The Geography of an EthniCity: Residential Segregation of Birthplace and Language Groups in Sydney, 1996

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ABSTRACT *Many contemporary cities have a diverse ethnic-cultural mix as a result of different international migration streams, with implications for the residential distribution of various ethnic groups within those cities. Boal recently suggested a series of scenarios against which the pattern in any one place could be evaluated. These are applied to Sydney in 1996, when over 34 per cent of the residents reported a birthplace outside Australia and 30 per cent reported using a language other than English at home. Lacking data on ethnic status, the birthplace and language data are used to explore Sydney's residential geography at two spatial scales, and to identify the degree of residential segregation of each birthplace and language group. Regression analysis, used to assess the relevance of human capital to observed levels of segregation, suggests that Boal's assimilation scenario accounts for most of the observed geographies, with some additional pluralism but little evidence of polarisation. These results suggest that the dynamics of Sydney's housing market facilitate movement into most areas of demand, subject only to labour market constraints; differential access to sections of the labour market, and hence to housing market sections, is a major factor in the residential segregation of birthplace and language groups in Sydney.*

KEY WORDS: ethnicity, segregation, Sydney housing market, labour market, disadvantage

Introduction

Analysis of housing markets in the context of urban social inequalities was first attempted in Rex & Moore's (1967) pioneering work. Much of the subsequent debate over unequal access to housing has polarised between a neo-Weberian viewpoint, maintaining that the housing market generates inequalities which transcend those of the labour market (e.g. Saunders, 1978), and a neo-Marxist position, which regards inequalities in housing market access, and hence housing or social area segregation, as deriving entirely from those in the labour market (e.g. Harloe, 1984). In addition, analysts have identified a major subset of housing segregation processes affecting migrant groups: European research into unequal access to the housing market among minority groups includes both cultural and historical factors, for example, whereas American studies focus on

socio-economic status, even in the case of the residential segregation of African-Americans (Huttman, 1991).

Residential segregation within cities thus reflects housing market operations and appreciation of its production provides insights to the housing and other problems experienced by both social class and minority groups, although some claim that spatially-segregated communities offer positive advantages to migrant communities in certain circumstances, providing communal foundations for building economic success (see Bolt *et al.*, 1998). The experience of minority groups has been a major focus of many studies, illustrated in recent special issues of *Tijdschrift voor Economische en Sociale Geografie* (1997) and *Urban Studies* (1998). EthniCities (Roseman *et al.*, 1996, p. xvii) are a recently recognised phenomenon comprising major population centres, mostly in the developed world, whose populations have a very diverse cultural mix based not only on long histories of migration but also recent changes reflecting globalisation. Their degree of cultural pluralism reflects that diversity, with minority communities sustaining their separate identities while participating in a complex economic structure. Part of this diversity is shown in their geographies, in the extent to which various ethnic groups experience housing segregation. This paper analyses that segregation pattern in a paradigm EthnicCity—Sydney.

The Causes of Segregation

Intra-urban ethnic group segregation results from a variety of processes and varies in its extent. It is imposed *on* some groups, which are entirely restricted to certain areas only (as under *apartheid* in South Africa); elsewhere, segregation may be substantial, because of discriminatory practices in labour and housing markets, but not absolute (what Massey & Denton, 1988, 1989, 1993, term 'hypersegregation'; see also Young, 1999). Other patterns of segregation reflect choices *within* the migrant groups themselves, at least some of whose members choose to live relatively apart from others either to sustain their cultures (as with Jewish people in Sydney: Burnley, 1995, p. 177) or from a desire to reduce the insecurity they would feel sharing areas with other groups. In yet other cases, there is neither imposed segregation nor voluntary separation but rather constrained choice in the housing market. This limits groups to certain areas only (almost invariably those with relatively cheap and undesirable housing) because of their success or otherwise in the labour market, in which cases their segregation reflects their socio-economic rather than their ethnic status, their human capital (represented by their educational and linguistic qualifications) and the occupations and incomes which they can attain (Forrest & Johnston, 1999). The spatial separation of the latter groups should lessen over time; as they build human capital and succeed in the labour market, more of the housing market should be open to them (Jones, 1996).

Boal (1999) identified a number of scenarios affecting the social dynamics of ethnic relations that might emerge in EthniCities. One—*annihilation* or expulsion (ethnic cleansing)—is irrelevant in most contexts, including that studied here. The other four are:

(1) *Assimilation*: economic, cultural and other differences between an ethnic group and the wider population disappear over time, accompanied by declining levels of residential segregation, "difference reduces and social and

spatial boundaries dissolve" (Boal, 1999, p. 588); certain types of assimilation, notably economic, may proceed more rapidly than others, however, with implications for the speed of spatial boundary dissolution.

(2) *Pluralism* is a process whereby groups (or some of their members) maintain their separate cultural identity, which thereby "encourages group diversity and the maintenance of group boundaries" and sustains spatial segregation.

(3) *Segmentation* involves much sharper spatial divides, with various ethnic groups occupying distinct areas because of antagonism both among groups and between each group and that section of the wider society where assimilation has been the norm. In this scenario, Boal (1999, p. 590) contrasts the "deteriorating inter-ethnic relations where … insecurity and mistrust characterise relations" with the "mild separations of pluralism".

(4) *Polarisation* is an extreme case of segmentation, where local divisions, perhaps reflecting wider inter- and/or intra-national conflicts, result in a fractured, even dichotomised social environment involving the virtual exclusion of a group's members from many areas and their almost exclusive occupancy of defined 'ghettos' (see Peach, 1996).

Boal suggests a continuum from polarisation through segmentation and pluralism to assimilation. Individual ethnic groups do not all enter a city at the same point on the continuum, however, and their degree of segregation may reflect economic and cultural circumstances at time of entry.

Full testing of these ideas requires comparable data sets over a sequence of decades, charting the changing economic status and residential pattern of individual groups, but some evaluation is possible using cross-sectional data, as in this paper on Sydney which focuses on three main issues:

(1) Establishing the residential segregation for a variety of birthplace and language-use groups there;

(2) Exploring whether the scale of spatial unit employed has a significant impact on the measurement of spatial segregation; and

(3) Using human capital theory to account for segregation levels, and the deviations from the models to suggest the importance of cultural and other influences in the context of Boal's scenarios.

Migration, Multiculturalism and EthniCities in Australia

Australia is a quintessentially immigrant nation, with the initial streams from the UK and north-western Europe followed by large numbers emigrating from southern and then eastern Europe. After abandonment of the 'white Australia' policy in the early 1970s, migrants were quickly accepted from a wide range of Asian, South American, African and Pacific origins. Various schemes currently operate for: (1) business migrants offering investment potential; (2) those wishing to settle in Australia; (3) refugees; and (4) family reconstitution. As the country's largest metropolitan area, Sydney is a major destination; at the 1996 Census over 31 per cent of its residents were born outside Australia.

Official attitudes to the absorption of these changing migrant streams went through several stages (Williams & Batrouney, 1998, p. 261). By 1964 a policy of 'assimilation' had been replaced by 'integration', whereby immigrant groups were expected to become part of the host society without necessarily losing their separate identity. With the ending of the 'white Australia' policy in about 1973,

a 'multicultural' policy was introduced. This gives individual groups the rights to retain and express their cultural identities, and to social justice and equal opportunity, within a framework of fully utilising the economic potential of all Australians. The outcome is a society whose sense of solidarity transcends national and ethnic affiliations, realised through cultural and political democracy (Smolicz, 1995): most newcomers' wishes for naturalisation are granted (and it is automatic for their Australian-born children), for example. There are few 'resident aliens' as a consequence and no major ethnic political movements; race and religion have not been the bases for exclusionary practices, although there has been some conflict over the designation of English as the sole 'national language'. There was some challenge to this in 1998 by the Australia First Party, which promoted immigrant repatriation policies, but after a brief period of success it was roundly defeated in the federal elections at the end of the year. Thus most Australians share a 'civic identity' with its nation-state, but within that overarching set of shared values live in a mosaic of culturally-diverse communities.

Perhaps because of the very wide variety of immigrants accepted into Australia since the early 1970s (the 1996 Census recorded some 241 separate languages and 277 separate birthplaces, Australian Bureau of Statistics, 1996) Sydney, and Australian cities generally, have among the lowest levels of ethnic group segregation in the Western world (Poulsen *et al.*, 2001). There is little overt discrimination. Instead, the migrant experience is dominated by occupational differentiation within the labour market (Forrest & Johnston, 1999), with some groups relatively economically disadvantaged. For many immigrants, especially those from non-English-speaking backgrounds, 'successful immigration is very often about success in the labour market' (Wooden, 1994, p. 218). With rising unemployment since the mid-1970s, associated with economic restructuring and increased global competition, prospects for such 'successful immigration' have deteriorated sharply, with potential implications for their ability to compete in the labour and hence the housing markets. Since Australian housing markets operate on market principles (with a small amount of public housing), those on lower incomes are less able to compete for homes in many parts of the city.

During and after three periods of recession in 1974–75, 1982–83 and 1990–94, unemployment rates among migrants from non-English-speaking backgrounds (NESB) were higher, and rose more quickly, than for those born in Australia or from English-speaking background origins (Brooks & Williams, 1995). Furthermore, recovery after each recession took increasingly longer for NESB migrants. This especially affected refugee migrants and most recent arrivals (Forrest & Johnston, 2000). Given recent changes to federal welfare policy, limiting benefits to newly-arrived immigrants, there is an increasing link between migration, social polarisation and occupational structures not altogether different from the situation in the US (Baum, 1997) or, as Burgess (1996, p. 100) puts it in the Dutch context, "the urban population is not only divided in terms of employment, but also in terms of ethnicity".

Labour and housing market operations strongly influence ethnic residential segregation in all countries, especially those where particular housing market sectors have over- and under-concentrations of certain ethnic groups. In Australian cities, two sectors of the private housing market, housing for rental from private landlords and housing for sale, predominate, and there is only a very small (residual) state housing sector (occupied by just 6 per cent of Sydney's

households, for example). Access to the owner occupier sector, for those with insufficient capital to make outright purchases, is by loans from banks and other financial institutions, which have historically been lower than commercial rates, though a Reserve Bank report (Lowe, 1995) shows that the interest rate for commercial (rental) properties as against interest on mortgages is currently about the same.

The economic and social advantages of home ownership accrue via horizontal redistribution of income from working to retirement years (Winter & Stone, 1999, p. 59) through purchase of an asset which appreciates over time, as opposed to increases to home rentals which accrue to the owner, not the renter (Neutze, 1981). This is enhanced by the absence of any death or capital gains tax on the family home. There is a suggestion that in Australia migrants are increasingly accessing the limited supply of public (government welfare) housing (Williams & Batrouney, 1998, p. 265), but this may ultimately result in their social (and spatial) polarisation because fewer families are presently making the expected change from public rental to owner occupancy. Some migrant groups are substantially under-represented in the state housing sector, however, whereas others are substantially over-represented. Very few of those born in Greece, Italy and Hong Kong live in state housing, for example, whereas high percentages of households from Lebanon, the Philippines and Sri Lanka occupy such housing. Similarly, whereas just 25 per cent of the Australian-born live in privately-rented homes, the percentages for Indonesians, Sri Lankans and Chinese are 66, 57 and 54 respectively, compared to 16 for Greeks and Italians. Increases in the number of lower income households (including many recently arrived migrant families) are coinciding with rising real housing costs (Burke, 1998). The consequence could well be the negation of the temporary nature of (low income) migrant enclaves anticipated by Jones (1996).

Studying Ethnicity in Sydney

Sydney is a paradigm EthniCity, therefore. It is divided in terms of its population's national and cultural origins, but is it also fractured spatially? Is it a segmented, even polarised, city with clear spatial boundaries and segregation of some, if not all, of the migrant groups, or is its residential geography characterised by pluralism and assimilation? Burnley's (1999) analysis of 1991 Census data suggests the latter for most ethnic groups. This paper uses more up-to-date and comprehensive data sets. Unfortunately, the Australian Census contains only indirect measures of ethnicity, and its small-area data do not cover the full range of ethnic groups. Nevertheless, the data are very rich and, with the caveats introduced, allow us to paint and appreciate Sydney's residential geography in considerable detail.

The Australian Census collects no direct information on ethnic identification/ status. Its information on residents' birthplace is an imperfect indicator, because it omits immigrants' descendants, who may identify strongly with their parents' ethnic status (Hugo, 1996, p. 55). Furthermore, a single birthplace (invariably a country) may incorporate individuals whose ethnic status is not linked to that country (as with Tamils from Sri Lanka) as well as including people who no longer identify with their country of birth. Thus birthplace data provide only a general picture of the residential concentration of ethnic groups. A further surrogate for ethnic identity is language used at home: people who normally use

a language other than that of the country in which they are resident arguably continue to identify strongly with their home culture, especially if they are well-established immigrants (Fishman, 1972). The 1996 Australian Census included questions on both indices, asking:

> In which country was the person born?

And

> Does the person speak a language other than English *at home*? If more than one language, indicate the one that is spoken most often.

This paper compares the geographies of birthplace and language in the Sydney metropolitan area at two scales. The first dataset was specially compiled from the 1996 Census for the New South Wales Health Research Consortium and includes information for 111 birthplaces and 80 languages spoken at home, with some cross-classification of the two. These data are not available at fine-grained spatial scale, however, so our analyses use the 45 constituent local government areas (LGAs) of the Sydney Statistical Division (SSD) as defined by the Australian Bureau of Statistics (ABS; Figure 1). Their average population of some 82 000 precludes detailed investigations of the geography of ethnicity; we can only explore the congregation of birthplace and language groups into the metropolitan residential mosaic's major administrative divisions. High levels of segregation at this scale imply substantial spatial separation, but lower indices could conceal degrees of residential separation inaccessible through such data. (Ethnic enclaves are unlikely to correspond with such administrative divisions and their identification is problematic in parts of Sydney because the LGAs, defined in the early 20th century, increase in area and population with distance from the city centre. Thus in suburban areas two migrant groups could be highly segregated from each other yet still be concentrated in the same LGA; near to the city centre, they are more likely to live in separate LGAs.)

The second dataset refers to the Sydney Urban Centre Location (UCL), for which the ABS releases data by collector's districts (CDs), the 5574 small areas used for census administration in 1996, with an average population of 548. The UCL is smaller by some 417 000 residents than the 45 LGAs, four (Blue Mountains, Gosford, Hawkesbury and Wyong, see Figure 1) of which are excluded entirely from the UCL, as are some rural parts of other outer suburban divisions. Only 32 separate birthplaces and 26 separate languages used at home are reported for these areas, so that although they offer a much finer-grained insight to the geography of ethnicity in Sydney they cannot display the full variety of the metropolitan multi-cultural complexity.

The analyses rely on two well-established measures of residential congregation (or unevenness: Massey & Denton, 1988). The *index of dissimilarity* between two groups indicates the percentage of one group's members who would have to move to other areas in order for the two relative distributions to be the same. The *index of segregation* similarly indicates the degree of movement necessary for one group's relative distribution across the constituent areas to be the same as that for the rest of the population.

There is a massive literature on these two indices since they were first suggested by Duncan & Duncan (1955). Many alternatives have been suggested, but the original indices suffice for our goal of mapping relative levels of spatial congregation. Poulsen & Johnston (2000) have opposed their use for tests of
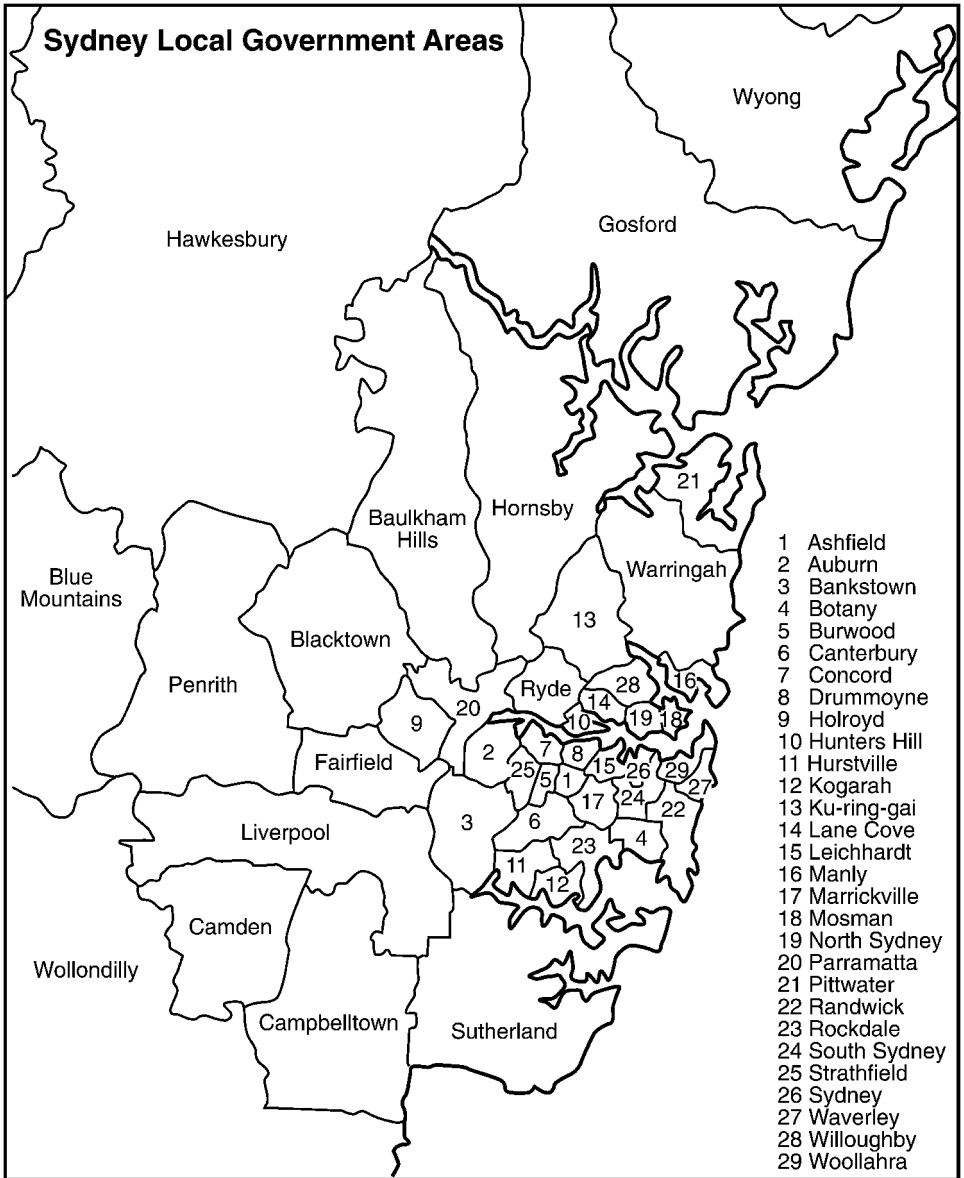
Sydney Local Government Areas

Wyong

Hawkesbury

Gosford

Baulkham Hills

Hornsby

21

Warringah

Blue Mountains

Blacktown

13

Penrith

9

Ryde

20

28

16

14

10

19 18

Fairfield

2

7 8

25 5 1

15 26 29

27

17 24 22

3

6

23

4

Liverpool

11

12

Camden

Wollondilly

Campbelltown

Sutherland

1 Ashfield
2 Auburn
3 Bankstown
4 Botany
5 Burwood
6 Canterbury
7 Concord
8 Drummoyne
9 Holroyd
10 Hunters Hill
11 Hurstville
12 Kogarah
13 Ku-ring-gai
14 Lane Cove
15 Leichhardt
16 Manly
17 Marrickville
18 Mosman
19 North Sydney
20 Parramatta
21 Pittwater
22 Randwick
23 Rockdale
24 South Sydney
25 Strathfield
26 Sydney
27 Waverley
28 Willoughby
29 Woollahra

Figure 1. The local government areas.

enclave/ghetto models with fine-grained data, suggesting absolute as against relative measures of spatial separation (see also Poulsen *et al.*, 2000). For the present purposes, however, the indices provide valuable insights into relative segregation which the absolute measures could not do for the analyses conducted for the LGAs at the SMA scale.

The expectations of this study are not readily expressed as formally-testable hypotheses. A high segregation index for a group, along with high levels of dissimilarity between its geography and that of many (most) of the other groups, can be consistent with several (possibly all) of Boal's four scenarios. Both segmentation and polarisation processes should be associated with high levels of

segregation; groups which are discriminated against and/or which feel threat-ened should be substantially segregated from others. But this might also occur with the other scenarios. Under pluralism, for example, members of a group may choose to live in separate areas in order to sustain their culture, even though they are economically assimilated. Under the assimilation model, the degrees of separation and assimilation should be consonant, perhaps reflecting how long the group has been in the city; those still concentrated in low-skill, low-paid occupations (many of them possibly recent arrivals who have yet to become fluent in English) will be more concentrated in certain residential areas than those with an occupational profile more in line with the city-wide pattern. All we have done, therefore, is: (a) measure the level of residential segregation for each group; (b) associate these measures with other variables to test whether they are linked to the groups' degree of economic and social assimilation; and (c) interpret the results against the four scenarios and other information about the groups.

Higher levels of segregation were anticipated for the language than the birthplace groups, as the former is generally a more meaningful index of ethnic identification than birthplace. Substantial variations were also anticipated in the level of segregation, reflecting both differences in the extent of any assimilation that has taken place and differences in the degree to which various groups' members wish to live in a culturally plural rather than an assimilated society. Migrants from northern and western Europe should be least segregated, there-fore. Many southern Europeans have also been in Australia for some time, notably Greeks, Italians and Maltese. Some argue however that, as with the Greek- and Italian-American communities in US cities, they have adopted a pluralist position, with many preferring to remain in spatially-defined communi-ties where their language is commonly used and their culture sustained through a variety of institutions and media (Burnley, 1999; Hugo, 1996). Most of the other migrant groups comprise relatively recent arrivals and, except those who en-tered under business migrant schemes, are less economically and culturally assimilated and so likely to be more segregated residentially. Some, including the significant refugee streams, may feel insecure, even threatened, in their new environment and be more segregated as a consequence, especially if that uncertainty is reciprocated by other, more powerful groups within Sydney society.

Ethnic Segregation at the Local Government Scale

This study reports on the segregation of 110 birthplace groups (the smallest, the Australian External Territories and Antarctica, with only 78 residents in Sydney, is excluded) and 71 separate language groups. The number of groups is smaller than the total listed in the ABS catalogue. Some are not included by the ABS in the source file used here—presumably because of their small size; others are amalgams (e.g. Other South European) which have been excluded. Each group's size and its index of segregation is given in Appendices 1 and 2, ordered according to their level of segregation.

Birthplace Groups

Of the 3 705 728 respondents in the 45 local government areas who reported

their birthplace in the 1996 Census, 65.3 per cent reported being born in Australia: of these, 32 547 were of either Australian Aboriginal or Torres Strait Islands origin (i.e. indigenous Australians). The remaining 108 groups range from 104 born in Eritrea and 156 in Vanuatu to nearly 160 000 born in England.

The mean index of segregation for the 110 groups is 35.5, and the standard deviation 16.4. Only 18 indices are below 25 and, excepting those born in Australia (other than Aboriginals and Torres Strait Islanders), none is below 10. The least-segregated groups comprise six where the home language of the great majority is English (the four UK countries, New Zealand and the Republic of Ireland) and 11 in northern Europe, plus Kenya and Papua-New Guinea, many of whose emigrants to Australia were probably both English-speaking and white. These findings are consistent with expectations regarding social assimilation.

Not surprisingly, given the scale of analysis and the heterogeneity of some birthplace categories (such as the various Chinese linguistic groups), there are relatively few groups with high indices. Only 14 exceed 50, including six over 60 and two over 70 (Burnley, 1999, suggests that indices below 80.0 indicate little detailed segregation, by which it is assumed he means the equivalent of polarisation in Boal's scenarios). The great majority comprise birthplaces from which large numbers of refugees have recently moved to Australia, Afghanistan, Armenia, Cambodia, El Salvador, Eritrea, Ethiopia, Iraq, Laos, Macedonia, Nicaragua and Vietnam. Thus those living most apart from the remainder of the population are groups many of whose members had only arrived in Australia relatively recently, in difficult circumstances with few resources. They occupy Boal's segmentation enclaves, from which they might move with economic assimilation and improving inter-ethnic relations.

The most segregated groups are not all concentrated in the same parts of Sydney. Those born in Japan, El Salvador, Eritrea, Ethiopia and Nicaragua have similar indices of segregation, for example, but the indices of dissimilarity between those born in Japan, for example, and those from the other four countries are 85.8, 78.3, 69.0 and 84.3 respectively. Many of the Japanese are business migrants who live in high-status areas on Sydney's North Shore in proximity to a school which uses the Japanese language. With the three birthplace groups from former Indo-China, on the other hand, the dissimilarity indices between the Vietnamese and those from Cambodia and Laos are only 35.5 and 40.5; that between those from Cambodia and Laos is 22.2. Three-quarters of those born in Cambodia live in Fairfield, for example (Figure 1), as do 57 per cent of those born in Laos, and 42 per cent of those born in Vietnam. (On Vietnamese in that part of Sydney, see Dunn, 1993, 1998.)

Language Groups

Thirty per cent of respondents reported using languages at home other than English. Apart from the 2.6 million who normally spoke English, 123 000 spoke Arabic and 102 000 Cantonese, c.85 000 of each spoke Greek and Italian, and nearly 55 000 spoke Vietnamese. There were many small groups too, with 16 having less than 1000 members (Appendix 2); the smallest was the 72 Belorussian speakers.

The mean index of segregation for the 71 groups exceeds that for the birthplace groups, at 42.6, with a standard deviation of 13.9. Appendix 2 shows

10 indices below 29 and 14 over 57. In comparative terms, therefore, those who speak languages other than English at home are somewhat more segregated than those born outside Australia, and a larger number of language than birthplace groups had indices above 60 (11 of the 71 compared with 6 of 111).

The least-segregated language groups are English plus eight (mainly northern) European languages and Afrikaans. Most of the 14 indices above 57 are for Asian languages, eight, such as Pashto (the official language of Afghanistan), Tetum (spoken in East Timor) and Hmong (a Laotian hill tribe language), having less than 1000 recorded speakers, although two others (Macedonian and Vietnamese) involve much larger populations; both of the latter include substantial numbers of recent refugees, suggesting that they occupy segmentation enclaves. Some groups have fairly similar distributions to others across the 45 areas. The average index of dissimilarity among the Hmong, Khmer, Vietnamese and Lao speakers, for example, is 29 (76 per cent of the Hmong-speakers live in Fairfield, as do 73 per cent of the Khmer-speakers, 54 per cent of the Lao-speakers and 43 per cent of the Vietnamese). Others live apart from language groups which are also highly-segregated: the average index of dissimilarity between the small population of Yiddish-speakers (54 per cent of whom live in Waverley) and the four Asian groups just discussed is 96.

Comparing Birthplace and Language Segregation

Are the two sets of segregation indices related? Matching the two datasets is not straightforward: some languages (such as Spanish) dominate in a number of countries whereas others (such as Tamil) are minority tongues in two or more, and some countries have several popular languages. A total of 37 cases were identified with very substantial overlap between the country of birth and the language: the language predominates in that country and nowhere else. The correlation between the two sets of indices was high (r^2 0.91), with higher indices of segregation for the language-speakers than for those from the specified birthplace, and no significant outliers. The two geographies appear to be very similar, but non-English-speakers are on average spatially more segregated, suggesting the importance of cultural differences.

Language and Birthplace

The dataset separately identifies different birthplaces for 20 language groups: for 14, it distinguishes those who speak the language at home and were born in Australia from those born elsewhere; in the other six (Portuguese, Spanish, Arabic, Cantonese, Mandarin and Other Chinese languages) several birthplaces are identified. For these ethnic groups, therefore, the joint impact of the two ethnicity measures can be explored. The segregation indices are in Appendix 3.

For most of the pairings, dividing a language group into those born in Australia and those born elsewhere, the difference between the two indices of segregation averages only 6.1 points: only three (for Lithuanian, Russian and Estonian) exceed 10. In most cases, therefore, there is little difference between the geographies of those from a particular birthplace speaking their language at home and those born in Australia who do so (many of whom are probably children of non-Australian-born, still living in the parental home), the index of dissimilarity between the two Italian groups is only 5.95, for example. For the

Lithuanian-, Estonian- and Russian-speakers, on the other hand, the respective indices of dissimilarity for those born in and outside Australia are 37.4, 57.6 and 34.0, suggest that in these cases the long-established cohorts have few links with more recent migrants, perhaps reflecting political and other tensions in their homelands,

Among the language groups with several separate birthplaces, the indices of segregation for Spanish-speakers born in Australia, Spain and elsewhere (most of whom come from Latin America) differ only slightly. For Portuguese-speakers, however, the index of segregation for those born in Portugal is 17 points higher than for those born in Brazil. (The index of dissimilarity between those two distributions is 47.4; Portuguese-speaking refugees from Timor are concentrated in Waverley, for example; migrants from Portugal are concentrated in Marrickville and Canterbury, an inner suburban area of low- to middle-income housing which has long had major migrant concentrations.) Among those speaking Arabic at home, there is a much larger index of segregation for those born in Australia than those born in North Africa, with those born in the Middle East very close to the Australian figure (the index of dissimilarity between the latter two is 4.4).

Finally, indices of segregation for the three Chinese languages show substantial internal variation, with differences up to 30 points. In each case, the highest index is for those born in Vietnam, many of whom have migrated to Australia as refugees, whereas many of those from Hong Kong, Malaysia and China itself entered as business migrants. Thus 41 per cent of those born in Vietnam and speaking one of the three Chinese languages at home live in Fairfield, as do 43 per cent of those speaking Vietnamese at home. Birthplace appears to be more important than language in accounting for their segregation. Of those born in China and speaking Cantonese, Mandarin or another Chinese language at home, on the other hand, only 7 per cent live in Fairfield, as do just 1.2 per cent of those born in Hong Kong and 3.0 per cent of those born in Malaysia.

Over 160 000 Sydney residents reported speaking a Chinese language at home in 1996. The indices of segregation for the three main groups are all below the metropolitan average, but when categorised by place of birth as well as language spoken a complex multi-cultural geography emerges. This is illustrated by the average index of dissimilarity for each row of the 18×18 matrix of indices for the various Chinese language-by-birthplace groups, i.e. the average index between each of those groups and the 17 others (Table 1). None is below 30, and eight exceed 40. The various Chinese language-birthplace groups have very different geographies from each other, substantially so in some cases, the average index of dissimilarity between those born in Vietnam on the one hand and those born in Hong Kong and Malaysia on the other is 72.6. This suggests a considerable degree of pluralism, of voluntary residential separation on cultural grounds, among many of Sydney's Chinese migrant communities; common language alone does not result in common residence.

Ethnic Segregation at a Fine Spatial Scale

Whereas the bespoke dataset contains information on a large number of birthplace and language groups, the data at the collector's district (CD) scale, areas with an average population of some 550, cover only 32 separate birthplaces and

Table 1. Average indices of dis-
similarity, local government area
scale: Chinese language groups
by birthplace

Cantonese	
BPL: Australia	30.50
BPL: China	33.17
BPL: Vietnam	49.21
BPL: Hong Kong	38.56
BPL: Malaysia	36.44
BPL: Other country	30.55
Mandarin	
BPL: Australia	32.17
BPL: China	37.00
BPL: Vietnam	46.71
BPL: Hong Kong	41.51
BPL: Malaysia	40.23
BPL: Other country	36.36
Other Chinese	
BPL: Australia	37.95
BPL: China	36.34
BPL: Vietnam	53.63
BPL: Hong Kong	41.36
BPL: Malaysia	41.20
BPL: Other country	41.92

26 language groups, with no cross-tabulation of the two. There is much greater geographical detail but less information on separate groups.

Given a ratio of some 130 CDs to every local government area, the indices of segregation are unsurprisingly on average much higher at the former scale (Appendices 1 and 2). The means at the CD scale are 55.2 for birthplace groups and 61.9 for language groups, some 20 points higher than at the local government area scale. The two datasets are not directly comparable, however, because of both the greater number of observations at the large scale and the incommensurability of some categories. Among birthplaces, for example, data are available at the LGA scale for England, Scotland, Wales and Northern Ireland, but only for the UK as a whole at the CD scale, whereas the Australian Aboriginal and Torres Strait Island populations are separated out at the smaller but not the larger scale. Among the language categories, there are no data for 'Total Chinese' at the local government scale. For comparable datasets, the mean indices are:

	LGA	CD
Birthplaces (29)	33.2	55.2
Languages (25)	36.5	62.6

The index of segregation exceeds 50 for the majority of birthplace groups (Appendix 1): least segregated by far are those born in the UK, Australia itself (other than those of Aboriginal and Torres Strait Island origin), and New Zealand; most segregated are the Torres Strait Islanders and the small group of Serbians. The most segregated birthplace groups are generally those whose culture differs substantially from the Anglo-Australian, except for the

unexpectedly high index for the c.6000 born in Canada. Most East and Southeast Asia groups, which include substantial numbers of recent business migrants, have relatively low indices of segregation, however, suggesting relatively immediate assimilation; the exceptions are those from Singapore and Sri Lanka. The issues relating to spatial scale and the varying size of LGA with distance from the city centre are illustrated by comparing the birthplace segregation indices. The Vietnamese are concentrated in a large suburban LGA, Fairfield, and have a very similar index at each scale. The Canadians, Hungarians, Irish and Serbians, on the other hand, are concentrated in the smaller inner city LGAs, and have much higher indices at the CD than the LGA scale.

The great majority of language spoken at home groups have segregation indices above 50, with the English-speaking majority a clear exception. The most segregated include several which include substantial numbers of recent refugees (Macedonian and Vietnamese speakers, for example) but also those speaking Netherlandic (many of whom live in market-gardening areas on the metropolitan fringe). The highest index is for the very small group who normally speak Australian Indigenous languages at home. There is a slight negative relationship between group size and segregation (r^2 0.22); smaller groups have higher indices. (The correlation for birthplace groups is 0.16.)

As well as being segregated from the remainder of the population, most groups have a very different residential pattern from each other. The most segregated birthplace group, those born in Serbia, has only two indices of dissimilarity below 80; 77 with those born in Chile and 70 with those born in Vietnam. Even the least segregated group, those born in the UK, had an average index of dissimilarity with the other groups of 60 (and indices as high as 84, 88 and 93 with the three most segregated groups respectively). The average index of dissimilarity is 74.5 indicating that the residential patterns of the various groups are very different.

The same is the case for the language groups; the two most segregated groups have residential geographies almost totally different from all of the other 25. The average index of dissimilarity for those speaking Australian Indigenous languages at home is 97.5 and that for those speaking Malay is 94.0. The average

Table 2. Indices of dissimilarity between comparable birthplace and language groups: collector's district scale

Croatia	Croatian	25.33
Germany	German	35.16
Greece	Greek	15.35
Hungary	Hungarian	41.03
Indonesia	Indonesian	32.88
Italy	Italian	12.21
Macedonia	Macedonian	15.75
Malta	Maltese	26.61
Netherlands	Netherlandic	53.07
Philippines	Tagalog	13.99
Poland	Polish	26.62
Vietnam	Vietnamese	13.53

index for those speaking English at home is 66.7, and 71.2 for those speaking German.

Segregation at the Two Scales Compared

Are the segregation variations consistent across the two scales, and does changing the scale assist in our appreciation of the relative salience of Boal's four scenarios? The indices at the collector's district scale were regressed against those for the comparable groups (29 birthplaces; 25 languages spoken at home) by local government area; the equations are Model I in Table 3.

Only half of the variation in segregation of birthplace groups at the CD scale is accounted for by segregation at the LGA scale, and just 15 per cent in the case of language spoken at home. A group's segregation at the larger scale is a poor predictor of its segregation at the smaller. Inspection of residuals suggests two possible reasons for this: that the smaller groups are more segregated at the CD scale; and that there is a curvilinear relationship, especially for the language groups. Model II incorporates the former point, with group size (in 000s) as a further independent variable; it increases goodness-of-fit to 0.80 for birthplace groups and 0.50 (more than a threefold increase) for language groups. For both, therefore, the larger the group the lower its index of segregation at the CD scale, whatever its segregation at the LGA scale; small groups concentrated into a relatively small number of Sydney's local government areas are also more concentrated into smaller areas within those larger units than is the case with the bigger groups. Inspection of Model II residuals shows non-linearity in both cases. For birthplace groups, this is for the most segregated only; for the language groups it occurs at both extremes of the segregation scale. We have re-estimated the regressions fitting curvilinear (power) rather than linear relationships. Although these increased the goodness-of-fit statistics for the Model I equations (to 0.62 for birthplace groups and 0.27 for language groups) the pattern of residuals remained the same.

Accounting for Ethnic Segregation

Having described the ethnic segregation in Sydney at two spatial scales and by two surrogate measures, birthplace and language, this final section seeks accounts for the variations identified. The model tested derives from human capital theory, widely used to account for the occupational patterns of birthplace

Table 3. Regressions of indices of segregation at the two scales: segregation at the CD scale is the dependent variable

	Birthplace		Language	
Model	I	II	I	II
Constant	31.45	37.14	45.51	47.52
Regression coefficients				
Segregation – LGA	0.74	0.89	0.47	0.77
Group size (000s)		− 0.45		− 0.73
R^2	0.48	0.80	0.15	0.50

groups in Australia as a whole (Forrest & Johnston, 1999, 2000). Those groups best able to compete in the Australian labour market should be least segregated spatially, at both scales, which is consistent with Boal's assimilation scenario; they are most likely to be assimilated culturally and residentially as well as economically. Any deviations from such general relationships should indicate groups that are more or less segregated than expected, suggesting the operation of cultural and other factors, either in society as a whole (the segmentation scenario) or within the group itself (the pluralism scenario).

The census measures used, and their relevance to the model, are (summary data are given in Table 4):

Table 4. Summary data for variables used in regression analyses

	Birthplace		Language		B&L
	LGA	CD	LGA	CD	LGA
Post-1990					
Minimum	1.0	1.0	0.7	0.7	0.0
Maximum	63.9	39.9	79.3	41.9	44.0
Mean	22.0	17.9	23.6	23.6	12.0
Standard deviation	15.3	12.2	18.1	18.1	13.6
Unemployment					
Minimum	1.0	4.7	0.1	5.8	0.0
Maximum	36.6	23.1	52.4	25.2	31.6
Mean	11.4	9.1	13.4	11.2	11.7
Standard deviation	7.1	4.7	8.5	5.5	5.9
Low Income					
Minimum	8.7	11.7	13.0	16.7	14.6
Maximum	65.8	48.8	70.4	51.7	62.4
Mean	34.3	30.7	37.9	36.5	36.3
Standard deviation	12.2	10.6	11.9	8.9	12.4
Good English					
Minimum	14.4	14.4	11.5	11.5	12.7
Maximum	99.9	99.9	95.8	90.5	100.0
Mean	63.8	67.6	54.5	51.9	60.0
Standard deviation	25.0	26.3	23.6	21.4	27.6
Education Qualification					
Minimum	26.1	52.3	53.3	53.3	42.2
Maximum	87.9	87.7	80.4	80.4	88.2
Mean	67.3	69.1	65.9	65.9	60.0
Standard deviation	12.1	10.7	7.8	7.8	11.3
Group Size (000s)					
Minimum	0.1	2.4	0.1	1.4	0.1
Maximum	158.4	66.9	122.1	122.1	56.1
Mean	10.6	24.9	13.7	33.7	11.3
Standard deviation	20.0	18.6	24.2	33.7	14.8
Index of Segregation					
Minimum	10.9	26.9	12.3	12.3	27.8
Maximum	73.8	89.5	83.3	66.7	65.8
Mean	36.1	56.3	43.4	38.3	42.0
Standard deviation	13.3	12.6	16.0	12.4	9.3

(1) *Recency of arrival*. The longer a group's members have been in Australia, the greater their economic and cultural assimilation should be and the smaller their desire to congregate in relatively separate residential communities. The chosen variable is the percentage of each group's members who arrived in Australia after 1990: the higher the percentage, the higher the expected level of segregation.

(2) *Employment status*. Getting a job is the first stage of economic assimilation, so the higher the level of unemployment among the male population aged 15 and over, the higher the expected level of residential segregation, reflecting both labour market disadvantage and the (probable) role of cultural communities in providing support for the disadvantaged.

(3) *Low income*. For those in employment, economic and cultural assimilation is likely to be less among those with low incomes, measured here as the percentage of family incomes below $A32 000 per annum, the higher this figure, the higher the expected level of segregation.

(4) *Good English*. The better the average level of English (on a self-response proficiency scale ranging from very good to not at all) the better the ability to compete in the labour market, leading to both economic and cultural assimilation and, it is anticipated, lower levels of residential segregation, even among those who choose to speak another language at home.

(5) *Educational qualifications*. Those with qualifications are better able to compete in the labour market; it is measured here as the percentage of those in the labour force reporting either a degree or a vocational qualification, the higher the percentage, the lower the expected level of segregation.

(6) *Group size*. The larger the group, the smaller the need for pluralist communal solidarity (ceteris paribus) and so the lower the expected level of segregation: group size is measured here in thousands.

Stepwise multiple regressions using these six independent variables were conducted for five different datasets, segregation by birthplace at the two spatial scales; segregation by language used at home at the two scales; and segregation by both birthplace and language used at home at the LGA scale only. (In the analyses of birthplace data, those born in Australia are omitted; in those of language, those whose native language is English are omitted, as are those speaking Australian Indigenous languages.)

Of the five regressions (Table 5), only two resulted in substantial R^2 coefficients. The highest is for birthplace at the LGA scale: segregation was higher the larger the percentage who had arrived recently and the higher the percentage of males unemployed; it was lower, the higher the percentages who reported excellent proficiency with English and who had educational qualifications. This suggests a clear relationship between economic and social assimilation, on the one hand, and residential segregation on the other: the more assimilated the group, the smaller the spatial separation. At the CD scale, however, recent arrival and educational qualifications were both insignificant, although there was an additional significant relationship with group size in the expected direction; the larger the group, the lower the segregation. The R^2 statistic is much smaller at this scale, however; the small number of birthplace groups involved excludes most of the smaller ones included at the LGA scale, many of which have large percentages of recent arrivals. Nevertheless, the same general conclusion can be drawn, that the large, economically-assimilated birth-

Table 5. Accounting for the level of segregation: regression analyses

	Birthplace		Language		B&L
	LGA	CD	LGA	CD	LGA
Constant	46.33	53.59	71.97	130.9	78.88
Regression coefficients					
Post 1990	0.17	*	*	*	*
Unemployment	0.48	1.65	*	*	*
Low income	*	*	*	0.56	0.26
Good English	− 0.30	− 0.31	− 0.23	− 0.83	− 0.25
Educational qualification	− 0.19	*	− 0.37	− 0.29	− 0.31
Size	*	− 0.49	*	*	*
Born in Australia					− 9.38
R^2	0.61	0.23	0.33	0.59	0.20

place groups were less segregated residentially (and inspection of the residuals suggested no common features among the groups more or less segregated than predicted).

The regressions for segregation by language used at home focus attention on two significant independent variables, the percentages who speak good English and who have educational qualifications. In general, the larger the percentage who are very proficient in English and who have the specified qualifications, the lower a group's level of segregation, even though members choose to speak another language at home; in addition, at the CD scale, the more families with low incomes the higher the segregation. Thus economic assimilation leads to greater cultural assimilation in terms of residential choice, even among those group members choosing not to speak English at home.

The residuals at the LGA scale show 11 groups much more segregated than predicted—Armenian, Assyrian, Belorussian, Bisaya, Greek, Hmong, Lao, Macedonian, Tamil, Vietnamese and Yiddish speakers—with some very large differences (Hmong: expected index 54.7; actual value 83.6; Yiddish: expected 32.6; actual, 79.9). There is either considerable segmentation (for many of the recent refugee groups, for example) or strong pluralistic tendencies leading to voluntary segregation (those who speak Assyrian and Yiddish, for example; the latter are a clearly-identifiable community whose members choose to live together to be close to a synagogue). Many of those segregated less than expected speak western and northern European languages at home (18 groups have segregation levels more than 10 points lower than predicted: those speaking Bosnian, Czech, German, Finnish, French, Hungarian, Indonesian, Mandarin, Netherlandic, Persian, Polish, Samoan, Slovak, South Slavic, Spanish, Thai and Tongan), suggesting that their social and economic assimilation does not stimulate them to live in separate neighbourhoods from those whose normal language at home is English. (This is in contrast to other groups, such as those who speak Greek and Italian at home, who have their own media and sustain their cultural traditions through close neighbourhood proximity.)

The initial regression for the groups cross-classified by birthplace and language spoken at home produced an R^2 value of just 0.14. Inspection of the

residuals suggested a further important difference, between those born in Australia and those born elsewhere, incorporated through a dummy variable, coded 1 if the group was born elsewhere and 0 if born in Australia. As well as the anticipated relationships with low income, good English and educational qualifications, this further variable showed a nine percentage points difference in average segregation index between those born in Australia and elsewhere, with the former more segregated. Those born in Australia but who use the language of their parental home are more likely to live in relative segregation from the remainder of Sydney society than are those who speak that language but were born elsewhere, suggesting that the former are culturally less assimilated.

Conclusions

Sydney is a multicultural city with a very large range of different ethnicities. This paper has explored aspects of the geography of its residential fabric using two indices of group ethnicity, birthplace and language spoken at home. The varying levels of residential segregation have been analysed in the context of Boal's (1999) model, providing substantial evidence of the operation of both the assimilation and the pluralism scenarios. The general pattern is consistent with the former; the more economically assimilated an ethnic group the less its spatial segregation. But there are substantial deviations from this, indicative of the pluralism model: some groups, such as Yiddish speakers, are more segregated than the labour market variables suggest should be the case, providing strong circumstantial evidence of residential congregation for cultural reasons. Others, notably those with substantial refugee elements and many of them relatively small in size, are also highly segregated, which suggests segmentation because of inter-ethnic insecurity as well as substantial economic disadvantage.

Within these general patterns there is a richly-textured geography of ethnicity, with very substantial differences in the areas occupied by different groups, at both the larger and, especially, the smaller spatial scale analysed here. Some of the differences undoubtedly reflect pluralistic group preferences, the desire to live apart from certain other groups within society, if not from all of them, and rarely to anything like the total exclusion of others. Other differences are consistent with a general process of assimilation, as new streams of migrants are slowly integrated into the cultural 'mainstream' and slowly lose their separate identity; this has its spatial counterpart in the apparent temporary development of ethnic enclaves, which in the past have dissipated quite quickly (perhaps little more than one or two generations: Jones, 1996). There are a few, the Australian Aboriginals and Torres Strait Islanders, for example (Kohen, 2000, pp. 86–92), whose residential separation probably reflects constraints as well as choice, a segmenting and a fracturing of society.

Sydney's housing market apparently facilitates both concentration and spatial assimilation, offering relatively few constraints to migrant choice in a multicultural society subject only to sufficient capital for initial entry to the owner occupier sector. Problems arise, however, when one or more of lack of facility with English, lack of education or lack of recognition of qualifications gained overseas, or time of arrival, leads to disadvantage in the labour force. When multiculturalism was first implemented in the 1970s, responsibility for migrants'

economic and welfare needs was important in policy development (Martin, 1975). With increasing economic rationalisation in the later 1980s and 1990s, however, migrant needs have received less consideration. Cost-cutting measures in parallel with increasing income polarisation have reduced access to sections of the labour market and increased relative poverty among more recently arrived migrant groups in particular (Williams & Batrouney, 1998, p. 275), and government failure to increase funding for public (welfare) housing could result in poverty-related migrant ghettoes in the first few decades of the 21st century, rather than the 'temporary enclaves' which marked the 1960s and 1970s.

Findings in this study suggest substantial evidence for at least three of Boal's scenarios. Assimilation appears to dominate; analyses based on human capital theory showed that those groups most integrated both socially and economically have the lowest levels of residential segregation. But there is also evidence of segmentation of groups, notably but not only small groups including substantial numbers of recent refugees, living in greater relative exclusion than their economic situation suggests should be the case. There are also suggestions of pluralism too, of members of ethnic communities (such as the Greeks, Italians, Lebanese and some of the Chinese, as well as the Yiddish speakers) who have chosen to sustain ethnic enclaves as part of their separate cultural identity; this is further reflected in the retention of strong patterns of intra-community marriages within these groups (Birrell & Healy, 2000). Except perhaps for the Vietnamese (on which see Poulsen & Johnston, 2000), there is little clear evidence of polarisation. The high levels of segregation of Torres Strait Islanders and those who speak Australian Indigenous languages at home at the CD scale may indicate intra-national tensions, however, while the high index of dissimilarity at the LGA scale between those born in Eritrea and Ethiopia may reflect international tensions in their homelands.

In an emerging multicultural society, some degree of residential concentration by ethnic groups may be desirable, having positive rather than negative implications for the processes of economic assimilation (Bolt *et al.*, 1998; although see the findings reported in Galster *et al.*, 1999), especially for refugees and other recent arrivals. Dunn (1993, p. 243), for example, concludes his study of Sydney's main Vietnamese enclave by claiming that:

> Dispersal policies for migrant settlement have been shown to be misguided. Forced dispersal is an intolerable restriction on personal mobility, a policy that leads to isolation, and often a domestic political expedient tacked on to a humanitarian program.

The findings here suggest that Sydney's housing market allows such clustering to occur where the members of the relevant ethnic group consider it desirable, while facilitating movement into most areas if desired, subject only to problems of labour market disadvantage and their consequences in differential housing market access.

The strength of the study's conclusions is limited by the nature of the available data. Because the Australian Census does not collect information on ethnic identity/status, we have had to rely on birthplace and spoken-language indicators of those variables, albeit indicators widely used in such work and which provide valuable insights to the complex residential geography of this EthniCity. Potentially more troubling has been the spatial scale of much of the data used in the cartographic explorations. In many cases residential segregation is a

small-scale phenomenon, with relatively small groups of migrants concentrating in just a few neighbourhoods comprising a few thousand people. Data at the CD scale which enable the identification and isolation of such clusters are available for only a small number of birthplace and home-language groups in Sydney, however, most of them relatively large and comprising long-established migrant communities (see Appendices 1 and 2). For these, and especially those who speak a language other than English at home, clear relationships have been shown between economic and social assimilation on the one hand and residential segregation on the other in line with expectations drawn from the work of Boal (1999) and Peach (1999). But for the wider range of birthplace and language groups we have had to rely on data at a much larger scale, which can give valuable indications of how segregated various groups are in relative terms, but no clear statement of absolute levels. (With the additional problem that these larger areas vary in size across the SMA, which makes for some difficulty in comparing the segregation of groups concentrated in suburban areas from those in the inner city.) Nevertheless, available information has enabled us to explore the cultural diversity of Sydney in much more detail than heretofore, and have illustrated patterns of settlement that are, in the main, consistent with human capital theory and the assimilation process. Hopefully, in the future more data will be provided at the smaller scale, thereby facilitating more comprehensive analyses of this paradigm EthniCity and its open housing market.

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Appendix 1.

Indices of segregation and number of individuals involved by birthplace, local government areas (LGA) and collectors' districts (CD, the birthplaces are ordered by size of index at the LGA scale)

		INDEX	
BIRTHPLACE	NUMBER	LGA	CD
Australia (non-Aboriginal)	2388031	2.5	24.4
Scotland	26475	10.9	
Germany, Federal Republic	20487	11.0	37.2
Northern Ireland	4611	14.2	
New Zealand	66862	14.4	25.9
Finland	1739	16.1	
Austria	5017	16.2	
Republic of Ireland	14413	17.0	48.9
England	158393	17.2	
Wales	4895	18.3	
Belgium	1079	19.1	
Denmark	2070	19.2	
Czech Republic	1935	20.5	
Slovak Republic	824	20.5	
Netherlands	12789	20.7	53.6
Kenya	1101	22.8	
Former Czechoslovakia, nfd	2938	23.6	
Slovenia	1702	24.0	
Latvia	1843	24.2	
Papua New Guinea	4097	24.8	
Norway	522	25.0	
Poland	15249	25.2	51.7
Lithuania	1022	25.3	
India	25438	25.7	47.4
Romania	3196	25.9	
Estonia	1018	26.3	
Egypt	16849	26.9	49.3
Spain	4318	27.4	
Peru	3283	27.4	
Colombia	1480	27.9	
Malaysia	17882	27.9	50.2
Hungary	8352	28.1	68.0
Canada	6327	28.2	71.6
Switzerland	2491	28.8	
Former Yugoslavia, nfd	16628	29.5	
Croatia	14861	29.8	55.6
France	4697	29.9	
Singapore	6457	30.2	72.0
Tanzania	427	30.5	
Aboriginal/Torres St Is.	32547	30.6	
Nigeria	451	30.7	
South Africa	18558	30.8	54.0
Zimbabwe	1392	31.1	
Italy	53417	31.1	44.5
Vanuatu	309	32.2	
Argentina	5167	32.2	
Sweden	1660	32.2	
Philippines	42445	32.6	49.4
Indonesia	16298	32.7	57.8
Fiji	20993	32.7	52.7
Mexico	368	32.7	
Brazil	1584	33.0	
USA	13507	33.5	55.3
Uganda	357	33.6	

BIRTHPLACE	NUMBER	INDEX LGA	CD
Pakistan	4311	33.9	
Mauritius	5363	33.9	
Myanmar	2361	34.5	
Thailand	6651	34.5	
United Arab Emirates	367	34.7	
Cyprus	7180	34.7	
New Caledonia	500	35.0	
Chile	11867	35.1	63.7
Solomon Islands	371	36.2	
Polynesia (excl. Hawaii), Other	410	36.6	
China	62458	37.4	49.1
Iran	8820	37.4	
Malta	17968	37.6	56.7
Zambia	482	37.8	
Macau	971	38.2	
Bulgaria	604	38.6	
Sri Lanka	13125	38.8	65.2
Hong Kong	37101	39.5	51.0
Jordan	1885	39.8	
Morocco	391	40.0	
Tonga	4365	40.3	
Uruguay	6734	40.8	
Ghana	794	41.8	
Korea, Republic of	20729	42.1	
Bosnia-Herzegovina	4035	42.1	
Ukraine	4041	42.4	
Micronesia	156	42.8	
Kuwait	823	43.0	
Turkey	10721	43.4	
Israel	2395	44.4	
Taiwan	6767	44.6	
Syria	3724	44.9	
Cook Islands	1339	45.2	
Ecuador	1036	45.7	
Greece	37609	45.7	53.2
Russian Federation	5160	46.5	
Serbia and Montenegro	2434	47.4	89.5
Western Samoa	4943	48.7	
Lebanon	50981	49.3	58.4
Sudan	1634	50.5	
Bolivia	390	51.3	
Bangladesh	3038	51.6	
Portugal	7987	52.1	
Nicaragua	407	53.7	
Ethiopia	336	54.3	
Japan	9156	55.8	
El Salvador	1732	57.0	
Eritrea	104	58.3	
Afghanistan	2906	59.0	
FYR of Macedonia	11915	59.9	76.4
Vietnam	59391	63.0	69.5
Iraq	9313	63.3	
Armenia	411	63.9	
Former USSR/Baltic, nfd	1407	65.0	
Cambodia	9208	70.3	
Laos	5312	73.8	
United Kingdom			23.0
Australia—Aborigine			51.9
Torres Strait I			87.8

Note: The number in each group refers to the LGA scale.

Appendix 2.

Indices of segregation and number of individuals involved by language spoken at home, local government areas (LGA) and collectors' districts (CD, the languages are ordered by size of index at the LGA scale)

		INDEX	
LANGUAGE	NUMBER	LGA	CD
English	2601794	3.1	39.0
German	19494	12.3	43.2
Slovak	1165	19.1	
Czech	2575	20.2	
Finnish	1339	21.0	
French	12551	21.9	55.5
Netherlandic	6368	22.1	
Afrikaans	939	26.0	
Hungarian	8462	26.3	68.9
Polish	15016	27.4	55.7
South Slavic	4230	28.5	
Danish	1084	28.9	
Slovene	1393	30.5	
Malay	1391	31.1	94.6
Gujarati	1773	31.6	
Latvian	1439	31.8	
Italian	84273	32.1	45.5
Spanish	43646	32.9	45.6
Croatian	23204	33.0	55.2
Norwegian	266	33.6	
Romanian	1834	33.7	
Cantonese	102449	34.3	44.7
Hindi	19030	34.4	
Urdu	4417	34.9	
Estonian	734	35.0	
Thai	4949	35.2	
Swedish	1201	35.8	
Fijian	2945	35.8	
Lithuanian	643	36.4	
Mandarin	39066	36.4	52.0
Punjabi	4131	37.2	
Tagalog (Filipino)	35805	37.4	55.8
Australian Indigenous	565	37.5	97.8
Maori	2294	38.2	
Other Chinese	19844	38.5	60.2
Bulgarian	484	38.5	
Indonesian	11995	38.6	70.4
Persian	8860	40.1	
Ukrainian	2680	40.4	
Sinhalese	3987	40.8	
Serbian	14159	43.0	69.6
Tongan	5885	43.2	
Korean	22393	43.5	
Greek	86285	43.8	51.6
Burmese	1539	45.1	
Arabic	122635	45.4	55.2
Bosnian	2722	45.8	
Maltese	16321	45.8	66.8
Russian	12072	47.5	71.8
Tamil	8546	47.6	
Turkish	15844	48.2	70.1
Bengali	3781	48.4	
Bisaya	217	48.7	

LANGUAGE	NUMBER	INDEX	
		LGA	CD
Portuguese	11463	49.8	73.4
Samoan	8137	50.9	
Albanian	346	53.4	
Japanese	9836	55.5	
Armenian	7522	58.6	
Nepali	750	59.7	
Macedonian	18897	59.7	74.6
Belorussian	72	62.8	
Pashto	423	63.3	
Kurdish	891	63.8	
Vietnamese	54721	65.7	72.3
Timorese	263	67.6	
Assyrian (including Aramaic)	9553	72.4	
Khmer	7466	75.4	
Tetum	229	76.9	
Lao	5253	77.1	
Yiddish	441	79.9	
Hmong	114	83.6	
All Chinese		44.8	

Note: The number in each group refers to the LGA scale.

Appendix 3.

Indices of segregation and numbers involved by language spoken at home and birthplace

LANGUAGE	NUMBER	INDEX
English	2601794	3.13
BPL: Australia	2131912	4.69
BPL: Other country	469882	10.37
Greek	86285	43.75
BPL: Australia	41899	43.09
BPL: Other country	44386	45.39
Italian	84273	32.11
BPL: Australia	33957	32.67
BPL: Other country	50316	32.70
Latvian	1439	31.83
BPL: Australia	326	40.82
BPL: Other country	1113	31.26
Lithuanian	643	36.37
BPL: Australia	139	49.59
BPL: Other country	504	38.27
Estonian	734	34.97
BPL: Australia	123	58.12
BPL: Other country	611	35.98
Russian	12072	47.45
BPL: Australia	1710	35.28
BPL: Other country	10362	50.10
Ukrainian	2680	40.40
BPL: Australia	791	36.85
BPL: Other country	1889	42.95
South Slavic	4230	28.45
BPL: Australia	876	31.87
BPL: Other country	3354	28.74
Croatian	23204	32.97
BPL: Australia	8350	34.14
BPL: Other country	14854	32.56
Macedonian	18897	59.72
BPL: Australia	6682	59.13
BPL Other country	12215	60.46
Serbian	14159	43.01

LANGUAGE	NUMBER	INDEX
BPL: Australia	3625	44.75
BPL: Other country	10534	42.69
Polish	15016	27.40
BPL: Australia	2733	28.29
BPL: Other country	12283	27.72
Turkish	15844	48.20
BPL: Australia	5440	49.82
BPL: Other country	10404	47.57
Portuguese	11463	49.76
BPL: Australia	2427	53.98
BPL: Portugal	6840	56.16
BPL: Brazil	1010	39.20
BPL: Other country	1186	42.05
Spanish	43646	32.86
BPL: Australia	9175	32.87
BPL: Spain	3208	32.29
BPL: Other country	31263	34.18
Arabic	122635	45.35
BPL Australia	53274	49.07
BPL: Middle East	56056	48.78
BPL: North Africa	10234	36.71
BPL: Other country	3071	43.74
Cantonese	102449	34.17
BPL: Australia	17408	33.18
BPL: China	26618	35.51
BPL: Vietnam	11775	63.00
BPL: Hong Kong	33434	41.84
BPL: Malaysia	5909	32.01
BPL: Other country	7305	36.50
Mandarin	39066	36.44
BPL: Australia	3954	35.96
BPL: China	22573	43.22
BPL: Vietnam	510	56.23
BPL: Hong Kong	235	42.88
BPL: Malaysia	2138	40.87
BPL: Other country	9656	38.97
Other Chinese	19844	38.50
BPL: Australia	2872	45.88
BPL: China	8157	41.96
BPL: Vietnam	1996	65.80
BPL: Hong Kong	551	38.21
BPL: Malaysia	2074	35.07
BPL: Other country	4194	46.90