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DISCUSSION PAPER

**Indigenous Australians and
the socioeconomic status of
urban neighbourhoods**

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ABSTRACT

This discussion paper presents an analysis of where Indigenous people live in Australian cities. The paper is motivated by the possible impact of the recent increases in the number of distressed urban areas on the Indigenous population. The urban Indigenous population are found to be concentrated in the low socioeconomic urban neighbourhoods which have borne the brunt of economic structural change in the past 20 years. Furthermore, the Indigenous population are residentially segregated from other Australians throughout major Australian cities. The generally low level of employment demand in locationally disadvantaged low socioeconomic status areas combine with poor access to public transport to reinforce the poor employment outcomes of the urban Indigenous population. The paper concludes that, in order to improve the lot of Indigenous Australians resident in low socioeconomic status areas, the appropriate mix of policies should address area-specific problems endemic in such areas as well as attempt to improve the macroeconomic employment performance of the Australian economy as a whole.

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Spatial inequality of income and employment is increasing in Australian cities. Using census data, Gregory and Hunter (1995a, 1995b) demonstrate that this was the case between 1976 and 1991.¹ Raskall (1995), using income tax data, shows that similar changes are evident. The basic thrust of this research is that the increasing concentration of unemployment in low socioeconomic status (SES) neighbourhoods is the primary factor behind the large increases in income inequality observed within all of Australia's major cities. This paper explores the implications of increasing neighbourhood inequality for Indigenous Australians.²

The majority of Indigenous people have low socioeconomic status (Taylor 1993a, 1993b). The major effect of the increase in overall inequality on the Indigenous population will arise from this fact and, in particular, the extent to which Indigenous people are concentrated in low SES neighbourhoods. Therefore, the major focus of this paper is to identify the extent to which low socioeconomic status of Indigenous people is associated with their concentration in low SES areas.

There are three factors underpinning the growth in urban neighbourhood inequality: the gradual and persistent increase in the national unemployment rates, regional shocks which particularly affect low SES neighbourhoods, and the social implications of the increased residential segregation of rich and poor. The implications for Indigenous people depend on the weight attached to each factor.

The economic cycle may be expected to be a major factor affecting the changing economic circumstances of neighbourhoods. There has been a traditional assumption that a period of strong economic growth would create an economic up-draft favouring the disadvantaged (Okun 1973; Vroman 1977). Consequently, neighbourhood inequality should fall during the economic upswing as more members of low SES neighbourhoods are drawn into employment and the relative wage of the low-paid increases. During the economic downswing, the process is reversed and inequality across neighbourhoods may increase. This macroeconomic influence affects all people in low SES groups, including Indigenous people.

Sustained and persistent shocks to the local regional economy can also increase neighbourhood inequality. For example, factory closures and reduced access to public transport may reduce employment for all residents in low SES neighbourhoods (Hunter 1995a, 1995b). The large declines in manual employment in these areas will have had a particularly large impact on Indigenous employment opportunities.³ Therefore, like macroeconomic changes, regional shocks will adversely affect Indigenous people to the extent that they are concentrated in low SES neighbourhoods.⁴

The social implications of increased inequality across urban neighbourhoods may have particular significance for Indigenous Australians living in low SES areas. The growth of high levels of joblessness in such areas raises questions as to whether the clustering of non-employed and economically disadvantaged individuals contributes to the persistence of joblessness. For example, does the increased spatial concentration of the poor and disadvantaged increase crime, drug taking and dependence on government welfare above that which would occur if the disadvantaged were spread more evenly throughout the community? In addition, does the increased concentration of the disadvantaged create cultures that reduce the ability of individuals to find jobs?

Recent economic literature places considerable emphasis on the effects of racial segregation and urban ghettos (Wilson 1987; Borjas 1995; Cutler and Glaeser 1995). Empirical evidence linking peer group influences in the local neighbourhood environment to teenage pregnancies, criminal behaviour, education attainment, human capital accumulation and job search behaviour can be found in Summers and Wolfe (1977), Case and Katz (1991), Crane (1991), Evans, Oates and Schwab (1992), and Holzer (1991).⁵ These peer group influences are likely to be particularly important for Indigenous people if they are integrated into the local low SES neighbourhoods. Therefore, the secondary focus of this paper is to determine the extent to which Indigenous people are residentially segregated from other Australians in major urban areas.

Many social scientists believe that social distance between groups, as measured by residential segregation between groups, declines as SES increases. Most empirical studies confirm that social distance and residential segregation do indeed decline with increases in SES. Notwithstanding this generally observed negative relationship between segregation and SES, several studies in the United States (US) have pointed to important exceptions to this rule. Massey and Denton (1985), for example, found that the social distance between Black and other Americans does not decline substantially as SES increases. This paper also examines the relationship between residential segregation indexes and SES in Australian cities to explore whether social distance between Indigenous and non-Indigenous people in Australia declines as SES increases.

Data

To conduct a local analysis of Indigenous SES, all Collection Districts (CDs) in the 1976 and 1991 Censuses are used. CDs are the smallest geographical area for which Census data are examined and usually contain 200-300 dwellings which are delineated by easily identifiable boundaries (that is, 'neighbourhood-sized' areas).⁶ Unfortunately, CDs are too small

for analysis of segregation across SES areas (see Appendix A). CDs are therefore aggregated to postcodes to avoid the small population problem. Postcodes are a reasonable compromise for this geographic analysis because they are both relatively homogeneous and do not hide substantial segregation that can exist within larger geographic units.⁷

Most of the geographical analysis in this paper is based on areas, both CDs or postcodes, ranked by SES. The Australian Bureau of Statistics (ABS) (1990) urban index of socioeconomic advantage is used to rank areas. Like other socioeconomic indexes, the ABS index provides a stable and reliable summary of income, education and occupational status (Linke 1988; Devery 1991a).⁸ However, unlike some SES indexes, the ABS index is specifically defined for CDs and other geographic areas. The CDs and postcodes are ranked by deciles and quintiles in order to group them into areas with similar SES. For example, the bottom decile CDs or postcodes are the areas with lowest 10 per cent of SES. Similarly, the bottom quintile of CDs or postcodes are the bottom 20 per cent of areas.

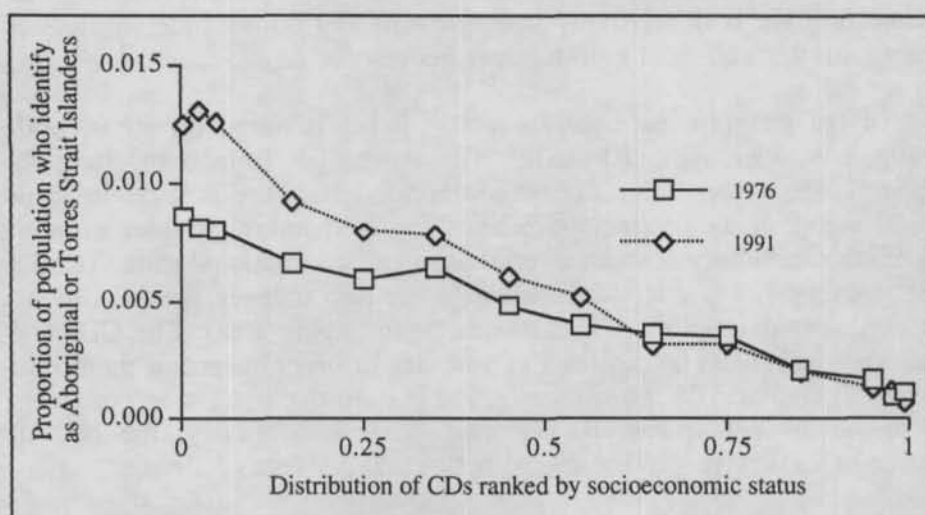
Where do Indigenous Australians live in cities?

There is an overwhelming body of evidence that Indigenous Australians are concentrated in low SES groups (Taylor 1993a, 1993b). This section examines data from the 1976 and 1991 Censuses to determine whether the SES of individuals is also reflected in the SES of the places where Indigenous people live. The changes in the distribution of Indigenous persons across areas ranked by SES over time are also analysed.

Figure 1 shows that Indigenous residences are concentrated in low SES major urban areas. More importantly, Indigenous residences were increasingly concentrated in low SES areas between 1976 and 1991. The Indigenous proportion of the total population not only increased in low SES areas but also fell in the top four deciles of CDs ranked by SES between 1976 and 1991.⁹

Table 1 also clearly indicates that the major urban Indigenous population is concentrated in low SES areas and gives a more complete breakdown of the data in Figure 1.¹⁰ Not only was there a clear concentration of Indigenous people in low SES areas in both censuses but there was an increase in this concentration between 1976 and 1991. That is, there was an increase in the proportion of Indigenous population in the bottom quintile of areas ranked by SES. The fall in proportion of the total population living in low SES areas underscores increased Indigenous concentration and leads to the increase in the proportion of the Indigenous population in low SES compared to other areas.

Figure 1. The distribution of Indigenous Australians within Australian cities, 1976 and 1991.^a



a. The CDs used are from the panel of major urban areas constructed by Hunter (1995b).

Source: ABS (1976, 1991) and the urban index of relative socioeconomic advantage, ABS (1990).

Table 1. Distribution of Indigenous population in major urban CDs ranked by quintile of SES, 1976 and 1991.^a

	Quintile of SES					Proportion in bottom quintile
	1	2	3	4	5	
1976 Census						
Number Indigenous	12,807	9,922	8,242	6,886		0.304
Total population (,000s)	1,427	1,623	1,741	1,921	2,031	0.163
Per cent Indigenous	0.9	0.6	0.5	0.4	0.2	
1991 Census						
Number Indigenous	22,007	16,189	13,777	12,033	6,724	0.311
Total population (,000s)	1,671	1,866	2,068	2,343	2,614	0.158
Per cent Indigenous	1.3	0.9	0.7	0.5	0.3	

a. Calculations use all major urban CDs from 1976 and 1991 Censuses.

Source: ABS (1976, 1991) and the urban index of relative socioeconomic advantage, ABS (1990).

The increasing concentration of Indigenous population in low SES neighbourhoods is also emphasised by the fact that the Indigenous proportion of the general population increased in low SES areas

compared to other areas in most States and Territories. The exception to this generalisation is that the measure actually fell in Canberra and Victoria.¹¹ The Canberra result may be due to increased Indigenous employment participation in the federal bureaucracy and the increased size of bureaucracies which specifically focus on Indigenous affairs, such as the Aboriginal and Torres Strait Islander Commission and the Office of Indigenous Affairs in the Department of Prime Minister and Cabinet. The Victorian result is driven primarily by an almost uniform decline, against the national trend, in the relative size of the Indigenous population. The proportion of Victoria's major urban Indigenous population living in the bottom quintiles of SES areas actually increased.

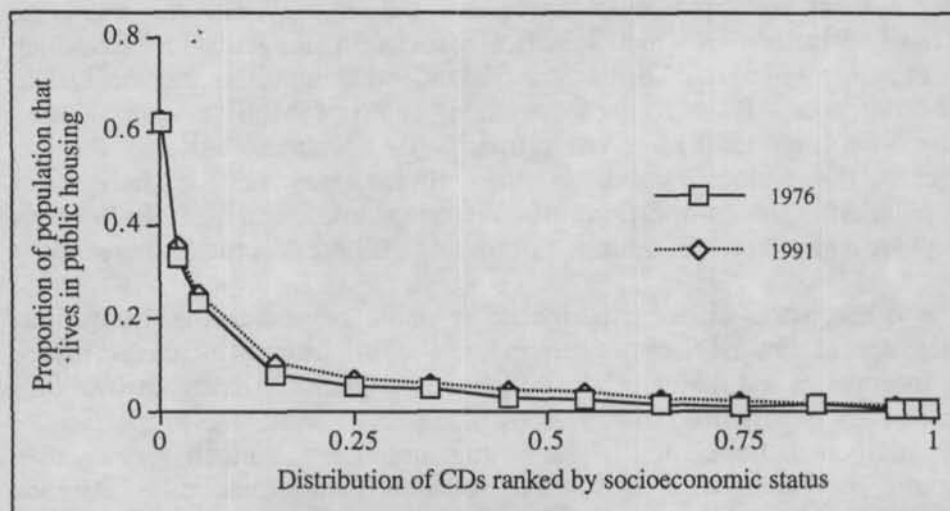
The other States either experienced a stable or increasing Indigenous presence in low SES major urban areas. The largest increases in the proportion of the major urban Indigenous population living in low SES areas were experienced in Adelaide and Perth. Overall, the proportion of the Indigenous population in the bottom quintile was much greater than would be expected if Indigenous persons were randomly assigned throughout the community.

One explanation for the concentration of Indigenous people in low SES CDs is their much greater reliance on public housing. That is, much of the Indigenous population are constrained to live in low SES areas because that is where public housing is located (Figure 2). According to Jones (1993), 31 per cent of Aboriginal families live in public housing. Furthermore, an extra 14 per cent of families are expected to be in Aboriginal community-based housing. Therefore, the supply of the public housing stock may be a constraint on the choice of residential location for more than one-third of families. Brief consideration should therefore be given to the role of public housing in the concentration of Indigenous Australians in low SES areas.

Figure 2 confirms that public housing is concentrated in low SES areas. However, unlike Figure 1 there was no increase in the concentration of the proportion in public housing in low SES areas between 1976 and 1991. Therefore, the increasing concentration of Indigenous Australians in low SES areas of major urban centres cannot be explained merely by the changes in the public sector housing stock in major urban areas.

Notwithstanding the lack of change in the public housing stock in major urban areas, it is possible that increased targeting of existing public housing may have affected the Indigenous composition of the population in low status areas.¹² Indeed, the proportion of Indigenous households living in government rental accommodation increased from 18.4 per cent to 31.1 per cent between 1976 and 1991 (Australian Institute of Health and Welfare 1995: 107).

Figure 2. The distribution of public housing within Australian cities, 1976 and 1991.^a



a. The CDs used are from the panel of major urban areas constructed by Hunter (1995b).

Source: ABS (1976, 1991) and the urban index of relative socioeconomic advantage, ABS (1990).

While census information about the distribution of Indigenous people in public housing across SES areas is severely limited, it is reasonable to assume that the increasing Indigenous presence in public housing is one factor which explains the increasing Indigenous concentration in low SES areas.

Correlations of proportion of population who are indigenous and SES

The simple correlation coefficient of the Indigenous proportion of the population and the socioeconomic status of a CD in the respective censuses reinforces the strong inverse association of the SES of an area and Indigenous population.¹³ Socioeconomic status was negatively correlated with the proportion of Indigenous people in an area's population in both censuses. That is, the Indigenous population tended to be concentrated in low SES CDs in both 1976 and 1991. A more important observation is that this negative correlation became stronger over time as it increased significantly from -0.231 to -0.288.¹⁴ The rank correlations between SES and the proportion of Indigenous displayed an even more pronounced change as it increased from -0.219 to -0.291. Therefore, the relationship between SES and the Indigenous population has become stronger over time.¹⁵ This is consistent with the above results, which found that the Indigenous population has become increasingly concentrated in low SES areas. The conclusion that the SES of local neighbourhood areas is

becoming a more important aspect of Indigenous experience seems warranted.

Residential segregation and SES

Early sociologists believed that the level of residential segregation is an indication of the social distance between groups (Burgess 1925). More recently, Denton and Massey (1988) postulated that socioeconomic advancement by ethnic groups would lead to progressive integration in society. Other researchers emphasise that segregation is lower among high SES populations because spatial mobility rises as social status increases (Kobrin and Goldscheider 1978). The empirical research supports these views, but the extent to which different groups have been able to desegregate their residential location varies considerably.

Several US studies have confirmed that racial and ethnic segregation generally tends to be higher in low SES areas (Massey 1985; Denton and Massey 1988). That is, for most racial and ethnic groups in the US residential segregation falls steadily as social class increases.¹⁶ Several researchers have speculated that the handicaps faced by Blacks in achieving returns to socioeconomic achievement such as education, income, occupational status, housing and other neighbourhood outcomes may be reflected in the lack of any significant (negative) relationship between SES and segregation of Blacks.

US research confirms that Black/White segregation, when measured within socioeconomic classes, exhibits little change as SES rises (Massey and Denton 1985; Massey, Condran and Denton 1987; Denton and Massey 1988). For example, Denton and Massey (1988) use the dissimilarity index to analyse the effect of SES on the segregation of Blacks, Hispanics and Asians in 60 metropolitan areas in the US. Their results show that Blacks are highly segregated from non-Hispanic Whites at all socioeconomic levels. Hispanic and Asian segregation is not only lower for all socioeconomic groups but declines markedly from low to high SES. The authors claim that the results indicate that the barriers to integration persist for Blacks in US society while successful assimilation continues for Hispanics and Asians.¹⁷

The remainder of this discussion paper seeks to establish whether there is an analogous phenomenon in Australia and therefore addresses two main questions: Is there a significant negative relationship between residential segregation and SES? Does the relationship between residential segregation and SES differ for Indigenous people and Australians born overseas (OSB)?¹⁸ To answer these questions, the analysis calculates residential segregation for both Indigenous persons and the OSB

population across SES. The next section examines the meaning and interpretation of residential segregation indexes before estimating the relationship between residential segregation and SES.

Residential segregation and social distance

Residential segregation can be viewed as a proxy for the social distance of a given population from other Australians. The use of residential segregation to examine the relationship between SES and social distance can be justified on the grounds that the various dimensions of social distance are highly correlated. For example, Timms (1972) found, using a series of structural, behavioural and subjective measures of social distance between various ethnic groups and other Australians in Queensland, that social distance and the various measures of dissimilarity (for example, residential segregation) are highly correlated.¹⁹

Residential segregation is not only a proxy for social distance but is an important part of the process of social differentiation. Jones (1967: 412) concisely indicates the importance of residential segregation:

[R]esidential proximity increases the probability of social interaction so that group interaction can be maximised and group norms maintained. Over time the different residential areas of a city acquire a social evaluation reflecting the social characteristics of their resident populations and spatial distance becomes an indicator of social distance.

Therefore, differences in residential segregation provide a means of determining whether social distance between Indigenous and other Australians declines as high SES areas are examined instead of low SES areas.

Factors underlying residential segregation

There are surprisingly few formal models of how residential segregation arises. However, there is a general consensus that measured level of residential segregation may be caused by two major factors: the social and institutional constraints faced by individuals in the housing market or the preferences of groups of individuals to live together. The differences in measured segregation across SES areas reflect differences in either factor. Unfortunately, in the absence of a structural model of behaviour it is impossible to decide which factor predominates.²⁰ Notwithstanding this obvious caveat, it is useful to speculate about the possible role of each factor.

There is considerable evidence, albeit largely anecdotal, that there was substantial discrimination against Indigenous people in the housing market in 1976 (Henderson 1975; Larsen et al. 1977). However, unless there is a systematic variation in the level of discrimination across SES areas, then it is difficult to claim that discrimination is the institutional factor driving the relationship between SES and residential segregation.

One possible institutional avenue for systematic variation in segregation arises from public housing policy. Given the concentration of public housing in low SES areas established earlier, policies which concentrate public housing in a relatively few low-cost areas may increase measured segregation in such areas relative to higher SES areas. Therefore, if more of the Indigenous population in low SES areas reside in public housing, then this may generate the predicted inverse relationship between segregation and SES.

Residential segregation can also reflect the residential preferences of various groups of people. For example, Gale and Wundersitz (1982) found that the role of kin networks was a major factor contributing to the migration of many Indigenous families to Adelaide and to the actual location of residence upon and subsequent to arrival.²¹ Since most Indigenous people already live in low SES areas, the process described by Gale and Wundersitz would tend to increase segregation in low SES areas vis-a-vis other areas.

One way of attempting to identify the role of preferences and constraints in differences in segregation is to identify any systematic differences in Indigenous segregation and the segregation of other ethnic groups, for example OSB people, from other Australians. These OSB segregation indexes can provide a benchmark of the extent to which preferences are different in the rest of the community. Of course, this methodology does not directly control for the differences in the preferences of non-Indigenous people. It merely provides a benchmark against which the differences in Indigenous segregation can be compared.

Measurement of residential segregation across SES

The index of dissimilarity is the most commonly used index in the segregation literature (Taeuber and Taeuber 1965).²² The index of dissimilarity equals zero if there is no residential segregation. The absence of segregation would require that Indigenous people always live in the same proportion in an area as that in which they are observed in the population at large. Conversely, there is complete segregation if Indigenous and non-Indigenous people always live in different areas. In such circumstances the index will equal one. The index indicates the relative proportion of Indigenous (or non-Indigenous) people who would have to change areas in order to achieve an even distribution across all areas.

The relationship between SES and segregation can be estimated by calculating the index of dissimilarity for each SES area separately. If social distance falls as SES increases, then we should expect to see higher residential segregation in lower SES areas than elsewhere.

The size of the geographic unit under analysis is particularly important when measuring segregation in areas with a small Indigenous population. For example, measured segregation in CDs with a high SES will be systematically biased upwards if there are very small numbers of Indigenous people in those areas. Appendix A gives a numerical illustration of this problem and provides a brief analysis of the implications for this study. In brief, in order to avoid this potential bias the following segregation indexes are measured at the postcode, rather than CD level.

The index of dissimilarity is also calculated for the immigrant population²³ to provide a benchmark against which to compare differences in Indigenous segregation. However, it should be borne in mind that immigrant segregation is not directly comparable with Indigenous segregation because the immigrant population is, by definition, very heterogeneous. The immigrant population cannot be considered to be as socially cohesive as the Indigenous population, given the diverse ethnic and cultural backgrounds of people born overseas. For example, Australian studies of segregation of this group show that there are several clusters of migrants, each with varying degrees of social distance from other Australians (Jones 1967; Timms 1972). Therefore, the relationship between SES and immigrant segregation merely provides a rough proxy for the relationship for the various migrant groups.

The relationship between residential segregation and SES in Australia

Is there a negative relationship between SES and segregation for Indigenous Australians? Or does the experience of Australian Indigenous people emulate the experience of Blacks in US cities? This section conducts a preliminary analysis of the relationship using the index of dissimilarity.

Table 2. Index of dissimilarity and SES in Australian postcodes, 1991.^a

	Quintile of SES				
	1	2	3	4	5
Indigenous segregation	0.324	0.321	0.339	0.288	0.321
Immigrant segregation	0.244	0.218	0.190	0.144	0.129

a. All CDs from the 1991 Census are aggregated to the postcode level.

Sources: The urban index of relative socioeconomic advantage from ABS (1990); ABS (1991).

The most interesting aspect of the segregation analysis is the apparent lack of a consistent relationship between the index of dissimilarity and SES for the Indigenous population in major urban areas. In line with the US studies of Black/White segregation, there is little difference in the level of segregation of Indigenous/non-Indigenous Australians between low SES and high SES neighbourhoods. However, there is some variation in measured segregation between the various quintiles, with the fourth quintile being substantially lower than the other quintiles.

These results appear to contradict the sociological predictions. That is, the apparent lack of a relationship between the index of dissimilarity and SES provides us with evidence that the social distance between Indigenous and non-Indigenous Australians does not abate as the SES of the area in which Indigenous Australians live improves.

In contrast to the Indigenous result, there is a systematic negative relationship between SES and the level of immigrant segregation in major urban areas. This result is consistent with there being less social distance between OSB and other Australians in the higher SES areas. Therefore, the results for the OSB population are consistent with sociological theory and provide a useful contrast to the result for the Indigenous population.

The other notable feature of Table 2 is that Indigenous segregation is uniformly higher than immigrant segregation in all SES areas. The smallest measured level of segregation for the Indigenous population is more than twice the size of the smallest level of segregation for immigrants. That is, there may be a lower bound on the lower level of segregation, and therefore social mobility, that is currently achievable for Indigenous people in major urban areas.

Policy implications

Increasing neighbourhood inequality in Australian cities has important implications for Indigenous economic outcomes, given the concentration of Indigenous people in low SES areas and the high level of residential segregation in Australian cities. While increasing national unemployment rates may have adversely affected employment outcomes for all Australians with low SES in the past 20 years, the Indigenous people living in locationally disadvantaged low SES areas are likely to have been particularly affected. For example, the decline of manual jobs and factory closures has led to a substantial decline in the available employment for all residents of low SES areas in the last 20 years (Hunter 1995a, 1995b). In addition to the low level of employment demand in low SES areas, Indigenous residents may have been hampered by the poor access to public transport typical of such areas (Maher et al. 1992; Hunter 1995b).²⁴

Indeed, the National Aboriginal and Torres Strait Islander Survey shows that transport problems constitute the single largest factor preventing the urban Indigenous unemployed from finding work (ABS 1995: 53).²⁵ Therefore, the decline in Indigenous employment in urban areas between 1976 and 1991 may be, in part, explained by the general decline of low SES areas.

The structural disadvantage of living in low SES areas is exacerbated by the increasing agglomeration of people with poor employment prospects. Consequently, as the unemployed increasingly live in the same neighbourhoods, their number of contacts and relatives who are in employment is likely to fall.²⁶ Hence, one avenue by which unemployed Indigenous people may find jobs is likely to narrow. In addition, the long-term unemployed from areas of heavy unemployment concentration may become discouraged and adopt behaviour patterns that affect the intensity of their job search. On the demand side, employers may discriminate against individuals from particular parts of the city.

Therefore, the general decline of low SES areas in combination with a general lack of access to information about jobs in such areas and the concentration of Indigenous population in low SES areas, may have particularly affected Indigenous residents. That is, the low level of employment demand and the generally non-conducive environment of low SES areas may be adversely affecting Indigenous employment outcomes.²⁷

Gregory and Hunter (1995a, 1995b) raise concerns about other social implications of the increased residential segregation of rich and poor that accompanied the recent increases in neighbourhood inequality. The most important implication from an Indigenous perspective is that the decline of low SES areas may accompany an increase in criminal activity. Devery (1991a, 1991b) has established a clear link between the SES of an area and the level of crime. Therefore, an increased concentration of Indigenous people in low SES areas, combined with a reduction in the average SES of low SES areas as people with poor prospects increasingly live in the same neighbourhoods, will increase the risk that the urban Indigenous population are either exposed to or involved in crime.

The inordinately high rates of arrest for the Indigenous population are well documented, having formed the core concern of the Royal Commission into Aboriginal Deaths in Custody. The high level of involvement with the juvenile and criminal justice systems is very deleterious to Indigenous employment outcomes, as long periods of detention can interfere with schooling (and by implication subsequent job search) and lead to a state of institutionalisation that may inhibit self-reliance and reliability (Commonwealth of Australia 1991a, 1991b: 381; ABS 1996). The probable increase in the exposure of the Indigenous

population (in relative and absolute terms) to crime in Australian cities is of clear concern to policy makers.

The high level of Indigenous segregation in low SES areas confirms that Indigenous residents are isolated from an increasingly isolated group, non-Indigenous low status residents. The isolation of the Indigenous population in Australian cities gives rise to concern about the possibility of an emerging Indigenous underclass similar to the underclass postulated in the US (Wilson 1987).

An alternative interpretation of the high level of Indigenous segregation in low SES areas suggests that Indigenous residents are insulated from the changes affecting other low SES residents. That is, it can be argued that the high level of residential segregation in all levels of SES shows that it may be necessary that policy continues to target Indigenous people specifically rather than low SES residents in general. However, while targeted policies can insulate the Indigenous population from the dominant environment in low SES areas to some extent, they can be a two-edged sword increasing the reliance on special Indigenous programs (Altman and Daly 1992).

The differences in the relationships between the index of dissimilarity and SES for the Indigenous and immigrant groups highlight potential policy issues. Indeed, since a substantial negative relationship between SES and index of dissimilarity is observed for immigrant groups but not for Indigenous persons, we might conclude there is some impediment to spatial/social mobility of Indigenous persons, even in high SES neighbourhoods. The policy response depends crucially upon what is causing the small negative relationship for Indigenous people. The limited relationship in major urban areas provides *prima facie* evidence that there are institutional or other impediments which may prevent Indigenous people choosing freely where to live. Furthermore, these impediments do not abate when the SES of a local neighbourhood increases.

One alternative explanation of the small negative relationship for Indigenous people in major urban areas is that it may be a result of policy decisions to locate some public housing in high SES neighbourhoods. This problem can be dealt with, in principle, by excluding from the analysis those neighbourhoods with public housing. However, this would require extensive computation and is left for future research. Even if the research is conducted, the small population problem may make it difficult to identify whether public housing is the cause of the anomaly.

In conclusion, there appears to be evidence that the social distance between Indigenous and non-Indigenous Australians does not decline markedly as they move into the higher SES areas. This has important

policy implications since it indicates that, even if government policies, such as the Aboriginal Employment Development Policy (Australian Government 1987), are successful in improving the SES of the Indigenous population, such programs may not reduce the social distance between Indigenous and other Australians.

Notes

1. Also see Hunter (1995a, 1995b, 1995c).
2. The term 'Indigenous Australians' refers to the Aboriginal and Torres Strait Islander people.
3. The employment in labouring declined by about 12 percentage points to 14 per cent in the bottom decile neighbourhoods ranked by SES between 1976 and 1991. The proportion of the employed in labouring in high status areas remained virtually constant at about seven per cent (Hunter 1995b).
4. However, it can be argued that differences in education and access to economic resources may mean that Indigenous people in low SES areas are especially disadvantaged in access to public transport in a 'user-pays' system.
5. The Australian evidence on these peer group influences is relatively crude. Devery (1991a, 1991b), for example, finds that the probability of being a crime victim is strongly correlated with the SES of the local area.
6. CDs can loosely be described as 'neighbourhoods'. However, there can be no pretence that these arbitrary statistical units had the social coherence that sociologists sometimes ascribe to a neighbourhood.
7. See the British debate of the late 1970s about the role of scale and size of the unit of analysis in segregation indexes (Jones and McEvoy 1978; Lee 1978; Peach 1979).
8. The basic structural composition of socioeconomic indicators has remained 'essentially the same for more than forty years and still provides a standard measure of social stratification [in sociology]' (Linke 1988: 7-8).
9. If Indigenous people in low status areas are more willing to identify themselves as Indigenous over time, then there may be an apparent increase in the concentration of Indigenous people. For this effect to be significant, there must be large numbers of Indigenous people in high status areas who refuse to identify themselves. The author believes that this effect, if it exists, will be small and can be ignored. The most significant effect of the large change in self-identification will be to increase the average level of the proportion of Indigenous people in the population rather than change the distribution of Indigenous people across SES areas.
10. However, the major difference between Table 1 and Figure 1 is that the former examines all CDs in the respective Censuses, not only those which did not change boundaries between 1976 and 1991.
11. Victorian major urban areas include both Melbourne and Geelong.
12. Whiteford (1995) details the general increase in the targeting of public housing during the 1980s and 1990s.

13. The simple correlation coefficient is called the ecological correlation when calculated using geographic data. The reason for the use of the adjective ecological is to emphasise the fact the correlation is calculated from the averages of an area rather than the correlation of individuals' circumstances.
14. The equivalent correlations for the overseas-born population provide an interesting contrast. Indeed, the correlations between SES and the proportion of the population born overseas actually became positive (They increased from -0.017 to 0.053 between 1976 and 1991). The standard errors for the estimates of the respective correlation coefficients are all less than 0.0001.
15. The increasing identification of Indigenous people might combine with the statistical bias induced by the small indigenous population (see Appendix A) to affect the result. However, the increasing identification of Indigenous people would tend to reduce the correlation between SES and the Indigenous proportion of the population because randomly assigning the increasing numbers of Indigenous people across high status CDs would reduce measured correlation.
16. Another important dimension of their research is that segregation is lower among immigrant groups with longer residence in the country.
17. They use *census tract* data from the 1980 US Census for the 50 largest Standard Metropolitan Statistical Areas and ten other metropolitan areas. US Census tracts are equivalent in size to Australia's postcode areas.
18. The OSB population merely provide a benchmark for the level of segregation experienced by other Australians in similar conditions.
19. For example, there is a high degree of correlation across the birthplace groups between the indexes of dissimilarity for residential, occupational, religious and marital dissimilarity.
20. Schelling (1978) modelled the preference to live together as the driving force behind residential segregation. In Schelling's model, mild concerns about being a local minority can lead to a completely segregated city. However, general mobility patterns and institutional constraints will prevent this occurring in reality. Also, the preferences postulated by Schelling may be balanced out by concerns about being isolated in indigenous 'ghettos'.
21. Gale and Wundersitz (1982) show that newly-arrived households were evenly distributed throughout Adelaide irrespective of where their kin lived. However, people who had lived in Adelaide longer had sorted out into locations closely associated with the location of their closest kin (that is spatially). Indeed, almost 50 per cent of other households lived less than one kilometre from their closest kin (p.110).
22. The index of dissimilarity is defined as:

$$ID_{IO} = (0.5) [S | (I_i/I) - (O_i/O) |]$$

where I_i and O_i refer to the number of Indigenous and non-Indigenous populations in the i th sub-area. I and O refer to the entire population in the geographic area under analysis.

23. The immigrant population is defined as the number of residents born overseas.
24. Hunter (1995b) finds that public transport problems are likely to be particularly pronounced in large cities, especially Sydney.

25. Almost one-quarter (22.9 per cent) of the unemployed urban Indigenous population either experienced transport problems or would have to travel too far to find work.
26. In a recent United Kingdom study, Gregg and Wandsworth (1995) show that the most successful method utilised by unemployed males to find a job is through friends and contacts. The utilisation rate of this method is not the highest but it has the highest success rate. Among males, one-third of jobs are found this way. Among women, one-quarter of jobs are found using this method. Montgomery (1991) estimates that 50 per cent of all workers currently employed in the US found their jobs through friends and relatives.
27. However, one countervailing factor to this problem is the Community Development Employment Projects scheme which is more likely to provide employment in areas with concentrations of Indigenous people (for example, Redfern).

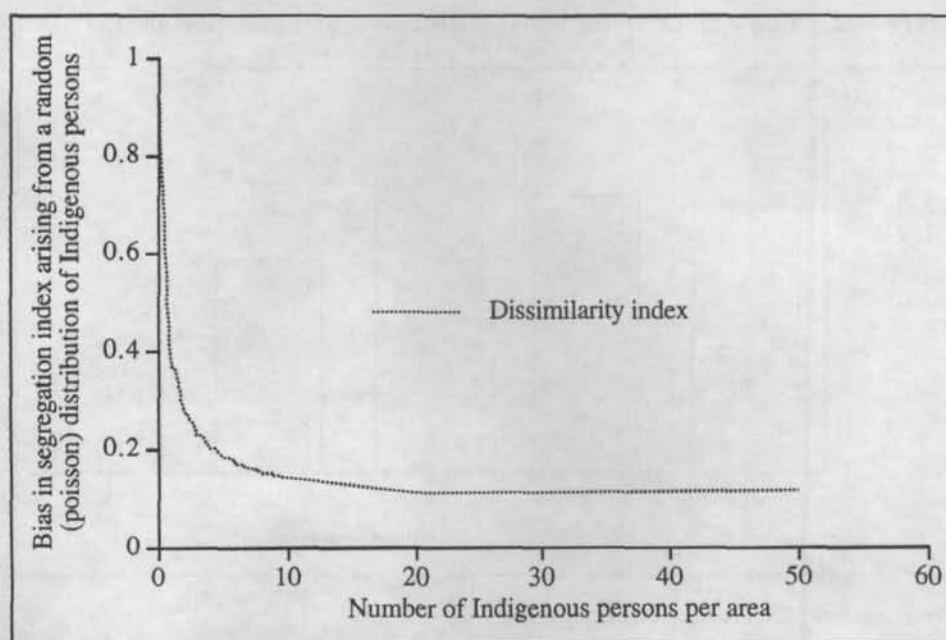
Appendix A. The small population problem for measurement of residential segregation.

This appendix considers several numerical examples to illustrate the problem of calculating the index of dissimilarity when there is only a small population of Indigenous people in an area. Consider the level of segregation in two states of the world in which the Indigenous population are spread as evenly as possible across all areas. However, in state A the Indigenous population is too small to spread throughout all areas. Table A.1 indicates that measured segregation is higher in state A simply because of the small numbers of Indigenous people in the overall population.

Table A.1. The small population problem and segregation.

Area	State A		State B	
	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous
1	0	1	1	1
2	1	1	1	1
3	1	1	1	1
Dissimilarity index	0.33		0	

Figure A.1. Small numbers bias in the index of dissimilarity.^a



- a. The above simulated segregation indexes are calculated assuming that there are 100 persons per area in 100 areas. The Indigenous population are assumed to be randomly assigned across these areas using a Poisson distribution.

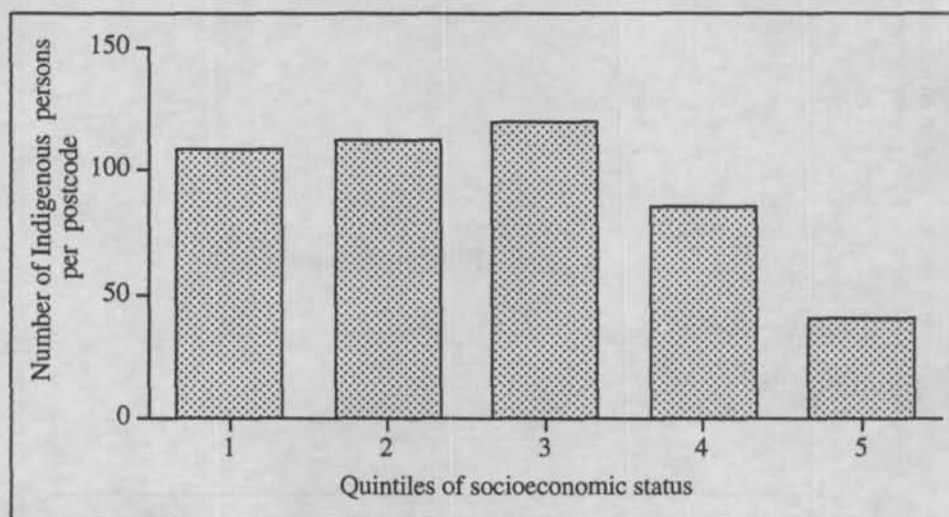
In both states, the Indigenous population is spread evenly throughout the community. However, since people are indivisible, state A has a higher level of measured segregation. The reason for the variation in measured segregation is that state A does not have enough Indigenous persons to spread around all areas.

Even if there are sufficient numbers of Indigenous persons to theoretically spread among all areas, there will be some difference in measured segregation. For example, if we add one to the Indigenous and non-Indigenous population in each areas in both states A and B then there will be a difference in the measured segregation. The new dissimilarity index in states A and B would then be 0.13 and 0 respectively. This illustrates that the distortion in measured segregation caused by the indivisibility of human beings reduces quickly as we increase the size of the population but is not entirely eliminated until the population size of all sub-populations becomes very large.

Table A.1 illustrates the existence of a small population problem. However, the extent of the problem needs to be quantified using a more sophisticated statistical technique. Given that people are indivisible an elementary count data model which use a Poisson distribution was deemed appropriate.¹ Figure A.1 graphs the simulated bias of the dissimilarity index generated by randomly assigning individuals to areas using a Poisson process. The figure illustrates that the vast majority of the bias is eliminated for the dissimilarity index if there are more than ten Indigenous people per area.

Table A.1 and Figure A.1 illustrate one potential problem of placing too much emphasis on segregation indexes where the population is very small. Several issues arise in the context of this discussion paper. Is there any systematic bias in the measurement of segregation across postcodes ranked by SES? Depending on the answer to this question, it can be determined whether the postcode is the appropriate level of analysis.

Figure A.2. Numbers of Indigenous Australians per postcode in 1991.



CDs are aggregated into 743 major urban postcodes.

Source: ABS (1991) and the urban index of relative socioeconomic advantage from ABS (1990).

Figure A.2 indicates that the postcode is the appropriate level of analysis for this paper. The small population problem does not affect the overall analysis of SES and segregation because all SES areas have an average of more than 40 Indigenous people per postcode in them.

The other levels' geographic units either suffer from the small population problem or preclude the analysis of the relationship of SES and segregation. Clearly CDs are too small, given that high SES areas have many fewer than ten Indigenous persons per CD in them. Higher levels of aggregation such as Statistical Local Areas or Local Government Areas do not facilitate ranking by SES and therefore preclude the proceeding analysis.

Appendix Note

1. The Poisson distribution is defined as $Prob(Y_i = y_i) = \frac{e^{-\lambda_i} \lambda_i^{y_i}}{y_i!}$.

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