. (2000),

who define an enclave as a neighbourhood with 10% same-group members. After

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[6] A census tract is a small geographic unit delineated by Statistics Canada that consists of between 2500 and 8000 people. Boundaries generally follow permanent and easily identifiable physical features such as streets, transportation easements and municipal areas, and are as socio-economically homogenous as possible. When delineating census tracts, Statistics Canada colludes with local authorities and urban planners to ensure that tracts are both geographically and sociologically intuitive (Statistics Canada 2002a)

performing a series of sensitivity tests, I decided to follow the convention of Bobo et al. and use a threshold of 10% to designate an ethnic enclave.[7]

Data

This study uses the 1996 and 2001 census of Canada master files, available at the Statistics Canada national headquarters in Ottawa, Ontario. The large sample size of the master files (20% instead of 3% in the public use files), the longitudinally-consistent census tract information, and the full ethnicity information allow me to focus on only Toronto for this study.

Toronto is a big advantage is an ideal environment for testing hypotheses about self-segregation. It has numerous areas that are flourishing as immigrant neighbourhoods, such as the several Chinese areas across the city, the Jamaican areas around Crescent Park and Flemingdon Park, and the Indian village in Brampton. This suggests that homebuyers face a similar housing market, and are subject to a similar pricing and availability frontier.

Second, since Canada has had several large shifts in its immigration policies over the years, toggling between labour force requirements, family reunification, and humanitarian considerations (see Akbari (1999) for a review of these policies), Toronto contains a wide cross-section of immigrant groups with widely-varying levels of ethnic capital. As a result, there is sufficient variation between groups to identify the differences in the home-buying behaviour between immigrants with different levels of ethnic capital.

Third, unlike the United States, where immigrants choose between many destination cities (Borjas (2002) reports that 32.5 percent of immigrants live in Los

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[7] This decision has also proven to be almost inconsequential elsewhere. Logan et al. (2002) experiment with similar sensitivity tests and find that results were quite robust to different definitions of an enclave.

Angeles, Miami, and New York combined), data from the 2001 Canadian census show that 37% of all immigrants (44% of recent (>1985) immigrants) choose to live in Toronto. This is comparable to New York at the turn of the century (Ward 1971), and makes Toronto one of the world's premier laboratories for identifying immigrant settlement patterns. Given these benefits, it seems that if there is an emerging enclave effect on homeownership, it is likely to be operating in Toronto.

Measures

The unit of analysis throughout is the economic family, defined as either an unattached individual or a union of two or more persons living in the same dwelling and related by blood, marriage, common-law or adoption. Only permanent Canadian residents who have recently moved and are not living in institutions, collective dwellings or military quarters, where the highest earner is age 25-65 are included, and the characteristics (origin, socio-demographic variables, etc) of the highest earner are used to represent the family. Below appear all other relevant coding details.

Table 2: The Changing Number of Ethnic Enclaves in Toronto, 1996-2001

Ethnic Group	Number of Enclaves		
	1996	2001	% increase
China	129	172	25.0%
India	54	115	53.0%
Iran	2	3	33.3%
Italy	148	139	-6.5%
Jamaica	24	24	0.0%
Jew	52	50	-4.0%
Philippines	3	17	82.4%
Poland	20	20	0.0%
Portugal	45	50	10.0%
Sri Lanka	3	12	75.0%
Ukraine	7	2	-250.0%
Vietnam	2	1	-100.0%

Source: 1996 and 2001 Census of Canada Master Files
Note: An ethnic enclave is defined as a census tract with 10% or

more of one ethnic group. It is possible for a neighbourhood to
be an enclave for more than one group.
Note: Using 1996 tract boundaries, and excludes institutional
residents and those living in collective dwellings.
Children under 18 are assigned the ethnic origin of the
highest earner in the economic family.

The models used here contain both family- and neighbourhood-level indicators.

Family information includes demographic, household, and immigration characteristics,

which, though largely extraneous for this study, are standard in tenure models and

included as controls. In addition to these, the census also contains some information on

the location of previous residence. These are included in case those who move from

within the city are in a different position for homeownership than those who are not.

Large differences in homeownership propensities by ethnic origin have also been found

elsewhere (Borjas 2002; Ray and Moore 1991; Skaburskis 1996), suggesting that

homeownership rates might be higher for some groups, regardless of the neighbourhood

characteristics. I include a vector of ethnicity main effect indicators to separate these

differences from the enclave effect.

To control for *neighbourhood characteristics* other than ethnic character, I also

include a series of ecological indicators. These include a vector of enclave indicators, the

mean logged neighbourhood income, the percent of residents with a university degree, a

series of controls for median house age, the migration patterns of that neighbourhood (a

dummy variable to indicate whether same-group members are entering or exiting the

neighbourhood), and the percentage of dwellings that are owner-occupied. In essence, by

including these variables it is possible to determine if homeownership propensities vary

in socioeconomically-similar neighbourhoods. Not shown in table 3 above are the

interaction terms between national origin (at the family-level) and the neighbourhood

ethnic enclave indicators. These are of central importance for this study, as they indicate

whether being of a certain origin *and* in an enclave of same-group members operate jointly to motivate homeownership beyond all the other variables in the tenure models. In other words, this is the enclave effect on homeownership.

Tenure Choice under Equilibrium Conditions

Vital to isolating an enclave effect on homeownership is the importance of determining what the neighbourhood ethnic concentration was when a residential choice was made. Voluntary segregation presupposes that families make choices based in part on the ethnic character of their neighbourhood, something that they are most likely to be in control of, and care the most about (Frey 1979), when they move. Imagine, for example, that a family of group X buys a home in a neighbourhood composed mainly of Canadian-born families, and that neighbourhood composition was a factor in their choice. If the ethnic character of this neighbourhood remained stable over time, using a cross-section of data without regard to duration would contain minimal measurement error, and the neighbourhood composition could be said to be in 'equilibrium' with the family's preferences.

More realistically, however, imagine that the composition has changed since group X family moved into their neighbourhood, and that Canadian-born families were displaced by families of a different ethnic origin, say group Y. Although dissatisfied with the ethnic shift, due to the transaction costs and the social and emotional attachment that the family has for their home, they choose to stay, and now live in a group Y enclave. As this related to ethnic preference, it would be erroneous to assume that the group X family 'chose' the composition of their neighbourhood at time 2. Therefore, they are not in equilibrium with their preference.

Table 3: Regression Variables and Coding Key

Demographic Information		Economic Indicators	
Age 25-34	Reference Category	In School	Dichotomous, 1=yes
Age 35-44	Dichotomous, 1=yes	No Highschool	Reference Category
Age 45-54	Dichotomous, 1=yes	Highschool	Dichotomous, 1=yes
		Post-Secondary Training	Dichotomous, 1=yes
Household Composition		University Degree	Dichotomous, 1=yes
Adults without Children	Dichotomous, 1=yes	Income	Continuous, Logged
Adults with Children	Reference Category		
Unattached Individual	Dichotomous, 1=yes	**Neighbourhood Characteristics (from 1996 Census)**	
Lone Parent	Dichotomous, 1=yes	Median house age < 5 Yrs	Reference Category
Economic Family Size	Continuous	Median house age 5-10 Yrs	Dichotomous, 1=yes
		Median house age 10+ Yrs	Dichotomous, 1=yes
Immigration Characteristics		Percent with Univ. Degree	Continuous
Immigrated before 1970	Dichotomous, 1=yes	Mean Neigh. Income	Continuous, Logged
Immigrated 1970-79	Dichotomous, 1=yes	0-25% Owner occupied	Reference Category
Immigrated 1980-89	Reference Category	25-49% Owner occupied	Dichotomous, 1=yes
Immigrated 1990-99	Dichotomous, 1=yes	50-74% Owner occupied	Dichotomous, 1=yes
		75-100% Owner occupied	Dichotomous, 1=yes
Ethnicity Characteristics		Not an Enclave	Reference Category
China	Dichotomous, 1=yes	Chinese Enclave	Dichotomous, 1=yes
India	Dichotomous, 1=yes	Indian Enclave	Dichotomous, 1=yes
Iran	Dichotomous, 1=yes	Iranian Enclave	Dichotomous, 1=yes
Italy	Dichotomous, 1=yes	Italian Enclave	Dichotomous, 1=yes
Jamaica	Reference Category	Jamaican Enclave	Dichotomous, 1=yes
Jew	Dichotomous, 1=yes	Jewish Enclave	Dichotomous, 1=yes
Philippines	Dichotomous, 1=yes	Filipino Enclave	Dichotomous, 1=yes
Poland	Dichotomous, 1=yes	Polish Enclave	Dichotomous, 1=yes
Portugal	Dichotomous, 1=yes	Portuguese Enclave	Dichotomous, 1=yes
Sri Lanka	Dichotomous, 1=yes	Sri Lankan Enclave	Dichotomous, 1=yes
Ukraine	Dichotomous, 1=yes	Ukrainian Enclave	Dichotomous, 1=yes
Vietnam		Vietnamese Enclave	Dichotomous, 1=yes
Move Characteristics			
Came from differenty Country	Dichotomous, 1=yes		
Same Census Subdivision	Dichotomous, 1=yes		
Came from different CSD	Dichotomous, 1=yes		

Note: 'Move Characteristics' variables are only used in Heckman probit models, and not the standard probit models. In addition to these variables, interaction terms between every ethnic group and its respective enclave indicator are included.

Applying this logic to homeownership, if neighbourhood composition is part of the package that attracts homebuyers (Gabriel and Painter 2003), over time there will be a growing 'disequilibrium' between actual and preferred neighbourhood composition in a single cross-section. Given the dynamic nature of enclave formation shown in Table 2 (for a lengthier discussion of this, see Hou (2004) or some of Schelling's classic work on

the 'tipping model' (1971; 1972)), it is important to measure ethnic composition as close to time of arrival as possible, which can be best done by focusing on movers.[8]

Estimation Technique

Using a sample of movers does introduce other problems. The greatest of these is that results are biased because movers are a self-selected sample. The size of the bias depends on how distinct the selected sample is from the population of interest (Winship and Mare 1992). In the case of movers, Table 4 below shows the differences.

Table 4: A Comparison of Toronto's Stayers and Recent Movers, 2001

Characteristics of Head	Stayers	Movers
Age	45.8	39.5
Currently in School	6.6%	11.4%
Less than High School	13.3%	11.5%
High School	11.6%	10.7%
Diploma or other	37.8%	37.1%
BA or Higher	26.7%	34.9%
Immigrated before 1970	19.4%	5.8%
Immigrated 1970-79	21.0%	12.1%
Immigrated 1980-89	19.7%	18.9%
Immigrated 1990-1999	16.4%	40.5%
Characteristics of Family		
Family Size	3.5	3.1
Adult without Children	41.6%	28.5%
Adults with Children	43.3%	47.8%
Unattached Individuals	11.7%	18.7%
Lone Parents	3.4%	5.0%
Percent Owner	78.8%	62.9%
Mean AEA Income	44,558	39,312

Source: 1996-2001 Census of Canada merged Master File created by author
Note: Other means are provided in Appendix A

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[8] As one reader commented, homebuyers in the present are also out of equilibrium, as they will often make purchase decisions based on future considerations. I believe that this more relevant for studying house characteristics (size, number of rooms, value, etc) than it is for neighbourhood composition.

As can be seen above, movers on average are younger, poorer but better educated, unattached, and more recent arrivals than the general population. Similarly, owners are older, wealthier, with children, and longer-term Canadian residents. Since certain characteristics predict both the propensity to own and to move, estimations based on a mover sample will overemphasize the relationship between any two variables that co-vary with both owning and moving.

To correct for this non-representativeness, I use a variation of Heckman's selection model (1979) capable of estimating binary outcomes in both the selection and the estimation equation (Boyes, Hoffman, and Low 1989; Greene 1992; Van de Ven and Van Praag 1981). Heckman's original procedure entails first estimating a probit regression to obtain the likelihood of not entering the sample – in this case, choosing not to move – and using this value (also called the Inverse Mill's Ratio) as a predictor in a subsequent OLS regression. Van de Ven and Van Praag (1981) altered Heckman's original formulation, making it possible to estimate a binary outcome in both the selection equation and the estimation equation (see also Boyes, Hoffman and Low (1989)). Their method uses maximum likelihood instead of entering a correction factor in the estimation equation as in Heckman's two stage method, however, due to the ability of maximum likelihood to simultaneously model the equations with bivariate normal errors (Van de Ven and Van Praag 1981). The result is a series of coefficients estimated for movers but readjusted to account the uniqueness of the mover sample.

This method is being used increasingly in housing studies, most notably in the recent work of the housing economist Gary Painter and his colleagues (Painter 2000; Painter, Gabriel, and Myers 2000; Painter, Gabriel, and Myers 2001). Using US census

data, Painter (2000) shows that there are substantial differences between the results of full population and adjusted mover-only samples, especially regarding age and immigrant status, and argues convincingly for the appropriateness of using movers in certain circumstances. Using movers here is paramount, as the purpose of the study is to identify the ecological antecedents to the buy/rent decision, which must be done as close to time of purchase to reduce neighbourhood disequilibrium.

As with the analysis of any binary dependent variable, the assumption for homeownership is that the outcome of interest is a latent continuous variable of the propensity to buy versus rent. This variable (OWN*) is unobserved, however, and the sole indicator of the underlying distribution is the dichotomous outcome OWN, which takes a value of 1 if the home is owned, and 0 if it is rented. Assuming the variable OWN* has a value of zero or less than zero for the propensity to rent, and greater than zero for buyers. The relationship of the observed indicator OWN and the latent indicator OWN* is as follows:

$$\text{if OWN*}_i > 0 \text{ then OWN}_i = 1 \tag{1}$$

$$\text{if OWN*}_i \leq 0 \text{ then OWN}_i = 0 \tag{2}$$

Although OWN is the observed variable, it is actually the underlying propensity or probability that is of interest, resulting in the equation:

$$\text{OWN*}_i = \beta X_i + \varepsilon_{i1} \tag{3}$$

Where β is a vector of coefficients, X_i is a vector of predictors, and ε_i is the estimation error.

This equation is only valid for random samples. When studying only movers, the buy/rent decision is observed only if a family moves, producing three possible outcomes,

all dependent on the outcome of the first equation (whether a family moves or not). This introduces a third possibility, that an outcome will not be observed in the OWN* equation (equation 6). Similar to the estimation equation, there is an underlying propensity to move, expressed as:[9]

$$MOVE^*_I = Z_i\gamma + \varepsilon_{i2} \tag{4}$$

Where: $\qquad$ $MOVE^*_I = 1$ if $MOVE^* > 0$, OWN is observed $\qquad$ (5)

$\qquad\qquad\qquad$ $MOVE^*_i = 0$ if $MOVE^* \leq 0$, OWN is not observed $\qquad$ (6)

Finally, combining the two equations to account for all three possibilities yields the following likelihood function:

$$L = \sum_{i \in S}^{y_i=1} \ln\left[\Phi_2\left(\beta X_i, Z_i\gamma, \rho\right)\right] + \sum_{i \in S}^{y_i=0} \ln\left[\Phi_2\left(-\beta X_i, Z_i\gamma, \rho\right)\right] + \sum_{i \notin S} \ln\left[1 - \Phi_1\left(Z_i\gamma\right)\right]$$

Where S contains all observations if OWN_i is observed (a family moves), and that OWN^*_i can be estimated in a maximum likelihood framework. The attraction of using maximum likelihood to estimate these equations is that it allows for $\varepsilon_{i1} + \varepsilon_{i2}$ to be jointly normally distributed (Φ_2) with a correlation coefficient ρ between error terms. [10] Analysis of ρ indicates whether the assumption of non-independence of equations is justified, and whether sample selection corrections are necessary.

Typically, although not always (Painter 2000; Painter, Gabriel, and Myers 2000; Painter, Gabriel, and Myers 2001), Heckman-style models require there to be a unique variable, or exclusion restriction, that predicts the outcome in the selection equation but not in the estimation equation (Dubin and Rivers 1990). For this study, the exclusion

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[9] Where Z = new child + age + currently in school + family size + year of immigration + family type, with coding consistent with that of Table 5.
[10] Notation for these models was taken from Painter (2000)

restriction is the addition of a new child into the home in the years 1996-2001. Presumably, the addition of a new child to the household creates an increase in the need for space, yet due to the income limitations that may be associated with a home purchase, might not have a bearing on the decision to buy or rent.[11]

Model fit under maximum likelihood can be assessed with a variety of fit measures. Here the commonly-used log likelihood and the Bayesian Information Criterion (BIC) are chosen to compare 'baseline' models, or ones with no enclave indicators or interactions (only BIC and the log-likelihood are shown for these models) to 'full models', or those that include the ethnic character of the destination neighbourhood and the ethnicity-enclave interaction terms. Although BIC is a derivation of the log likelihood,[12] it penalizes heavily for model complexity, resulting in a more discriminatory assessment of each successive model (Raftery 1995). It is therefore more likely to ensure that the choice between the baseline and the full model is both judicious and conservative, and will determine if knowing the ethnic character of a neighbourhood where a family moves permits a better prediction of their tenure decision. Lower values of BIC imply a closer alliance between the observed data and the experimental model, and differences between models assume a chi-square distribution at degrees of freedom equal to k-1 new parameters.

For the bivariate probit models, the Wald test of independent equations is also included, which determines whether there are important differences between a standard probit model on the full sample and the Heckman variant. If there are no differences, ρ (the correlation coefficient between error terms) will not be significantly different from 0

(implying no correlation in errors between the two equations), and the simpler probit model may be used in favour of the Heckman model (Painter 2000). If, conversely, ρ is significant, the corrections made by the bivariate models are necessary. This test has a chi-square distribution with one degree of freedom, requiring a value greater than 3.8 to be considered statistically significant.

Results

The first set of models (labelled 'Probit') contain results from a probit specification run on all families (regardless of whether they've moved or not), followed by a bivariate probit model ('HeckProb') that uses movers but corrects for non-representativeness. Table 5 below shows the relative fit information from the baseline and full models.

Table 5: Model Fit Statistics to Test Enclave Effect

	Probit		HeckProb		
	2*L.L.	BIC	2*L.L.	BIC	Chi-Square
Baseline	-65,804	66,178	-143,982	144,584	13.49
Full Model	-65,394	66,042	-143,686	144,559	14.17
Difference	410	-136	296	-24	

Source: 1996-2001 Census of Canada merged Master File created by author
Note: 'Baseline' models refer to specifications that exclude neighbourhood ethnic composition and a vector of ethnicity-enclave indicator terms. Full models include these terms. Chi-square statistics refers to the Wald test of Independent Equations.

In both the standard and Heckman probit models, BIC and the log likelihood point to the models with neighbourhood ethnic composition data as the better choice, suggesting that neighbourhood ethnic composition is indeed a relevant component of a family's housing tenure decision.[13] Consequently, given the improvement in model fit in the full model, only these results will be interpreted.

Since it is the ethnicity-enclave interaction term that measures the enclave effect, these coefficients are reproduced in Table 6 below (full results are shown in Appendix

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[13] For the Log Likelihood, a bigger positive number is preferred; for BIC, a lower negative number is desirable. In both cases, the model with neighbourhood information fits better.

A). To ease interpretability, first order partial derivatives (marginal effects) are shown, with all other variables evaluated at their mean. These can be interpreted in much the same way as the coefficients of an OLS regression, denoting the difference in homeownership propensities for a family in an enclave of same-group members versus an otherwise identical family moving to a non-enclave.

Table 6: The 'Enclave Effect' for Toronto's 12 Largest Immigrant Groups

High Ethnic Capital Groups			*Low Ethnic Capital Groups*		
Group	**Probit**	**HeckProb**	**Group**	**Probit**	**HeckProb**
China	2.3 *	5.7 ***	Jamaica	-14.1 ***	-16.7 ***
Jew	2.9	0.9	Poland	-4.3	-3.8
India	-2.7 *	-3.5	Portugal	2.2	4.1
Iran	-11.8	-8.1	Sri Lanka	-4.1	6.9
Italy	7.1 ***	7.2 ***	Vietnam	-1.6	5.6
Phillipinnes	-17.9 ***	-10.8			
Ukraine	-5.5	-15.2			

*p<0.05, **p<0.01, ***<0.001
Source: 2001 Census of Canada with 1996 Neighbourhood Data attached
Note: The numbers above refer to the average differences (in percentage points) in predicted homeownership rates in an enclave versus a non-enclave.

Looking first at the probit models, 5 groups have significantly different homeownership propensities in an enclave versus a non-enclave. For 3 of them (Indians, Filipinos, and Jamaicans) the enclave effect is negative, suggesting that there is an increase in spatial distance with a home purchase for these group members. Based on their ethnic capital, only Jamaicans follow the expected trends (hypothesis 2); both Indians and Filipinos are unexpectedly more likely to buy outside of their enclave, despite having above-average levels of ethnic capital (Table 1).

For Chinese and Italians, however, the results are more consistent with patterns predicted by group ethnic capital. Expected homeownership rates are about 6 and 7 points higher for these families in an enclave, suggesting that Chinese and Italians are more

interested in 'buying in' to their enclave than they are to mainstream society, as predicted by hypothesis 1.

The Enclave Effect under Equilibrium Conditions

Based on the results for the probit models shown above, there is only mixed evidence regarding the role of ethnic capital in determining homeownership patterns. Although Chinese, Italians and Jamaicans conform to the expectations of hypotheses $1 + 2^{14}$, Indians and Filipinos do not.

As argued earlier, however, these models are misleading since they do not allow for neighbourhood turnover, and it can not be determined the degree to which families chose the current ethnic composition of their neighbourhood. I argued above that neighbourhood choice can be better determined looking at the composition at time of move, and by correcting the coefficients for the sample selection bias that accompanies a non-random sample.

The chi-square value of 14.2 (critical value is 3.8) for the Wald Test of Independent Equations (Table 5) shows that there are indeed salient differences in the tenure choice models of movers and the full sample. Although it cannot be determined from this figure whether this is evidence for neighbourhood disequilibrium (this can only be determined by comparing the enclave coefficients between the two models in Appendix A), it does suggest that correcting for the likelihood of moving alters the tenure choice model, and that overall, the Heckman probit models of homeownership should be interpreted in favour of the standard probit models. Once again, due to space constraints

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[14] It can not be determined from this analysis whether Jamaicans are choosing to live in their enclave by renting, or if they are buying or renting outside of their neighbourhoods; it can only be said that they are more likely to buy outside of a Jamaican neighbourhood.

only the ethnicity-enclave interaction terms between probit and Heckman probit models will be compared here.

For most groups the differences in the enclave effect between the two models were relatively minor. In no instances did a previously hidden enclave effect emerge, neither did an enclave effect reverse. There are, however, two important changes: the negative enclave effect for Indians and Filipinos found in the standard probit models now disappear in the Heckman model, removing the two cases that ran contrary to the expectations based on ethnic capital. Now, 3 groups follow (and no groups contradict) the patterns of homeownership predicted earlier by looking at a group's ethnic capital.

Consistent with hypothesis 1, two high ethnic capital groups appear to be 'buying to get in' to their neighbourhood under equilibrium conditions, and one low ethnic capital group is 'buying to get out. For 3 of the 12 groups studied here, there is an enclave effect on homeownership.

Discussion and Conclusion

Several researchers (Borjas 2002; Logan, Alba, and Zhang 2002; Marcuse 1997; Zhou 1992) believe that voluntary ethnic clustering is on the rise in North America's largest urban centres, implying that residential segregation has for some groups become a matter of choice instead of constraint. Part of the reason for the proposed shift is that, unlike the arrivals of yesteryear, today's immigrants are no longer universally impoverished, and it has become possible for them to retain the advantages of living in an enclave (kinship ties, language and cultural preservation, etc.), while gaining the socioeconomic benefits of living and buying in a good neighbourhood. These 'new neighbourhoods' where affluence and ethnicity intersect have become known as 'ethnic communities' (Logan,

Alba, and Zhang 2002; Myles and Hou 2004), and have been described by 'new assimilation theorists' as residential choices made by immigrants with broader options.

Although new assimilation researchers describe the anomalous behaviour of some groups, none have yet advanced a framework for predicting when instances of self-segregation might occur. Additionally, this research does not adequately address the dynamic processes that underlie neighbourhood turnover and transformation. Necessarily then, researchers must assume that living in an enclave without financial constraint is a neighbourhood choice. Clearly this is not always the case, and the resulting disequilibrium between preferences and actual circumstances may mislead researchers about the relationship between actual and preferred neighbourhood ethnic composition. The many social, economic, and emotional transaction costs associated with moving to a new neighbourhood often deters households from moving (Goodman 2002), even though neighbourhoods may decreasingly resemble what a family would choose in the absence of transactions costs.

In this paper I address these two shortcomings by using ethnic capital to identify the impact that temporally-prior neighbourhood ethnic composition characteristics have on homeownership propensities among a sample of movers. By testing for an 'enclave effect' on homeownership, I am able to determine whether ethnic communities emerge voluntarily, or if there are other instead structural factors (such as availability, price, etc.) moderating findings of self-segregation. This is the first study to determine how neighbourhood ethnic composition alters behaviour while using group-level socioeconomic resources to predict what that effect will be.

After correcting for 'neighbourhood disequilibrium', or the possibility that neighbourhood composition departs from what a family prefers over time, I find that 3 of the 12 groups consider proximity to same-group members to be 'part of the package' that helps them make their homeownership decision. 2 of the 3 groups, Chinese and Italians, have above-average levels of ethnic capital and tend to seek homes close to other group members. For low ethnic capital Jamaicans, the other group where distance seems to matter, home purchases are more likely to occur outside of enclaves. In all three cases, there is an enclave effect on homeownership that is a function of group ethnic capital.

To conclude, although these findings are novel, what is perhaps more surprising in this study is how *infrequently* neighbourhood composition alters the incentives for homeownership. The few U.S. studies that do look at the effect of ethnic concentration on homeownership (Borjas 2002; Flippen 2001; Gabriel and Painter 2003) all find that proximity to same-group members does shape homeownership decisions. ¾ of the groups in this study suggest that this is not the case for Toronto, and that proximity to same-group members is not leading families to make tenure choices that they would not already make.

Appendix A: Determinants of Tenure Choice for Toronto's 15 Largest Groups, 2001						
	Standard Probit			Heckman Probit		
	dy/dx	Std. Err.	Mean	dy/dx	Std. Err.	Mean
Characteristics of High Earner (2001)						
Age25-34	Ref.			Ref.		0.419
Age35-44	0.032 ***	0.004	0.320	0.022 *	0.009	0.350
Age45-54	0.062 ***	0.005	0.235	0.007	0.016	0.167
Age55-64	0.085 ***	0.005	0.125	-0.013	0.023	0.063
InSchool	-0.029 ***	0.006	0.090	-0.033 ***	0.010	0.114
No High School	Ref.			Ref.		0.173
High School Education	0.021 ***	0.006	0.112	0.039 ***	0.012	0.107
Post-secondary Education	0.048 ***	0.005	0.374	0.070 ***	0.009	0.371
Undergraduate Degree	0.057 ***	0.006	0.307	0.087 ***	0.011	0.349
loginc	0.066 ***	0.003	10.320	0.061 ***	0.004	10.236
Family Size	0.052 ***	0.002	3.308	0.043 ***	0.004	3.140
YSM	0.004 ***	0.001	14.336	0.006 ***	0.001	10.891
YSM2	0.000	0.000	378.131	0.000 ***	0.000	236.683
Family Type						
2 Adults, with Children	Ref.			Ref.		0.478
2 Adults, No Children	0.052 ***	0.005	0.352	-0.008	0.013	0.285
Unattached Individual	-0.001	0.008	0.151	-0.027	0.015	0.187
Lone Parent	-0.163 ***	0.012	0.042	-0.215 ***	0.015	0.050
MoverCharacteristics						
Same Census Subdivision				Ref.		0.608
Different Census Subdivision				-0.032 ***	0.008	0.222
Different Country				-0.162 ***	0.010	0.170
National Origin						
Chinese	0.201 ***	0.005	0.210	0.233 ***	0.013	0.147
Indian	0.090 ***	0.007	0.147	0.112 ***	0.013	0.052
Iranian	0.023	0.012	0.023	0.063 ***	0.019	0.076
Italian	0.222 ***	0.005	0.201	0.254 ***	0.015	0.059
Jamaican	Ref.			Ref.		0.076
Jewish	0.158 ***	0.006	0.058	0.211 ***	0.017	0.068
Filipino	0.059 ***	0.008	0.068	0.103 ***	0.014	0.038
Polish	0.119 ***	0.006	0.060	0.164 ***	0.014	0.025
Portuguese	0.176 ***	0.005	0.079	0.226 ***	0.015	0.026
Sri Lankan	0.037 ***	0.010	0.029	0.062 ***	0.018	0.322
Ukrainian	0.155 ***	0.005	0.028	0.171 ***	0.017	0.235
Vietnamese	0.105 ***	0.009	0.020	0.124 ***	0.020	0.007

Appendix A: Determinants of Tenure Choice for Toronto's 15 Largest Groups, 2001 (cont.)						
	Standard Probit			Heckman Probit		
	dy/dx	Std. Err.	Mean	dy/dx	Std. Err.	Mean
Neighbourhood Characteristics (1996)						
Med. Age of House < 5 yrs.	Ref.			Ref.		0.129
Med. Age of House 5-10 yrs.	-0.070 **	0.023	0.154	-0.159 ***	0.036	0.155
Med. Age of House >10yrs.	-0.216 ***	0.015	0.733	-0.396 ***	0.024	0.716
0-24% Owner	Ref.			Ref.		0.126
25-49% Owner	0.144 ***	0.005	0.213	0.146 ***	0.010	0.220
50-74% Owner	0.255 ***	0.005	0.312	0.283 ***	0.012	0.308
75-100% Owner	0.364 ***	0.006	0.369	0.412 ***	0.013	0.346
Log Neigh. Income	0.156 ***	0.013	10.488	0.276 ***	0.022	10.490
Percent with Univ. Degree	-0.373 ***	0.029	0.226	-0.639 ***	0.049	0.228
Concentration Increase				0.041 ***	0.008	0.711
Enclave Indicators						
≥10% Chinese	0.028 ***	0.006	0.305	0.042 ***	0.011	0.322
≥10% Indian	0.037 ***	0.007	0.228	0.032 *	0.014	0.235
≥10% Iranian	0.036	0.026	0.006	0.086 *	0.043	0.007
≥10% Italian	-0.005	0.005	0.223	0.015	0.009	0.194
≥10% Jamaican	0.081 ***	0.008	0.034	0.144 ***	0.016	0.033
≥10% Jewish	-0.048 ***	0.010	0.075	-0.054 ***	0.016	0.066
≥10% Filipino	-0.043 *	0.022	0.032	-0.102 *	0.042	0.030
≥10% Polish	-0.001	0.012	0.020	-0.024	0.020	0.019
≥10% Portuguese	0.025 **	0.008	0.074	0.024	0.015	0.062
≥10% Sri Lankan	-0.089 ***	0.026	0.029	-0.172 ***	0.037	0.032
≥10% Ukrainian	-0.008	0.031	0.002	0.044	0.043	0.001
≥10% Vietnamese	-0.209 ***	0.044	0.001	-0.294 ***	0.057	0.001
Interactions						
Chinese*Enclave	0.023 *	0.009	0.148	0.057 ***	0.016	0.160
Indian*Enclave	-0.027 *	0.013	0.073	-0.035	0.021	0.084
Iranian*Enclave	-0.118	0.096	0.001	-0.081	0.114	0.002
Italian*Enclave	0.071 ***	0.010	0.110	0.072 ***	0.019	0.075
Jamaican*Enclave	-0.141 ***	0.026	0.011	-0.167 ***	0.038	0.011
Jewish*Enclave	0.029	0.015	0.035	0.009	0.028	0.028
Filipino*Enclave	-0.179 ***	0.063	0.009	-0.108	0.090	0.008
Polish*Enclave	-0.043	0.023	0.007	-0.038	0.039	0.006
Portuguese*Enclave	0.022	0.015	0.031	0.041	0.027	0.023
Sri Lankan*Enclave	-0.041	0.064	0.006	0.069	0.087	0.006
Ukrainian*Enclave	-0.055	0.056	0.001	-0.152	0.096	0.000
Vietnamese*Enclave	-0.016	0.074	0.000	0.056	0.113	0.000
Exclusion Restriction						
New Child				0	0	0.278
Correlation Coefficient ρ (Std. Error)				0.367 (0.088)		
Observations		85,135		Censored	43,537	
				Uncensored	41,598	
Ownership Rate	Obs.	0.710			0.629	
	Pred.	0.790			0.618	
Likelihood Function	Baseline	-32,902			-71,991	
	Full Model	-32,697			-71,843	

Note: Baseline Model fit information refers to models (not shown) without any neighbourhood ethnicity characteristics.

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