CENTRE FOR ABORIGINAL ECONOMIC POLICY RESEARCH

THE AUSTRALIAN NATIONAL UNIVERSITY

Location or Qualifications? Revisiting Indigenous Employment through an Analysis of Census Place-of-Work Data

N. Biddle

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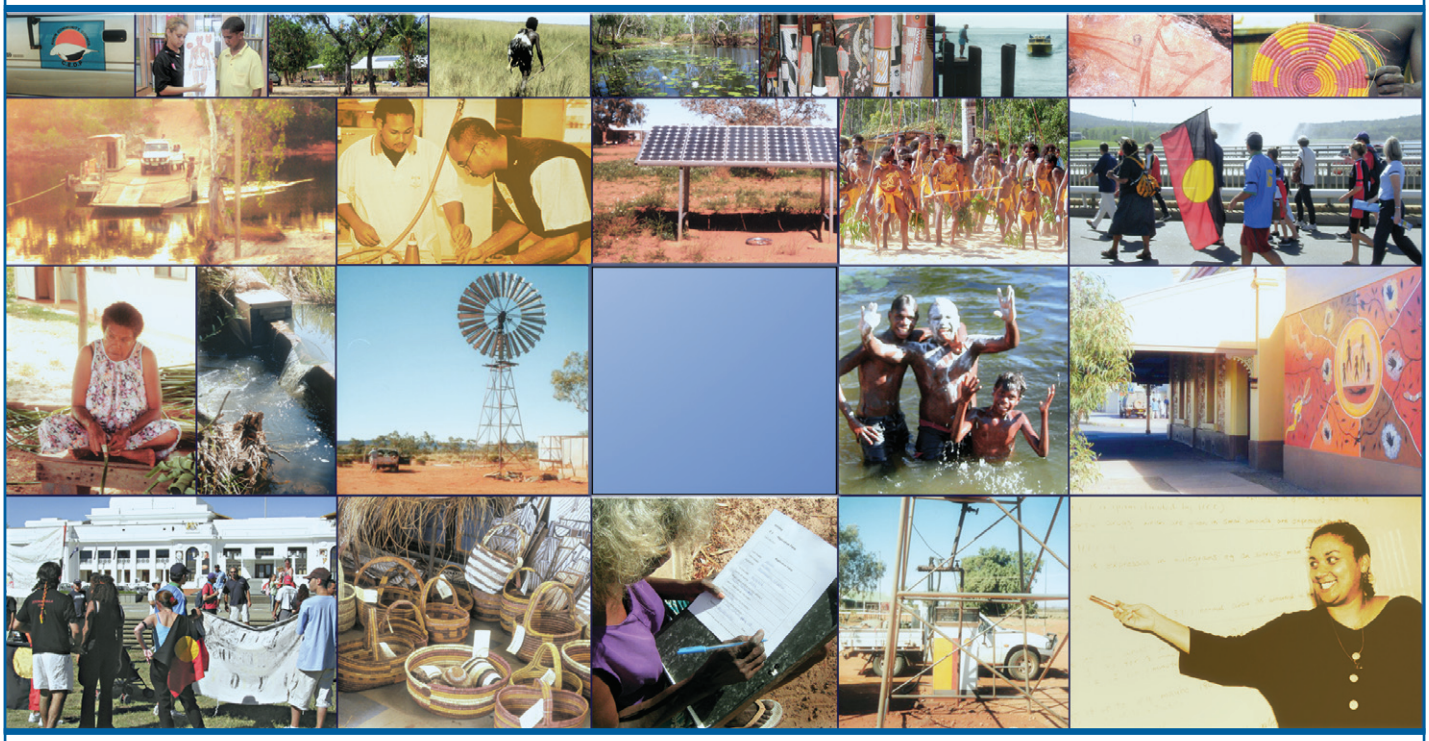

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Ministerial Council for Aboriginal
and Torres Strait Islander Affairs

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Location or qualifications? Revisiting Indigenous employment through an analysis of census place-of-work data

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ABSTRACT

One of the potential constraints on achieving the Council of Australian Governments' (COAG) employment target is location. It has been noted by a number of authors that the very different geographic distributions of the Indigenous and non-Indigenous populations is a key factor in explaining the former's socioeconomic disadvantage relative to the latter. The aim of this paper is to revisit the potential role of location in explaining poor Indigenous employment outcomes through an analysis of Indigenous and non-Indigenous Australians' place of work. The analysis presented in the paper focuses on a number of issues including the distribution of Indigenous employment, inward and outward flows, and commuting behaviour, as well as local employment prospects. One of the main conclusions from the analysis is that Indigenous Australians live in areas that have a slightly higher number of jobs per usual resident than do non-Indigenous Australians. Ultimately, the results presented in this paper support an emphasis on Indigenous labour supply in meeting COAG's employment targets. It would appear that it is the ability of the Indigenous population to secure the jobs that are available, rather than the location of jobs, that is most important in explaining Indigenous labour under-utilisation.

Keywords: Indigenous employment, journey to work, spatial mismatch, 2006 Census.

CAEPR INDIGENOUS POPULATION PROJECT

This project has its genesis in a CAEPR report commissioned by the Ministerial Council for Aboriginal and Torres Strait Islander Affairs (MCATSIA) in 2005. The aim of the paper (published as CAEPR Discussion Paper No. 283) was to synthesise findings from a wide variety of regional and community-based demographic studies. What emerged was the identification of demographic 'hot spots'—particular Indigenous population dynamics in particular regions that give rise to issues of public policy concern. These trends spatially align with specific categories of place that transcend State and Territory boundaries. The 'hot spots' coalesce around several structural settings including city suburbs, regional towns, town camps, remote Indigenous towns, and outstations, as opposed to the more formal regionalised or jurisdictional spatial configurations that have tended to guide and inform Indigenous policy development.

Recognising that the structural circumstances facing Indigenous populations are locationally dispersed in this way, MCATSIA has established an enhanced research capacity at CAEPR to further explore the dynamics and regional geography of Indigenous population and socioeconomic change.

This research activity commenced in late 2007 and is constructed around four discrete yet overlapping projects:

- a detailed regional analysis of relative and absolute change in Indigenous social indicators
- an assessment of social and spatial mobility among Indigenous metropolitan populations
- case-study analyses of multiple disadvantage in select city neighbourhoods and regional centres
- the development of conceptual and methodological approaches to the measurement of temporary short-term mobility.

Working Papers related to these projects are co-badged with MCATSIA and released as part of the CAEPR Working Paper Series. It should be noted that the views expressed in these publications are those of the researcher/s and do not necessarily represent the views of MCATSIA as a whole, or the views of individual jurisdictions.

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EXECUTIVE SUMMARY

1. One of the potential constraints on achieving the Council of Australian Governments' (COAG) employment target is location. It has been noted by a number of researchers that the respective geographic distributions of the Indigenous and non-Indigenous populations is a key factor in explaining the former's socioeconomic disadvantage relative to the latter.

2. One characteristic of the area-level analysis of Indigenous outcomes is that it is based almost exclusively on the concept of usual residence. That is, the characteristics of those who live in the areas that Indigenous Australians live in are compared with the characteristics of those who live in the areas that non-Indigenous Australians live in. However, according to the 2006 Census, 64.9 per cent of the employed population worked in a different Statistical Local Area (SLA) to the one in which they identified as being their place of usual residence. The aim of this paper is to revisit the potential role of location in explaining poor Indigenous employment outcomes through an analysis of Indigenous and non-Indigenous Australians' place of work. The analysis in the paper is structured around the research questions outlined below.

COAG: Council of Australian Governments

SLA: Statistical Local Area

How is Indigenous employment distributed across Australia and how does this compare to the distribution of the usual resident Indigenous population?

3. Looking at both the usual resident and place-of-work population, it is clear that in absolute terms the Indigenous population is predominantly urban. Within non-remote Australia there is, however, some realignment by place of work, with a higher percentage of Indigenous workers identifying city areas as their place of work compared to the percentage who identified city areas as their place of usual residence. The reverse was true for large regional towns, small regional towns and regional rural areas. The distribution of Indigenous workers in remote location types (LTypes) was similar to the distribution of the usual resident population.

LType: location type

4. Area-level segregation of Indigenous workers relative to the non-Indigenous population is lower than the level of residential segregation. Those Indigenous Australians who are highly skilled or in jobs with a wage premium are more likely to work in areas with other non-Indigenous Australians who have similar characteristics. On the other hand, low-skilled and lowly remunerated Indigenous Australians are more likely to work in areas where comparable non-Indigenous Australians do not.

What types of areas have a large outward movement of usual residents for work and what type of areas have a large inward movement of workers? Furthermore, what is the net effect on respective population counts?

5. There are two potential reasons why the distribution of Indigenous employment might be different to the distribution of Indigenous usual residents. The first is through differences in the rate of employment compared to non-employment. The other potential reason is commuting or travelling for employment.

6. City areas had the highest rate of outward movement but they also had the highest rate of inward movement. This implies that city areas have higher rates of mobility than the rest of the country, rather than having particular attractive or unattractive employment prospects per se.

7. There was also net movement for the Indigenous population out of regional rural areas, but net flows into predominantly non-Indigenous remote towns and remote dispersed settlements. For the non-Indigenous population, there was also a net flow into these latter LTypes. According to the census, there were a substantial number of non-Indigenous Australians working in remote LTypes who did not live there.

8. Ultimately, one of the most important things to note from the analysis of Indigenous employment flows was the constant term for the rate of outward movement. Holding geographic characteristics constant, Indigenous Australians were only slightly less likely to leave their area for work than the non-Indigenous population. The big difference in raw numbers for the two populations is therefore as a result of the types of areas in which Indigenous Australians live, rather than any unwillingness to commute or travel for work.

Focusing on those who do work outside their area of usual residence, how does the distance that people travel to work vary by geography?

9. Indigenous Australians travelled on average 27.4 km for work. This was somewhat larger than the 20.9 km that non-Indigenous Australians on average travelled for work. Once those who worked in their area of usual residence were excluded, the average distance travelled for work was 62.8 km for Indigenous employment migrants and 32.1 km for non-Indigenous employment migrants. However, the average distance away from one's area of usual residence is skewed somewhat by large values at the extreme end of the distribution. This was especially the case for the Indigenous population.

10. Of those Indigenous Australians who travelled outside their area of usual residence for work, those who lived in city areas travelled the shortest distance on average. Those who lived in regional Australia travelled on average further than those in city areas, whereas those who lived in remote Australia travelled the furthest.

How does the method by which people travel to work vary across Australia?

11. Like the non-Indigenous population, the majority of the non-Indigenous population travelled to work as the driver of a car. However, for the Indigenous population, this was only a bare majority compared to the non-Indigenous population, over two-thirds of which reported using this mode of transport. More non-Indigenous Australians also used public transport than the Indigenous population and more worked from home. The modes of transport that Indigenous Australians were most likely to use (relative to the non-Indigenous population) were as a passenger in a car or walking.

12. Much of the difference between the Indigenous and non-Indigenous populations is driven by the types of areas in which the two populations live. For example, without standardising the population, fewer Indigenous Australians took public transport to work than the non-Indigenous population. However, after standardising the distribution of the population by geography to take into account availability, a higher percentage of Indigenous Australians were estimated to use that method.

What is the average number and type of job in the areas in and around those in which Indigenous Australian live? How do these employment prospects vary once the number of usual residents that these jobs are likely to be spread over are controlled for?

13. In absolute terms, the Indigenous population live in areas that have far fewer employment options than the non-Indigenous population. When the average number of jobs within the local area is divided by the total number of usual residents the picture becomes quite different. Rather than living in areas of poor employment prospects, Indigenous Australians in fact live in areas that have a slightly higher number of jobs per usual resident (0.689) than do non-Indigenous Australians (0.660 jobs).

14. It is in remote Australia that the Indigenous Areas (IAREs) where Indigenous Australians live appear to have the most favourable employment prospects, with 0.77 jobs per usual resident on average in predominantly non-Indigenous remote towns.

IARE: Indigenous Area

How are these local employment prospects related to actual employment outcomes?

15. At an area level, education, demographic and geographic characteristics explain a large amount of the variation in Indigenous employment outcomes.

16. After controlling for these characteristics, for Australia as a whole and non-remote Australia in particular, those Indigenous Australians who live in areas with a higher number of jobs have a higher probability of being employed. Even if the distribution of employment opportunities did not explain the difference between the Indigenous and non-Indigenous populations, it did explain some of the variation in employment outcomes within the Indigenous population. This highlights a potential role for policies related to employment demand in reducing disparities within the Indigenous population.

17. It is not possible to completely eliminate the role of spatial mismatch in explaining Indigenous employment disparity using aggregate data. Ideally, individual data should be used to analyse Indigenous employment disparities, as this would allow the researcher to control for other human capital characteristics. Unfortunately, however, this data is only available for internal research within the Australian Bureau of Statistics (ABS).

ABS: Australian Bureau of Statistics

18. Ultimately, the results presented in this paper support an emphasis on Indigenous labour supply in meeting COAG's employment targets. It would appear that it is the ability of the Indigenous population to secure the jobs that are available, rather than location of the jobs that is most important in explaining Indigenous labour under-utilisation.

INTRODUCTION AND OVERVIEW

In his apology to the stolen generations in early 2008, the Australian Prime Minister Kevin Rudd outlined a 'new partnership on closing the gap' (Rudd 2008). The focus of this partnership, from the government's point of view, was a number of explicit targets aimed at eliminating or at least substantially reducing the disparity between Indigenous and non-Indigenous Australians in a number of outcomes. The centrepiece of this Closing the Gap agenda was to close the 'life expectancy gap' within a generation (Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) 2009). However, in addition to targets related to education, the Federal Government and COAG were also committed to 'halve the gap in employment outcomes between Indigenous and non-Indigenous Australians within a decade' (COAG 2009; FaHCSIA 2009).

FaHCSIA: Department of Families, Housing, Community Services and Indigenous Affairs

CDEP: Community Development Employment Program

At the time of the 2006 Census, 46.0 per cent of the Indigenous population aged 15 years and over were employed, compared to 61.7 per cent of the non-Indigenous population. Biddle, Taylor and Yap (forthcoming) estimate that, after taking into account population growth, 82,565 jobs would be required by 2016 to meet COAG's employment goal. This rises to 117,289 jobs required if jobs lost through the changes in the Community Development Employment Program (CDEP) are taken into account. When one considers that only 49,325 more Indigenous Australians were employed in 2006 compared to 1996, a time of rapid economic expansion in the general economy, it is clear that halving the gap in employment between Indigenous and non-Indigenous Australians is not going to be easy.

There are three potential constraints on achieving COAG's employment target: qualification, inclination and location. In the modern Australian economy, most jobs require particular skills or experience. Even those jobs for which particular training is not required are more likely to be given to applicants with more or better qualifications. Across almost all indicators, Indigenous Australians lag behind the non-Indigenous population in terms of qualifications in particular, and other measures of human capital in general, like health and labour market experience. For example, according to the most recent census, 23.9 per cent of the Indigenous population 15 years and over had completed Year 12 compared to 49.7 per cent of the non-Indigenous population. The difference between the percentage of the respective populations with bachelor degrees or higher is even greater still.

The second explanation for persistently high employment gaps between the Indigenous and non-Indigenous populations, inclination, is used by those across the political spectrum, albeit with different explanations and conclusions drawn. Whether it is because of 'passive welfare' (Pearson 2009: 159) or alternative activities in the 'hybrid economy' (Altman 2009: 9) a number of authors argue that, on average across the two populations, the incentive or inclination to undertake work in the wage economy is lower for Indigenous Australians than non-Indigenous Australians.

The suggested response to these different Indigenous and non-Indigenous preferences varies. Where Pearson (2009) argues for radical change to the welfare system as it relates to Indigenous Australians, Altman (2009) argues for a greater recognition and acceptance of diversity in setting government targets. Ultimately though, both authors make the case that COAG's employment targets are unlikely to be met without considerable changes to Indigenous incentives (whether that is desirable or not) and the property rights to natural resources.

The final potential constraint on achieving COAG's employment target—location—is the subject of this paper. It has been noted by a number of authors (e.g. Biddle forthcoming; Hughes & Warin 2005; Tesfaghiorghis 1991) that the respective geographic distributions of the Indigenous and non-Indigenous populations is a key factor in explaining the former's socioeconomic disadvantage relative to the latter. However, these authors focus to varying degrees on the relative concentration of Indigenous Australians in remote Australia, whereas over three-quarters of the Indigenous population live in regional Australia or major cities (ABS 2008).

Even outside of remote Australia, there is the potential for location to impact on the employment prospects of Indigenous Australians. Biddle (2009a) studied the residential patterns of the 43 per cent of Indigenous Australians who lived in the 28 urban centres with 2,000 or more Indigenous Australians. The findings from this study were that Indigenous Australians in these urban centres were concentrated in particular suburbs and neighbourhoods. Furthermore, residents of the neighbourhoods in which Indigenous Australians were most likely to live had substantially worse employment and other socioeconomic outcomes than the neighbourhoods in which non-Indigenous Australians were concentrated.[1]

One characteristic of the area-level analysis of Indigenous employment and other socioeconomic outcomes is that it is based almost exclusively on the concept of usual residence. That is, the characteristics of those who *live* in the areas that Indigenous Australians live in are compared with the characteristics of those who *live* in the areas that non-Indigenous Australians live in. In many contexts, this is the most appropriate approach, as most of the potential area-level effects identified by Bolt, Burgers and van Kempen (1998), Buck (2001), Durlauf (2004) and others relate to the networks in and around a person's lived environment. Leaving aside the problematic nature of usual residence (see Morphy 2008), the other problem with relying solely on usual residence is that where a person lives is not always the same as where they work.

According to the 2006 Census, 64.9 per cent of the employed population worked in a different SLA to the one which they identified as being their place of usual residence. This is perhaps not surprising given only 5.4 per cent of the population worked at home, according to the census. However, it does show that analysing where people live relative to where jobs are actually located will give additional insight compared to an analysis of usual residence only.

There has been a large amount of research in Australia that looks at the relationship between a person's place of work and their place of usual residence. With data from as far back as the 1960s (Alexander 1979), this analysis has used journey-to-work data in a number of ways. This includes the method by which people travel to work (Mees, O'Connell & Stone 2008), the spatial distribution of work origin and destination (O'Connor, Stimson & Daly 2001) and the development of functional economic regions (Mitchell, Bill & Watts 2007). Added to this literature on patterns and methods of travel to work is the concept of spatial mismatch. Starting in the US with Kain (1968), this research has used the distribution of jobs relative to usual residents as an explanation for poor minority employment outcomes. The alternative concept of skills mismatch (Houston 2005) or racial mismatch (Hellerstein, Neumark & McInerney 2008) have also been tested without being able to discount the distribution of jobs as one of the contributing factors in explaining poor minority employment.

Missing from the literature is a consideration of whether these local employment prospects in any way contribute to the large gap in employment probabilities between Indigenous and non-Indigenous Australians. This paper aims to address this issue. In order to understand the potential role of the location of jobs in explaining Indigenous employment outcomes, it is important to first identify Indigenous journey-to-work patterns. This includes the mode of travel between the workplace and usual residence of Indigenous Australians, as well as the relative distance between the two. The analysis in this paper is therefore structured sequentially around the following research questions:

- How is Indigenous employment distributed across Australia and how does this compare to the distribution of the usual resident Indigenous population?
- What types of areas have a large outward movement of usual residents for work and what type of areas have a large inward movement of workers? Furthermore, what is the net effect on respective population counts?
- Focusing on those who do work outside their area of usual residence, how does the distance that people travel to work vary by geography?

- How does the method by which people travel to work (car, public transport, walking, etc.) vary across Australia?
- What is the average number and type of job in the areas in and around those in which Indigenous Australian live? How do these employment prospects vary once the number of usual residents that these jobs are likely to be spread over are controlled for?
- How are these local employment prospects related to actual employment outcomes?

The final section of the paper summarises the main results from the analysis and considers the implications for policy and future research. The next section of the paper outlines the data and geography used in the analysis.

DATA AND GEOGRAPHY

The data for this paper comes from the 2006 Census of Population and Housing. The analysis utilises a cross-tabulation of a person's place of work (identified using the question on workplace address) with a person's place of usual residence. This data was provided by the ABS at the SLA level, of which there were 1,415 usable areas.

The analysis in this paper is undertaken separately for Indigenous and non-Indigenous Australians. The former includes those who identify as being Aboriginal, Torres Strait Islander or both Aboriginal and Torres Strait Islander. Those who do not state their Indigenous status are excluded from the analysis.

As the analysis focuses on people's place of work, most of the data is restricted to those who were at least 15 years old and employed in the week preceding the census. Out of a total sample of 455,030 Indigenous Australians counted in the 2006 Census, 122,751 were employed, of which 104,282 stated both their place of work and place of usual residence alongside. This is compared to a usable sample of 7,988,788 non-Indigenous Australians.

Given the relatively small Indigenous sample size and the fact that SLAs vary substantially in size by jurisdiction and geographic area, the 1,415 SLAs were aggregated into 531 Indigenous Areas (IAREs) for the majority of the analysis.[2]

On the one hand, this aggregation will lead to a slightly less fine-grained analysis. For example, 43.7 per cent of the Indigenous population worked outside their SLA in the week leading up to the census compared to only 34.2 per cent of the population who worked outside their IARE.

On the other hand, by using a geography that is designed specifically for the Indigenous population and is therefore reasonably consistent in terms of population size, there are far fewer areas with small sample sizes than if SLAs were used. Looking at the place of usual residence of Indigenous Australians in the sample, the lowest population count for IAREs is 11, and there are only a further four areas with populations under 30 people. Compared to this, there were 73 SLAs with no employed Indigenous usual residents, a further 209 with 1–9 usual residents, and a further 373 with 10–29 usual residents.

The other benefit of using IAREs as the unit of geography is that it allows analysis to be carried out by the LType classification developed in Taylor and Biddle (2008). While based on the standard five-category remoteness classification used by the ABS known as the Accessibility/Remoteness Index of Australia (ARIA), the LType classification also takes into account urban centre size, as well as the share of the population who identified as being Indigenous. Regression analysis undertaken for Biddle and Prout (2009) and Biddle (2009b) showed that the LType classification explained a much greater proportion of the variation in short-term mobility and long-term migration respectively than did the ARIA classification, hence its use in this paper.

ARIA: Accessibility/ Remoteness Index of Australia

Table 1. Indigenous and non-Indigenous population counts and shares by LType: Usual resident population aged 15+ and place-of-work population, 2006

	Total usual resident population		Usual resident population aged 15+		Place-of-work population	
Indigenous	**Count**	**Share**	**Count**	**Share**	**Count**	**Share**
City areas	154,674	34.1	92,892	34.7	40,592	38.9
Large regional towns	106,762	23.6	61,254	22.9	22,626	21.7
Small regional towns and localities	76,073	16.8	43,173	16.1	14,504	13.9
Regional rural areas	10,612	2.3	6,049	2.3	1,870	1.8
Predominantly non-Indigenous remote towns	31,920	7.0	19,017	7.1	7,541	7.2
Predominantly Indigenous remote towns	50,655	11.2	31,070	11.6	12,105	11.6
Town camps	2,086	0.5	1,416	0.5	398	0.4
Remote dispersed settlements	20,423	4.5	12,587	4.7	4,597	4.4
Total (Australia)	**453,205**	**100.0**	**267,458**	**100.0**	**104,233**	**100.0**
Non-Indigenous	**Count**	**Share**	**Count**	**Share**	**Count**	**Share**
City areas	12,848,425	70.5	8,761,007	71.5	5,871,162	73.4
Large regional towns	2,853,998	15.7	1,855,217	15.2	1,173,497	14.7
Small regional towns and localities	1,837,188	10.1	1,170,472	9.6	672,022	8.4
Regional rural areas	461,108	2.5	299,296	2.4	142,668	1.8
Predominantly non-Indigenous remote towns	175,586	1.0	121,841	1.0	99,754	1.2
Predominantly Indigenous remote towns	7,157	0.0	5,762	0.0	6,959	0.1
Town camps	61	0.0	58	0.0	31	0.0
Remote dispersed settlements	44,650	0.2	31,767	0.3	31,584	0.4
Total (Australia)	**18,228,173**	**100.0**	**12,245,420**	**100.0**	**7,997,677**	**100.0**
Indigenous share						
City areas		1.2		1.0		0.7
Large regional towns		3.6		3.2		1.9
Small regional towns and localities		4.0		3.6		2.1
Regional rural areas		2.2		2.0		1.3
Predominantly non-Indigenous remote towns		15.4		13.5		7.0
Predominantly Indigenous remote towns		87.6		84.4		63.5
Town camps		97.2		96.1		92.8
Remote dispersed settlements		31.4		28.4		12.7
Total (Australia)		**2.4**		**2.1**		**1.3**

Source: Customised calculations using the 2006 Census of Population and Housing.

THE DISTRIBUTION OF INDIGENOUS EMPLOYMENT

This first section of results summarises the distribution of Indigenous population and employment across Australia. Table 1 gives the usual resident population, the usual resident population 15 years and over, and the place-of-work population (or those who worked in the area) by LType. The first section of the table looks at the Indigenous population, the second section the non-Indigenous population, and the final section the percentage of the relevant population who identified as being Indigenous. For the first two sections, the census count as well as the share of the total Australian population are given.

Looking at both the usual resident and place-of-work population, it is clear that in absolute terms the Indigenous population is predominantly urban. More than three-quarters of the usual resident and place-of-work populations can be found in the first four non-remote LTypes, compared to less than a quarter in remote Australia. Within non-remote Australia there is some realignment by place of work. Specifically, a higher percentage of Indigenous workers identified city areas as their place of work compared to the percentage who identified city areas as their place of usual residence. The reverse was true for large regional towns, small regional towns and regional rural areas. Similar trends were also found for the non-Indigenous population.

While in absolute terms the Indigenous population may predominantly live and work in non-remote Australia, it is when they are compared to the non-Indigenous population that their relative remoteness becomes apparent. In total, 1.3 per cent of applicable workers were identified as being Indigenous. However, only 0.7 per cent of workers in city areas were Indigenous. In remote Australia, the percentage who identified as being Indigenous was much higher than the national average. It is not surprising, given how they have been defined, that predominantly Indigenous remote towns and town camps had a high Indigenous share, however it is interesting to note that there was a substantial decline in that share when comparing the place-of-work population with the place of usual residence population. However, the other two LTypes in remote Australia also had an Indigenous share amongst workers that was substantially higher than the national average, but also substantially lower than the Indigenous share of usual residents.

PLACE-OF-WORK SEGREGATION

A consistent finding from research on the Australian Indigenous population is a more widespread yet clustered distribution relative to the non-Indigenous population. Not only are Indigenous Australians more likely to live in particular regions (generally remote) than the non-Indigenous population, within those regions they are concentrated in particular cities, towns, suburbs and even neighbourhoods (Biddle 2009a). Given the locations which Indigenous Australians are concentrated in are more likely to be those where the population is relatively disadvantaged, this residential segregation has been raised as a potential way in which Indigenous disadvantage is entrenched (Atkinson, Taylor & Walter 2008; Biddle 2009a; Taylor 2006). However, as mentioned previously, 34.2 per cent of the employed Indigenous population was estimated to work outside their IARE of usual residence, with these employment flows having the potential to reduce the degree of place-of-work segregation.

Table 2 compares the degree of residential and place-of-work segregation by IARE. Segregation is calculated using the Theil index (Reardon & Firebaugh 2002), which allows segregation to be additively decomposed into that segregation which is caused by differences in residential or place-of-work patterns by Indigenous Region (IREG), the least disaggregated level of geography in the Australian Indigenous Geographical Classification (AIGC) below State or Territory, and that which is caused by patterns within the regions at the town or suburb level. Clearly, IAREs are larger than the standard neighbourhood size used in most residential segregation analysis, so these results are in many ways an underestimate of residential and place-of-work segregation.

IREG: Indigenous Region

AIGC: Australian Indigenous Geographical Classification

Table 2. Residential and place-of-work segregation by IARE: Theil index decomposed by IREG, 2006

IREG	Number of IAREs	Total usual resident population		Usual resident population aged 15+		Place-of-work population	
		Count	Theil	Count	Theil	Count	Theil
Queanbeyan	9	8,453	0.020	5,111	0.017	1,625	0.017
Bourke	10	7,547	0.162	4,772	0.167	1,466	0.095
Coffs Harbour	25	40,043	0.018	24,353	0.016	8,090	0.009
Sydney	55	41,791	0.067	26,696	0.056	11,075	0.021
Tamworth	14	14,722	0.036	8,824	0.038	2,736	0.028
Wagga Wagga	23	16,306	0.032	9,899	0.029	3,123	0.023
Dubbo	8	9,183	0.012	5,350	0.011	1,776	0.012
Melbourne	23	14,120	0.018	9,300	0.015	4,194	0.006
Non-metropolitan Victoria	22	15,907	0.032	9,613	0.029	3,014	0.021
Brisbane	28	41,369	0.023	25,361	0.019	11,846	0.006
Cairns	18	18,271	0.128	11,278	0.128	4,254	0.148
Mt Isa	6	6,997	0.165	4,312	0.167	1,747	0.154
Cape York	13	6,938	0.482	4,602	0.478	2,276	0.394
Rockhampton	18	15,116	0.055	8,956	0.054	3,543	0.046
Roma	16	12,247	0.111	7,088	0.115	2,765	0.110
Torres Strait	15	7,118	0.126	4,355	0.118	2,574	0.103
Townsville	13	19,045	0.080	11,650	0.082	4,531	0.058
Adelaide	23	16,987	0.033	10,633	0.029	3,737	0.015
Ceduna	3	2,023	0.110	1,277	0.100	468	0.092
Port Augusta	7	6,444	0.264	4,284	0.268	1,439	0.272
Perth	22	21,323	0.034	13,353	0.032	4,333	0.008
Broome	6	3,560	0.153	2,360	0.143	902	0.000
Kununurra	13	4,352	0.217	2,748	0.198	1,124	0.102
Narrogin	17	8,455	0.033	4,985	0.033	1,542	0.016
South Hedland	6	5,666	0.075	3,750	0.075	1,446	0.019
Derby	10	4,450	0.221	2,879	0.217	1,421	0.008
Kalgoorlie	9	5,202	0.176	3,360	0.184	1,346	0.207
Geraldton	8	5,498	0.087	3,430	0.084	1,066	0.055
Tasmania	16	16,720	0.023	10,644	0.021	4,633	0.021
Alice Springs	2	4,498	0.156	2,985	0.178	895	0.000
Jabiru	11	9,150	0.304	5,805	0.280	1,848	0.192
Katherine	10	8,274	0.324	5,244	0.308	1,716	0.257
Apatula	15	9,034	0.188	6,110	0.200	1,269	0.136
Nhulunbuy	11	8,545	0.448	5,723	0.433	1,420	0.045
Tennant Creek	6	3,251	0.211	2,162	0.222	528	0.032
Darwin	17	10,755	0.037	6,815	0.031	3,262	0.047
Australian Capital Territory	3	3,845	0.004	2,456	0.003	1,878	0.001
Australia (total)	**531**	**453,205**	**0.214**	**282,523**	**0.211**	**106,908**	**0.164**
Australia (within)			**0.049**		**0.048**		**0.035**
Australia (between)			**0.165**		**0.164**		**0.129**
Australia (between/total)			**0.771**		**0.777**		**0.787**

Source: Customised calculations using the 2006 Census of Population and Housing.

Table 3. Place-of-work segregation by other characteristics: Theil index decomposed by IREG, 2006

Characteristic	Population	Total	Between	Within	Ratio (between/ total)
Age					
15–24	26,780	0.175	0.136	0.039	0.777
25–34	26,541	0.181	0.144	0.037	0.796
35–54	45,712	0.160	0.125	0.036	0.781
55+	7,875	0.157	0.116	0.041	0.739
Usual hours worked per week					
Part-time (≤34 hours)	44,073	0.255	0.203	0.053	0.796
Full-time (≥35 hours)	59,122	0.109	0.087	0.022	0.798
Employment sector					
Government	29,251	0.273	0.216	0.057	0.791
Non-government	73,944	0.121	0.096	0.026	0.793
Occupation					
Manager or professional	19,665	0.107	0.082	0.025	0.766
Labourer	24,744	0.308	0.246	0.062	0.799
Other occupation	60,078	0.126	0.099	0.027	0.786
Income					
Low (<$250 per week)	22,769	0.401	0.326	0.075	0.813
Medium ($250–$999 per week)	65,414	0.130	0.103	0.027	0.792
High (≥$1000 per week)	16,620	0.073	0.059	0.014	0.808
All workers	106,908	0.164	0.129	0.035	0.787

Source: Customised calculations using the 2006 Census of Population and Housing.

The first column in Table 2 gives the number of IAREs in that IREG, with the remaining columns giving the population count and level of segregation in that IREG for the total usual resident population, the usual resident population 15 years and over, and the place-of-work population. The final four lines of the table give the total level of segregation for the respective population, the amount of segregation caused by within-region patterns, the amount of segregation caused by between-region patterns and the ratio of between segregation to total segregation.

Looking at the last section of the table, it is clear that the area-level segregation of Indigenous workers relative to the non-Indigenous population is lower than the level of residential segregation, with only a very small proportion of this decline resulting from differences in residential location of the working-age population. Furthermore, there were declines in both within and between segregation meaning that the proportion of segregation caused by differences in the distribution across regions stayed reasonably constant.

There were only four regions—Cairns, Port Augusta, Kalgoorlie and Darwin—that had a higher level of place-of-work segregation than residential segregation. For a further two, Dubbo and Roma, the two segregation measures were essentially the same. In the remaining 31 IREGs, the distribution of Indigenous workers across IAREs was more even than the distribution of usual residents. In particular, Broome, Derby and Alice Springs all had quite high levels of residential segregation by IARE, but virtually no place-of-work segregation.

The results presented in Table 2 clearly show that, in general, there is a more even distribution of Indigenous workers than Indigenous usual residents. However, place-of-work segregation is still quite large, with much of the segregation resulting from the distribution of workers across regions rather than across particular suburbs, towns or communities. In order to help understand the potential causes of this segregation, it is important to consider whether certain types of Indigenous workers have a particularly uneven distribution. The results presented in Table 3 consider national place-of-work segregation by the age, hours worked, employment sector, occupation and income of the workers.

Compared to the other disaggregations of workers, there is very little difference by age in place-of-work segregation. In general, there is a slightly more even distribution across IAREs for older compared to younger workers, although this difference is marginal.

There was a more even distribution of full-time compared to part-time workers; those in the non-government compared to government sector; managers and professionals compared to labourers; and those with higher incomes. In essence, those Indigenous Australians who are highly skilled or in jobs with a wage premium are more likely to work in areas with other non-Indigenous Australians of similar characteristics. On the other hand, low-skilled and lowly remunerated Indigenous Australians are more likely to work in areas where comparable non-Indigenous Australians do not.

INDIGENOUS EMPLOYMENT FLOWS

The previous section of results demonstrated a number of differences in the distribution of employment compared to the residential distribution of the Indigenous population. There are two potential reasons why the distribution of Indigenous employment might be different to the distribution of Indigenous usual residents. The first is through differences in the rate of employment compared to non-employment by LType or IARE. If a higher proportion of Indigenous Australians in a particular region or type of area are more likely to be unemployed, or not in the labour force, compared to other parts of the country, then these areas will have fewer Indigenous workers compared to usual residents (proportionately). Biddle, Taylor and Yap (forthcoming) show distinct regional and area-based patterns of rates of Indigenous employment, so this is likely to explain at least some of the differences discussed earlier.

The other potential reason for a difference in the distribution of employment and residents is, of course, commuting or travelling for employment. That is, people who live in a particular area but have a place of work that is in another city, suburb or town. It has already been mentioned that 34.2 per cent of the employed Indigenous population worked in a different IARE compared to the one in which they lived. When combined with the 51.0 per cent of the non-Indigenous population who worked in a different IARE compared to where they lived, this commuting has the potential to substantially change the relative geographic distribution of the two populations.

Understanding the distribution of employment flows can give important insights into the patterns and causes of Indigenous labour under-utilisation. If Indigenous Australians are less likely to travel outside their area of usual residence for work then they may have fewer jobs available to choose from, even after controlling for the employment prospects in their local area.

Table 4. Association between rates of employment flows, LType and State or Territory of IARE: Indigenous and non-Indigenous Australians, 2006

	Indigenous			Non-Indigenous		
Explanatory variable	Outward	Inward	Net	Outward	Inward	Net
Large regional towns	–31.6	–27.7	n.s.	–33.9	–25.7	n.s.
Small regional towns and localities	–39.8	–37.3	n.s.	–42.6	–34.0	n.s.
Regional rural areas	–23.8	–32.5	–16.0*	–29.7	–34.5	n.s.
Predominantly non-Indigenous remote towns	–59.9	–39.0	12.5*	–60.6	–27.6	26.8
Predominantly Indigenous remote towns	–73.0	–52.4	n.s.	–71.8	–21.4	43.1
Town camps	–74.6	n.s.	n.s.	–75.6	n.s.	n.s.
Remote dispersed settlements	–68.4	–45.5	12.3*	–64.7	–15.8	43.9
Victoria	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Queensland	7.9	n.s.	n.s.	5.8	6.7	n.s.
South Australia	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Western Australia	9.9	7.5	n.s.	6.2	16.6	13.7
Tasmania	n.s.	n.s.	n.s.	8.5*	11.0*	n.s.
Northern Territory	25.9	8.6	–11.5*	25.9	12.4	n.s.
Australian Capital Territory	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Constant	61.5	50.9	n.s.	64.4	46.6	–12.9
Adjusted R-Squared	0.5868	0.3707	0.0175	0.5852	0.2457	0.1679

Source: Customised calculations using the 2006 Census of Population and Housing.

Notes: n.s. = variables that were not significant at the 10% level of significance.
* = variables that were significant at the 10% level but not the 5% level.
The base case is a city area in New South Wales.

In this section three aspects of commuting are considered: outward flows (the percentage of the population who left a given IARE for employment); inward flows (the percentage of the population who worked in a given IARE but did not live there); and net flows (the difference between the two).[3]

A regression approach is used to analyse the distribution of these three aspects of employment flows across the IAREs, with the parameters of the model estimated using the ordinary least squares (OLS) technique. Two models are used for each of the dependent variables, with the first (Model 1) including the LType and State or Territory of the IARE only. The second model (Model 2) includes these variables but also has a number of additional variables that capture geographic, demographic and socioeconomic characteristics of the area. These include the size of the area, the socioeconomic rank of the usual resident Indigenous and non-Indigenous population (calculated separately in Biddle forthcoming), and the level of population migration into and out of the area.

OLS: ordinary least squares

Looking down the first column in Table 4, it is clear that those Indigenous Australians whose usual residence is in a city area are much more likely to leave that IARE for their job. Based on the size of the coefficients, regional rural areas and large regional towns have the next highest level of outward flows, while town camps and predominantly Indigenous remote towns have the lowest level of outward migration. Although the scale was slightly different, these patterns were also found for the non-Indigenous population.

Table 5. Association between rates of employment flows and LType, State or Territory and other characteristics of IARE: Indigenous and non-Indigenous Australians, 2006

	Indigenous			Non-Indigenous		
Explanatory variable	Outward	Inward	Net	Outward	Inward	Net
Large regional towns	–21.6	–24.4	–9.1*	–24.1	–23.1	n.s.
Small regional towns and localities	–22.1	–27.8	–10.0*	–25.4	–26.9	n.s.
Regional rural areas	–7.6*	–21.7	–17.7	–13.0	–24.5	n.s.
Predominantly non-Indigenous remote towns	–38.5	–31.2	n.s.	–41.0	–21.8	14.4*
Predominantly Indigenous remote towns	–50.1	–49.8	n.s.	–55.5	–23.5	24.7
Town camps	–63.1	–37.1*	n.s.	–68.2	n.s.	n.s.
Remote dispersed settlements	–36.8	–35.4	n.s.	–38.5	n.s.	27.1
Victoria	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Queensland	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
South Australia	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Western Australia	8.9	n.s.	–9.6*	5.4*	12.1	n.s.
Tasmania	n.s.	10.1*	n.s.	n.s.	13.5	n.s.
Northern Territory	19.6	n.s.	–19.6	18.7	n.s.	–12.8*
Australian Capital Territory	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Geographic size of area (ln km^2)	–2.4	–1.5	n.s.	–2.5	–1.8	n.s.
Indigenous outcomes in 2nd quartile	–10.7	n.s.	18.2	–9.4	n.s.	15.3
Indigenous outcomes in 3rd quartile	–14.0	7.2	27.7	–11.3	8.5	27.0
Indigenous outcomes in 4th quartile	–20.3	9.3*	33.3	–16.9	9.7*	31.0
Non-Indigenous outcomes in 2nd quartile	8.3	–19.4	–37.4	8.3	–12.6	–24.9
Non-Indigenous outcomes in 3rd quartile	n.s.	–24.8	–41.1	n.s.	–15.6	–25.8
Non-Indigenous outcomes in 4th quartile	n.s.	–28.1	–45.9	n.s.	–16.7	–28.1
Indigenous population out-migration	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Non-Indigenous population out-migration	n.s.	–0.5	–0.6	n.s.	–0.3	–0.4
Indigenous population in-migration	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Non-Indigenous population in-migration	n.s.	n.s.	n.s.	0.2	n.s.	n.s.
Constant	68.5	79.1	28.9	69.0	65.9	n.s.
Adjusted R-Squared	0.6653	0.4385	0.1490	0.6644	0.2959	0.2269

Source: Customised calculations using the 2006 Census of Population and Housing.

Notes: ln km^2 = the natural logarithm of the surface area in square kilometres.
n.s. = variables that were not significant at the 10% level of significance.
* = variables that were significant at the 10% level but not the 5% level.
The base case is a city area in New South Wales where both the Indigenous and non-Indigenous populations are in the 1st (most advantaged) quartile based on their respective distributions of socioeconomic outcomes.

While city areas had the highest rate of outward movement, they also had the highest rate of inward movement. This implies that city areas have higher rates of mobility than the rest of the country, rather than having particular attractive or unattractive employment prospects per se.

Nonetheless, there were still some differences by LType in terms of net flows, albeit at the 10 per cent level of significance only. There was net movement for the Indigenous population out of regional rural areas, but net flows into predominantly non-Indigenous remote towns and remote dispersed settlements. For the non-Indigenous population, there was also a net flow into these latter LTypes. According to the census, there were a substantial number of non-Indigenous Australians working in remote LTypes who did not live there.

There were also differences by State or Territory in the various employment flows. Indigenous Australians were more likely to leave Queensland IAREs compared to those in New South Wales, whereas there were higher rates of both outward and inward flows for Western Australian IAREs. However, the only jurisdiction which had net flows significantly different from the base case was Northern Territory. On average, more people left Northern Territory IAREs for work than those who came in. For the non-Indigenous population, on the other hand, the only jurisdiction with net flows significantly different from the base case was Western Australia, with higher than average net inflows.

Table 5 contains the results from the expanded model estimates.

There were some differences between the coefficient estimates for the LType variables once other characteristics of the area were controlled for. While city areas still had the highest rate of both outward and inward employment flows for the Indigenous and non-Indigenous population, the size of the coefficients for the other LTypes was smaller. Furthermore, the LTypes that had a significantly different rate of net employment flows for the Indigenous population were slightly different. Regional rural areas once again had significant net outward movement, though in Model 2 it was now significant at the 5 per cent level of significance, whereas predominantly non-Indigenous remote towns and remote dispersed settlements were no longer significant. On the other hand, large and small regional towns now also had significant net outward movement (albeit at the 10% level of significance only).

The strength of the association between jurisdiction and employment flows also varied once additional variables were controlled for. In particular, there was no longer a significant difference between the outward flows of Indigenous Australians in Queensland relative to New South Wales, and no longer a significant difference between Western Australia and New South Wales in terms of inward flows.

Of the additional variables included in Model 2, IAREs which are large in terms of geographic size (measured by the natural logarithm of the area in km^2) had lower rates of outward and inward employment flows. This is perhaps not surprising, as those who lived in these areas would have to travel greater distances to work in another IARE. In addition, people who lived outside of the IARE would have to travel greater distances to work there. However, in net terms, these two effects appear to cancel each other out.

The association between the socioeconomic outcomes of the usual resident population and rates of employment flows are consistent across the Indigenous and non-Indigenous estimates. These variables, taken from Biddle (forthcoming), are defined such that the first quartile (the base case) has the most advantaged socioeconomic outcomes and the fourth quartile the most disadvantaged outcomes. Keeping this in mind, it would appear that in net terms both Indigenous and non-Indigenous Australians tend to travel for work into areas where the Indigenous population is relatively disadvantaged, but travel out of areas where the non-Indigenous population is relatively disadvantaged.

The final set of results in Table 5 (i.e. the association between in-migration and out-migration) show that both Indigenous and non-Indigenous Australians were less likely to commute into areas which had large non-Indigenous outward migration between 2001 and 2006. This is potentially explained by the finding in Biddle and Hunter (2006) that non-Indigenous Australians in particular were found to move out of areas with poor employment prospects.

Table 6. IAREs with large net employment inflows for the Indigenous population, 2006

		Net employment migration	
IARE name	IREG	Indigenous	Non-Indigenous
Perth/Vincent	Perth	1121.4	578.6
Brisbane City Inner North	Brisbane	773.6	496.5
Adelaide/Prospect/Walkerville	Adelaide	762.4	442.5
Cairns—City	Cairns	564.6	426.7
Marrara/Winnellie/Berrimah	Darwin	551.9	345.0
Melbourne/Port Phillip	Melbourne	430.8	365.5
Darwin/Inner Suburbs	Darwin	352.8	87.8
Sydney—Remainder[a]	Sydney	248.1	400.8
Redfern[a]	Sydney	248.1	400.8
Brisbane City Inner South	Brisbane	243.3	185.1
Hobart	Tasmania	227.4	101.6
Auburn	Sydney	203.7	107.7
Perth West	Perth	194.4	40.8
Lower North Sydney	Sydney	174.6	47.8
Greater Dandenong	Melbourne	152.3	79.1
Yarra	Melbourne	144.0	60.1
Fremantle/East Fremantle	Perth	121.3	84.8
Parramatta	Sydney	103.7	54.9
Alawa/Brinkin/Nakara	Darwin	103.3	48.8

Source: Customised calculations using the 2006 Census of Population and Housing.

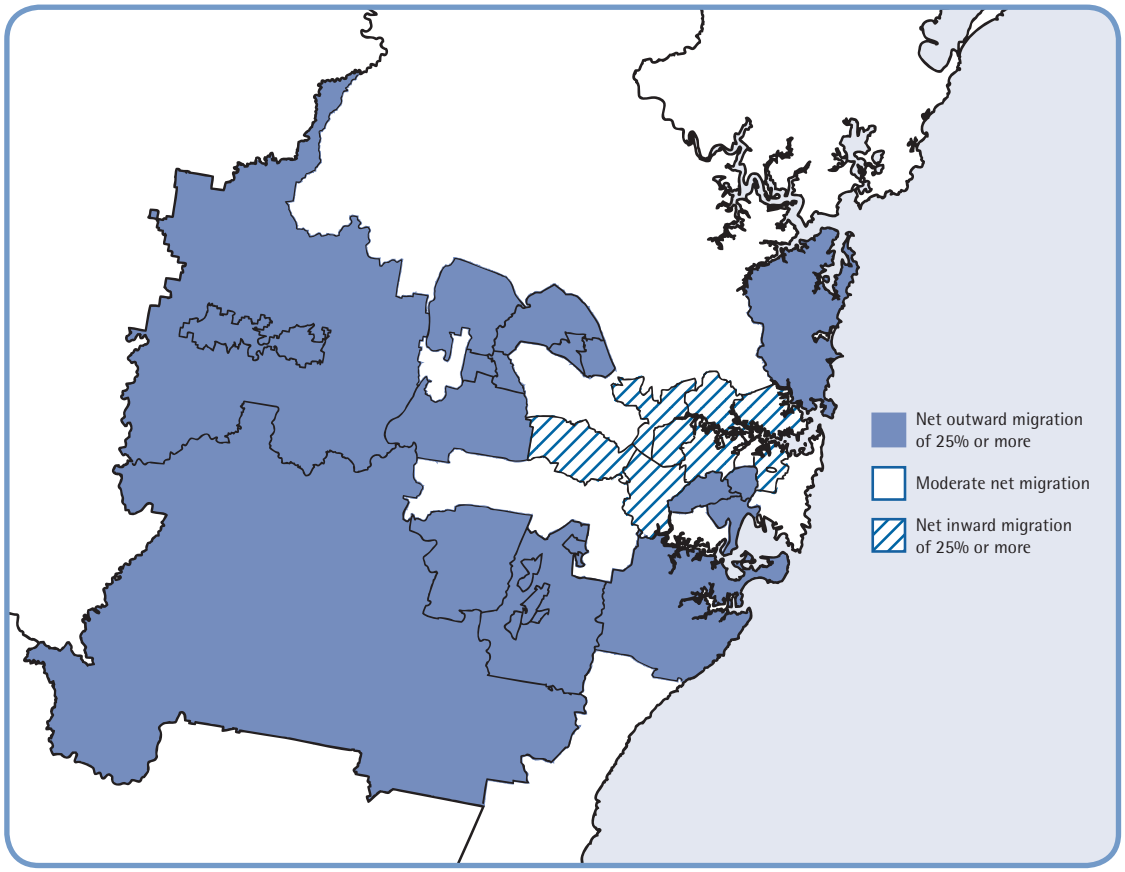
Note: a. As the IAREs named 'Sydney—Remainder' and 'Redfern' are in the same SLA, they both have the same estimated rates of employment flows.

Ultimately, one of the most important things to note from Table 5 is the constant term for the rate of outward movement. Holding LType, State or Territory and other characteristics constant, Indigenous Australians were only slightly less likely to leave their IARE for work than the non-Indigenous population. The big difference in raw numbers reported earlier for the two populations (34.2% compared to 51.0%) is therefore mostly as a result of the types of areas in which Indigenous Australians live, rather than any unwillingness to commute or travel for work.

Within cities and large regional towns, there are also distinct employment flows that are not captured easily by national regression models. An analysis of the areas in urban Australia with the greatest net inflow (>100%) shows that Indigenous Australians, like their non-Indigenous counterparts, travel for work into areas in and around the central business districts of the cities in which they live.

By contrast, those urban areas with large net outward migration tend to be found in the outer suburbs of their respective cities. These employment flows are highlighted by using the example of Sydney, the city with Australia's largest concentration of Indigenous and non-Indigenous residents and workers. Fig. 1 shows those areas with moderately large net positive inflow (>25%) in a dark shade alongside those areas with moderately large net outflow (<–25%) in a lighter shade.

Fig. 1. Indigenous employment flows in Sydney: IAREs with large net inward and outward migration



Source: Customised calculations using the 2006 Census of Population and Housing.

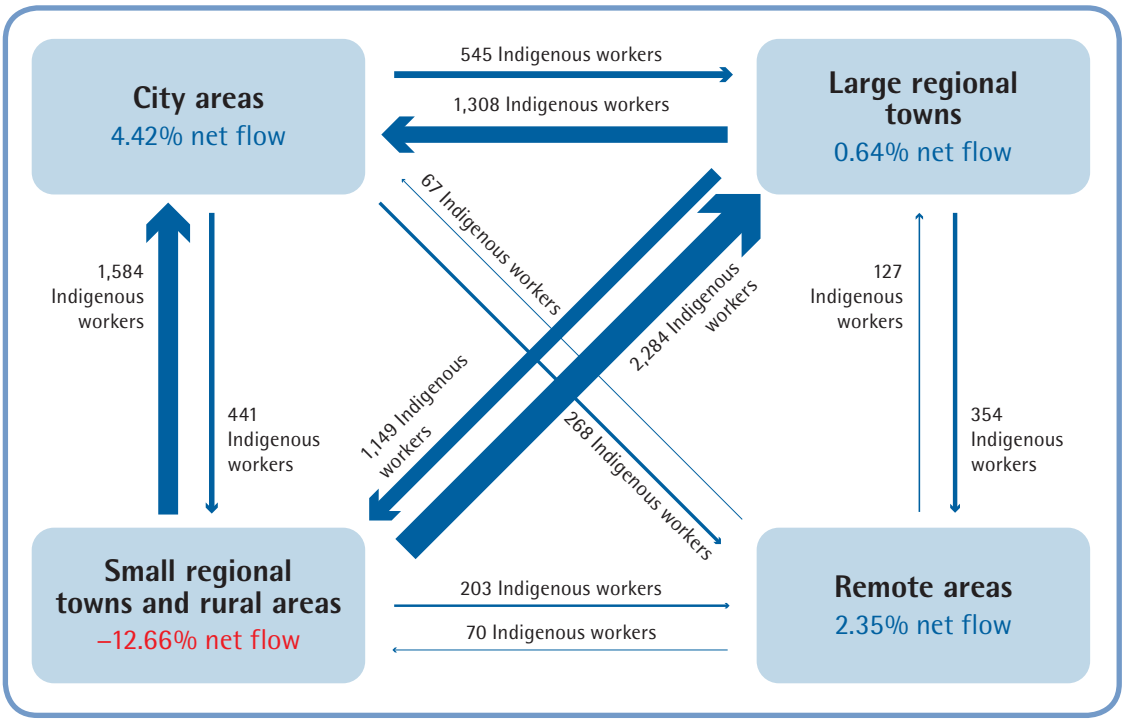
PATTERNS OF EMPLOYMENT FLOWS

The previous section showed that there were particular areas with large inflows or outflows of Indigenous and non-Indigenous workers. Sometimes these flows balanced out, whereas for other types of areas there were consistent net flows of the population for work. In order to design and deliver policy that takes into account these flows, it is important to understand the dynamics and patterns involved. For example, how far on average do those who leave their IARE for work travel, and are there differences across Australia in this distance to work? After taking distance into account, are there other characteristics of areas that influence where people end up working?

MOVEMENT BETWEEN LOCATION TYPES

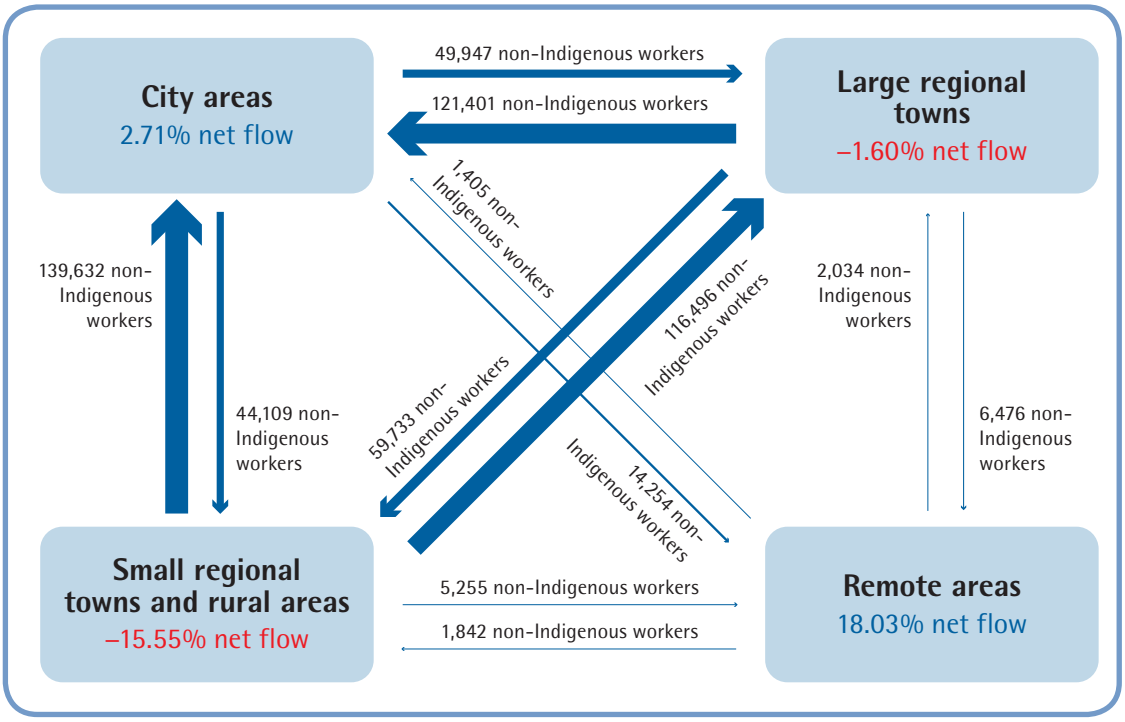
These patterns of movement for employment are summarised at a broad level in Fig. 2 (for the Indigenous population) and Fig. 3 (for the non-Indigenous population). They show the number of people counted as moving to or from four groupings of IAREs based on the LType of their source or destination. City areas and large regional towns are grouped separately, whereas small regional towns and rural areas are grouped together, as are all the remote areas. It should be noted that a different scale is used for the arrows in the two figures.

Fig. 2. Employment flows by four-category LType: Indigenous, 2006



Source: Customised calculations using the 2006 Census of Population and Housing.

Fig. 3. Employment flows by four-category LType: Non-Indigenous, 2006



Source: Customised calculations using the 2006 Census of Population and Housing.

Outside of remote Australia, there was a net transfer of Indigenous and non-Indigenous workers to more urbanised parts of the country. For both populations, more people worked in city areas but lived in large regional towns, compared to those who travelled in the opposite direction for work. However, for the Indigenous population especially, the biggest net transfer was from those who lived in small regional towns and rural areas but worked in city areas and large regional towns.

Compared to the employment migration that occurred across the LTypes in urban Australia, the scale of movement between remote and non-remote Australia was quite small. On balance though, more Indigenous and non-Indigenous Australians worked in remote areas but lived in non-remote Australia, compared to working outside of remote Australia. The biggest transfer to remote Australia was from non-Indigenous Australians in city areas. In total, 97 per cent of the population who worked in remote Australia but did not live there were non-Indigenous.

DISTANCE BETWEEN PLACE OF WORK AND PLACE OF USUAL RESIDENCE

The majority of those Indigenous and non-Indigenous Australians who live in city areas or large regional towns but work in remote Australia would not travel between the location types on a daily basis. Rather, many would be classified as fly-in/fly-out workers (Storey 2001; Taylor & Scambary 2005). That is, those who spend considerable time working in the area, but list other parts of the country as their place of usual residence. On average, the majority of employment migration is over much shorter distances.

Taking the distance between the midpoint of a person's SLA of usual residence and the SLA of their place of work, Indigenous Australians travelled on average 27.4 kilometres (km) for work. This was somewhat larger than the 20.9 km that non-Indigenous Australians on average travelled for work. However, once those who worked in their SLA of usual residence (and whose distance was hence set to zero) were excluded, the average distance travelled for work was 62.8 km for Indigenous employment migrants and 32.1 km for non-Indigenous employment migrants.

The average distance away from one's SLA of usual residence is skewed somewhat by large values at the extreme end of the distribution. This was especially the case for the Indigenous population. For example, focusing still on those who worked outside their SLA (employment migrants), 25 per cent of Indigenous Australians worked within 6.9 km of their place of usual residence. Furthermore, 50 per cent of this population worked within 13.0 km (the median) and 75 per cent worked within 25.9 km. So, while there was a relatively small minority of people whose place of work was hundreds, or even thousands, of kilometres away from their place of usual residence, the vast majority of Indigenous and non-Indigenous people travelled only a relatively short distance for work.

While the majority of people who worked outside their SLA of usual residence only travelled a short distance, there was substantial variation across Australia in the average distance travelled. This is demonstrated in Table 7, which shows the association between the average distance between a person's SLA of usual residence and the SLA in which they work and other characteristics of the area. While distances are calculated between SLAs, the dependent variable is found by calculating the average distance by IARE. Those who lived and worked in the same SLA were excluded from the analysis.

The first column of results uses the source IARE as the unit analysis. That is, the analysis looks at the average distance that people were away from their place of usual residence for work, and how this was associated with characteristics of their place of usual residence. The second column uses the destination as the unit of analysis and focuses on the association between the average distance that people had travelled to their place of work and how this was associated with characteristics of their place of work.

Table 7. Association between average distance between usual residence and place of work and LType, State or Territory and other characteristics of IARE: Indigenous and non-Indigenous Australians who worked outside their SLA, 2006

	Indigenous		Non-Indigenous	
	Source	Destination	Source	Destination
Large regional towns	111.1	68.3	93.2	55.0
Small regional towns and localities	107.8	97.0	145.8	106.7
Regional rural areas	84.4	76.2*	102.8	69.0*
Predominantly non-Indigenous remote towns	326.4	443.7	475.0	526.9
Predominantly Indigenous remote towns	391.3	359.4	394.2	628.6
Town camps	n.s.	n.s.	n.s.	n.s.
Remote dispersed settlements	398.3	470.9	504.1	594.4
Victoria	n.s.	n.s.	n.s.	n.s.
Queensland	n.s.	n.s.	54.5	55.0
South Australia	n.s.	n.s.	n.s.	n.s.
Western Australia	82.6	99.6	112.0	75.6
Tasmania	n.s.	n.s.	n.s.	n.s.
Northern Territory	−128.1	−160.1	−120.9	n.s.
Australian Capital Territory	n.s.	n.s.	n.s.	n.s.
Geographic size of area (ln km^2)	n.s.	n.s.	−5.4*	n.s.
Indigenous outcomes in 2nd quartile	n.s.	n.s.	n.s.	n.s.
Indigenous outcomes in 3rd quartile	n.s.	n.s.	47.1*	n.s.
Indigenous outcomes in 4th quartile	n.s.	96.0	68.9	72.3
Non-Indigenous outcomes in 2nd quartile	n.s.	−91.4	−79.1	−93.9
Non-Indigenous outcomes in 3rd quartile	−65.8	−140.8	−113.5	−143.2
Non-Indigenous outcomes in 4th quartile	n.s.	−126.8	−93.0	−117.9
Constant	72.8	97.6	89.9	72.3
Adjusted R-Squared	0.5064	0.6651	0.6362	0.7612

Source: Customised calculations using the 2006 Census of Population and Housing.

Notes: ln km^2 = the natural logarithm of the surface area in square kilometres.
n.s. = variables that were not significant at the 10% level of significance.
* = variables that were significant at the 10% level but not the 5% level.
The base case is a city area in New South Wales where both the Indigenous and non-Indigenous populations are in the 1st (most advantaged) quartile based on their respective distributions of socioeconomic outcomes.

Of those Indigenous Australians who travelled outside their SLA of usual residence for work, those who lived in city areas travelled the smallest distance on average. Those who lived in regional Australia travelled on average further than the base case, whereas those who lived in remote Australia travelled the furthest. A similar pattern was found when the destination area was used as the unit of analysis. However, the differences between remote and non-remote Australia were greater. For example, those Indigenous Australians who worked in remote dispersed settlements (but did not live in the particular SLA) were on average 568.5 km away from their SLA of usual residence. The average distances for the non-Indigenous population were greater still, with those employment migrants working in predominantly Indigenous remote towns on average 700.9 km away from their SLA of usual residence.

There were also some differences by State or Territory. Those Indigenous Australians who lived or worked in Western Australia worked on average further away from their place of usual residence than the base case (New South Wales). On the other hand, those Indigenous Australians who lived or worked in the Northern Territory were not as far away from their place of usual residence, after controlling for LType.

There was very little systematic association between the geographic size of a person's source or destination area and the distance between their SLA of usual residence and the SLA in which they work. There was, however, a significant association with the socioeconomic outcomes in the area. Those Indigenous and non-Indigenous Australians who worked in the areas with the lowest Indigenous socioeconomic outcomes had travelled further on average from their place of usual residence than those in more advantaged areas. On the other hand, when the average distance was lower, the worse the socioeconomic outcomes of the non-Indigenous population.

METHOD OF TRAVEL TO WORK

Given the substantial variation in the distance between a person's place of usual residence and their place of work, it is not surprising that there is also a range of ways by which a person travels between the two. Like the non-Indigenous population, the majority of the non-Indigenous population travelled to work as the driver of a car. However, for the Indigenous population, this was only a bare majority (52.4%) compared to the non-Indigenous population, for whom over two-thirds of the population (68.5%) reported this mode of transport. More non-Indigenous Australians also used public transport than the Indigenous population (10.4% compared to 8.0%), and more also worked from home (5.4% compared to 2.3%).

The modes of transport that Indigenous Australians were most likely to use (relative to the non-Indigenous population) were as a passenger in a car or walking. The differences between the two populations in these two modes of transport were quite large. Fifteen per cent of Indigenous Australians travelled to work as a passenger, compared to 6.8 per cent for the non-Indigenous population, and 17.4 per cent of the Indigenous population walked, compared to only 4.4 per cent for the non-Indigenous population.

Much of the difference between the Indigenous and non-Indigenous populations is likely to be driven by the types of areas in which the two populations live. Indigenous Australians are more likely to live in remote Australia, where public transport is lacking and walking to work is feasible. To demonstrate this, Table 8 gives the percentage of the Indigenous and non-Indigenous populations who used nine different modes of transport by LType. Averages for Australia as a whole are also given, with the final line in the Indigenous section of the table showing the estimated distribution for the Indigenous population if they had the same geographic distribution as the non-Indigenous population.

Table 8. Method of travel to work by LType of usual residence: Indigenous and non-Indigenous Australians, 2006

	Car only		Public transport[b]	Truck only	Motorbike only	Bicycle only	Walked	Worked from home	Other[c]
	Driver	Passenger[a]							
Indigenous									
City areas	60.3	12.3	15.5	1.5	0.9	1.3	5.2	1.9	1.2
Large regional towns	63.3	18.1	4.3	1.3	0.7	1.7	7.2	1.9	1.5
Small regional towns and localities	57.3	17.6	3.0	2.6	0.6	1.3	13.4	2.9	1.3
Regional rural areas	65.4	13.4	2.2	3.0	0.5	0.6	9.5	3.9	1.4
Predominantly non-Indigenous remote towns	49.7	18.8	4.3	1.2	0.3	1.6	19.6	2.3	2.2
Predominantly Indigenous remote towns	14.6	14.2	3.0	1.2	0.2	0.4	62.4	2.4	1.5
Town camps	21.7	21.7	21.3	1.2	0.0	1.2	22.4	9.1	1.6
Remote dispersed settlements	15.3	10.5	2.9	1.0	0.1	0.3	63.7	4.3	1.9
Australia	52.4	15.0	8.0	1.6	0.6	1.2	17.4	2.3	1.4
Australia (non-Indigenous population weight)	59.8	12.3	13.8	1.4	0.8	1.4	6.7	2.5	1.3
Non-Indigenous									
City areas	67.7	6.5	13.7	1.3	0.7	1.1	3.8	4.3	0.8
Large regional towns	74.3	8.4	2.0	1.7	0.9	1.4	4.6	5.5	1.1
Small regional towns and localities	67.1	7.2	1.5	2.5	0.8	0.9	7.0	11.4	1.5
Regional rural areas	68.7	6.4	1.5	2.7	0.9	0.5	5.8	12.1	1.3
Predominantly non-Indigenous remote towns	61.2	8.2	3.4	1.7	1.3	2.6	10.1	9.2	2.3
Predominantly Indigenous remote towns	36.0	6.5	1.9	1.8	0.8	1.8	40.8	6.1	4.3
Town camps	31.6	0.0	0.0	0.0	0.0	0.0	68.4	0.0	0.0
Remote dispersed settlements	47.8	7.9	6.7	1.8	0.7	1.9	17.8	11.9	3.4
Australia	68.5	6.8	10.4	1.5	0.8	1.1	4.4	5.4	1.0

Source: Customised calculations using the 2006 Census of Population and Housing.

Notes: a. Includes those who travelled in a car as a driver and a passenger.
b. Includes those who took public transport and other modes of transport.
c. Includes those who used multiple modes of transport but not public transport.

For the first five LTypes, around half or more of the Indigenous population travelled to work as the driver of a car, with a further 12–18 per cent travelling as a passenger. Of these LTypes, public transport is a common method of travel in city areas only, with walking to work being relatively common in small regional towns and predominantly non-Indigenous remote towns. More than 60 per cent of those who live in predominantly Indigenous remote towns or remote dispersed settlements walked to work, with relatively small percentages using the other travel methods. Finally, there was a very even spread of travel methods in town camps, with around 20 per cent of the population travelling to work as a driver or passenger, as well as walking and, interestingly, taking public transport.

In general, there is less difference between the Indigenous and non-Indigenous populations in terms of their methods of travel to work within LTypes compared to for Australia as a whole. However, even after controlling for the relative distributions of the population by IARE, there were still substantial differences. Specifically, after standardising the Indigenous percentages using the non-Indigenous population distribution, a higher percentage of the population drove to work (compared to the non-standardised rates), while fewer were passengers in cars or walked to work compared to the non-standardised rates. The biggest difference, however, was for public transport. Without standardising the population, fewer Indigenous Australians took public transport to work than the non-Indigenous population. However, this was entirely to do with the geographic distribution of the population, as after standardising the distribution, a higher percentage of Indigenous Australians were estimated to use that method.

The remaining differences between Indigenous and non-Indigenous Australians in the method by which they travel to work are likely to be as a result of income and car ownership. Indigenous Australians are likely to have to rely on public transport to get to work to a much larger extent than the non-Indigenous population, especially when relative household size is taken into account. This is an issue that is taken up in forthcoming analysis using individual-level census data.

PROXIMITY TO EMPLOYMENT AND INDIGENOUS LABOUR UNDER-UTILISATION

The results presented up until now have focused on the geographic patterns of employment flows. That is, the types of areas that have large inflows or outflows of workers; how far on average people are away from their place of usual residence, and whether this average distance varies across Australia; and variation in the method of travel to work. The main overarching conclusion from this analysis was that, once their geographic distribution had been controlled for, Indigenous Australians were just as likely to travel for work outside their own area as the non-Indigenous population. Willingness to travel for work does not appear to be an explanation for labour market under-utilisation. The question posed in this section is whether proximity to employment (spatial mismatch) explains any of the difference in employment outcomes between Indigenous and non-Indigenous Australians.

PROXIMITY TO EMPLOYMENT

To gauge the potential role of job location in influencing Indigenous labour under-utilisation, the first step is to consider the average residential proximity to different types of jobs. After including jobs that were in a person's own SLA and those SLAs that were either adjacent to, or within a reasonable distance from, a person's SLA of usual residence (11.7 km),[4] the average Indigenous Australian aged 15–64 has 153,080 jobs within close proximity. This is less than half the number of jobs that the typical non-Indigenous Australian has within the same distance (365,834 km).

In absolute terms, the Indigenous population live in areas that have far fewer employment options than the non-Indigenous population. However, as shown in Table 1 earlier in this paper, Indigenous Australians

Table 9. Average number of jobs in local area by LType: Indigenous and non-Indigenous Australians, 2006

	Number of jobs			Number of jobs per usual resident		
	Indigenous	Non-Indigenous	Ratio	Indigenous	Non-Indigenous	Ratio
City areas	353,196	474,393	0.74	0.65	0.67	0.97
Large regional towns	70,951	82,499	0.86	0.78	0.65	1.20
Small regional towns and localities	59,450	103,955	0.57	0.63	0.60	1.06
Regional rural areas	116,031	151,088	0.77	0.54	0.56	0.98
Predominantly non-Indigenous remote towns	15,059	21,534	0.70	0.77	0.77	1.00
Predominantly Indigenous remote towns	2,692	3,722	0.72	0.65	0.70	0.93
Town camps	6,850	8,676	0.79	0.65	0.66	0.98
Remote dispersed settlements	11,054	32,757	0.34	0.75	0.74	1.01
Australia	153,080	365,834	0.42	0.69	0.66	1.04

Source: Customised calculations using the 2006 Census of Population and Housing.

are also much more likely to live in regional and remote Australia, where population density is low. When the average number of jobs within the local area is divided by the total number of usual residents aged 15–64 within the same area, the picture becomes quite different. Rather than living in areas with poor employment prospects, Indigenous Australians in fact live in areas that have a slightly higher number of jobs per usual resident (0.689) than do non-Indigenous Australians (0.660 jobs). Table 9 shows the variation in employment options and prospects by LType for the Indigenous and non-Indigenous population.

Table 9 shows that there is substantial variation in both the number of jobs and number of jobs per usual resident across the eight LTypes. By a substantial margin, Indigenous Australians in city areas have the greatest number of jobs in their local area. This is followed by those Indigenous Australians who live in regional rural areas, though this reflects in part the much larger geographical size of IAREs in this LType. On the other hand, for those Indigenous Australians who live in remote Australia and, in particular those who live in predominantly Indigenous remote towns, there are very few jobs in their IARE or the ones that are close by. Relative to the non-Indigenous population in the same LType as themselves, the areas with the greatest number of jobs in and around them are those in large regional towns and town camps, with the fewest in remote dispersed settlements and small regional towns.

The picture regarding employment prospects once again changes when the usual resident population that could potentially compete for the jobs is taken into account. After doing so, it is in remote Australia where the IAREs that Indigenous Australians live in appear to have the most favourable employment prospects, with 0.77 jobs per usual resident on average in predominantly non-Indigenous remote towns.

While the employment prospects of the areas in which Indigenous Australians live may be roughly equivalent to, or in some LTypes, better than that of the non-Indigenous population, there was substantial variation in the types of jobs that are in proximity to where Indigenous Australians live. This is demonstrated in Table 10 by looking at the average number of different types of jobs within an Indigenous or non-Indigenous Australian's local area (as defined previously). Jobs are broken down by: full-time or part-time status and employment sector; occupation; industry; and income of the employee.[5]

Table 10. Average number of jobs in local area by type of job: Indigenous and non-Indigenous Australians, 2006

	Number of jobs			Number of jobs per usual resident		
	Indigenous	Non-Indigenous	Ratio	Indigenous	Non-Indigenous	Ratio
All jobs	153,080	365,834	0.42	0.69	0.66	1.04
Hours worked and sector of employment						
Part-time government sector	6,702	14,997	0.45	0.044	0.030	1.47
Full-time government sector	17,082	37,462	0.46	0.091	0.072	1.26
Part-time private sector	41,883	99,846	0.42	0.176	0.186	0.95
Full-time private sector	84,683	207,107	0.41	0.364	0.360	1.01
Occupation						
Managers	20,981	50,166	0.42	0.099	0.094	1.06
Professionals	33,971	88,513	0.38	0.126	0.141	0.89
Technicians and Trades Workers	19,201	43,434	0.44	0.095	0.084	1.13
Community and Personal Service Workers	13,264	30,453	0.44	0.065	0.058	1.12
Clerical and Administrative Workers	26,046	63,851	0.41	0.100	0.108	0.93
Sales Workers	15,366	36,589	0.42	0.059	0.066	0.88
Machinery Operators And Drivers	9,337	20,477	0.46	0.051	0.041	1.25
Labourers	13,408	28,480	0.47	0.086	0.061	1.41
Industry						
Agriculture, Forestry and Fishing	3,265	3,962	0.82	0.044	0.021	2.06
Mining	1,490	1,683	0.89	0.030	0.007	4.19
Manufacturing	16,079	39,410	0.41	0.057	0.070	0.82
Electricity, Gas, Water and Waste Services	1,548	3,183	0.49	0.008	0.007	1.18
Construction	8,749	19,617	0.45	0.041	0.038	1.08
Wholesale Trade	7,324	19,469	0.38	0.022	0.030	0.72
Retail Trade	17,507	41,146	0.43	0.071	0.077	0.92
Accommodation and Food Services	9,796	22,226	0.44	0.046	0.043	1.08
Transport, Postal and Warehousing	7,369	17,301	0.43	0.029	0.030	0.97
Information Media and Telecommunications	3,452	10,058	0.34	0.010	0.014	0.69
Financial and Insurance Services	7,453	20,993	0.36	0.021	0.028	0.73
Rental, Hiring and Real Estate Services	2,954	6,831	0.43	0.011	0.012	0.90
Professional, Scientific and Technical Services	12,054	32,991	0.37	0.038	0.049	0.78
Administrative and Support Services	4,555	11,533	0.39	0.018	0.019	0.97
Public Administration and Safety	11,438	23,693	0.48	0.079	0.048	1.64
Education and Training	12,016	28,549	0.42	0.054	0.053	1.01
Health Care and Social Assistance	16,245	39,349	0.41	0.071	0.071	0.99
Arts and Recreation Services	2,229	5,749	0.39	0.008	0.009	0.87
Other Services	5,782	13,774	0.42	0.024	0.025	0.96
Total income of employee						
Low income (<$250 per week)	15,337	35,340	0.43	0.086	0.070	1.23
Medium income ($250–$1000 per week)	85,815	200,128	0.43	0.379	0.375	1.01
High income (≥$1,000 per week)	49,932	125,602	0.40	0.214	0.206	1.04

Source: Customised calculations using the 2006 Census of Population and Housing.

Looking at the first section of Table 10, it is clear that the majority of the jobs within the local area of Indigenous Australians are full-time and in the private sector. There were 84,683 of these jobs within the local area of Indigenous Australians, which equates to 0.364 jobs per usual resident. This was only slightly higher than the number of full-time private sector jobs per usual resident in the local area of the non-Indigenous population. Compared to this, government sector jobs in general, and part-time government jobs in particular, were much more common (per usual resident) in the areas in which Indigenous Australians lived.

A number of these jobs were likely to be part of CDEP which was much more prevalent at the time of the 2006 Census than it is currently, or is expected to be in the future. Whatever the source of these jobs, the results in Table 10 clearly show that relative to the non-Indigenous population, Indigenous Australians have much greater access to jobs in the government sector than in the private sector. If these jobs are eroded through the demise of CDEP or general public sector cutbacks and are not replaced, then the slight locational advantage that Indigenous Australians have might also disappear.

Relative to the non-Indigenous population, Indigenous Australians live in areas that have few sales workers and professional jobs per usual resident. On the other hand, they live in areas that have a relatively high number of machinery operator or driver and labourer positions in particular, as well as relatively few technicians or trade worker and community or personal service worker positions.

While there is a fair degree of diversity by occupation in the types of jobs that Indigenous Australians have access to relative to the non-Indigenous population, the diversity by industry is even greater still. There were 0.03 jobs in the mining industry per usual resident in the average local area of Indigenous Australians. While this may not seem high, it was 4.19 times the value for the non-Indigenous population. There were also a little over twice as many agriculture, forestry and fishing jobs on average in the areas in which Indigenous Australians live, and 1.64 times as many public administration and safety jobs.

Compared to the three industries mentioned above, there were a number of industries that did not have a strong presence in the areas in which Indigenous Australians lived (relative to the non-Indigenous population). Chief amongst these were the information media and telecommunications industry, the wholesale trade industry, and financial and insurance services. However, the professional, scientific and technical services industry and the manufacturing, arts and recreation services industry also had a relatively low presence.

There are two ways to interpret the industry results. On the one hand, the results highlight the types of industries that Indigenous Australians have an absolute and relative advantage in accessing in locational terms. It is these industries that Indigenous Australians in school and training might consider focusing on. On the other hand, the table also highlights the types of industries that do not have a presence in the areas in which Indigenous Australians live. Governments and employers in these industries could keep this in mind when trying to promote equitable access for Indigenous Australians to all types of jobs. An over-reliance on particular industries could expose the Indigenous population to greater risks from cyclical or structural change.

LOCATION OR QUALIFICATION?

Clearly, there is substantial variation across Australia in the number and type of jobs that are available in a person's local area, both before and after controlling for the size of the local usual resident population. Before targeting policy, however, it is important to identify the relationship between local area employment prospects and actual employment outcomes. Previous discussion in this paper has shown that many Indigenous and non-Indigenous Australians are willing to travel large distances on a daily basis for employment. Furthermore, with 46.5 per cent of the Indigenous and 43.1 per cent of the non-Indigenous

Table 11. Factors associated with percentage of population employed: Indigenous Australians by remoteness, 2006

	Australia		Non-remote		Remote	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Percentage completed Year 10 or 11	0.438	0.375	0.532	0.511	0.328	0.323
Percentage completed Year 12	0.736	0.678	0.910	0.850	0.483	0.487
Percentage without qualifications	−0.557	−0.567	−0.421	−0.454	−0.674	−0.673
Percentage aged 15–24 attending secondary education	−0.229	−0.216	−0.178	−0.159	−0.389	−0.384
Percentage aged 15–24 attending other education	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Percentage aged 25+ attending any education	−0.393	−0.364	−0.442	−0.458	n.s.	n.s.
Percentage of population aged 0–14	0.460	0.475	0.448	0.489	0.480	0.489
Percentage of population aged 15–24	0.487	0.519	0.415	0.447	n.s.	n.s.
Percentage of population aged 55+	0.517	0.439	0.481	0.455	n.s.	n.s.
Percentage Torres Strait Islander	−0.091	−0.096	−0.127	−0.132	n.s.	n.s.
Percentage married	0.274	0.310	0.337	0.374	n.s.	n.s.
Percentage away from their place of usual residence on census night	0.223	0.168*	n.s.	0.173*	n.s.	n.s.
Percentage who changed usual residence between 2001 and 2006	−0.119	−0.111	−0.138	−0.145	n.s.	n.s.
Large regional towns	n.s.	n.s.	n.s.	n.s.		
Small regional towns and localities	n.s.	n.s.	n.s.	n.s.		
Regional rural areas	n.s.	n.s.	n.s.	n.s.		
Predominantly non-Indigenous remote towns	7.764	7.450				
Predominantly Indigenous remote towns	10.412	10.604			n.s.	n.s.
Town camps	n.s.	n.s.			n.s.	n.s.
Remote dispersed settlements	19.737	19.473			12.679	12.742
Victoria	n.s.	n.s.	n.s.	n.s.		
Queensland	3.621	3.596	n.s.	n.s.	11.229	10.978
South Australia	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Western Australia	n.s.	−2.617*	−4.569	−4.633	n.s.	n.s.
Tasmania	n.s.	n.s.	n.s.	n.s.		
Northern Territory	n.s.	n.s.	3.360*	n.s.	n.s.	n.s.
Australian Capital Territory	n.s.	n.s.	n.s.	n.s.		
Number of jobs in the local areas per usual resident		4.135		6.238		n.s.
Constant	21.239	21.321	n.s.	n.s.	47.036*	45.293*
Number of observations	530	530	368	368	162	162
Adjusted R-Squared	0.6061	0.6131	0.6514	0.6558	0.5785	0.5758

Source: Customised calculations using the 2006 Census of Population and Housing.

Notes: n.s. = variables that were not significant at the 10% level of significance.

* = variables that were significant at the 10% level but not the 5% level.

The base case IARE is in New South Wales. For the Australia and non-remote estimates, the base case IARE is a city area. For the remote estimates it is a predominantly non-Indigenous remote town.

population changing their place of usual residence between 2001 and 2006, there is plenty of scope for people to relocate to areas with better employment prospects if they felt that it was in their best interests (notwithstanding the large economic and social costs of doing so). The question is, therefore, whether in an economy and society such as Australia's, the number of jobs available in the local area explains any of the geographic variation in employment outcomes identified for the Indigenous population (e.g. Biddle, Taylor & Yap forthcoming).

Ideally, this relationship would be tested using individual-level data. This would allow the researcher to test whether any relationship between local employment prospects and actual employment outcomes holds after controlling for other factors like an individual's education and labour market experience. It would also allow for comparisons with the non-Indigenous population. With the data available, the non-Indigenous population dominates the labour market to such an extent that it is not possible to separate labour demand from labour supply. That is, the dependent variable (the proportion of the non-Indigenous population employed) would have a direct causal effect on the main explanatory variable of interest (the number of jobs in the local area per usual resident). For the Indigenous population in general, and the non-remote Indigenous population in particular, this is less likely to be the case.

Unfortunately, the individual-level data that is available to researchers outside the ABS does not include a sufficient level of geographic detail to undertake an analysis of location and spatial mismatch. The analysis presented in this section must therefore rely on area-level information and hence should be treated as exploratory only.

Following a regression-style analysis again, the dependent variable is the percentage of the population aged 15 and over who were employed at the time of the 2006 Census. In the first model, a range of education, demographic and geographic variables are included as explanatory variables. In the second model, the number of jobs in the local area per usual resident is added as an additional explanatory variable. This variable is calculated using all workers (Indigenous and non-Indigenous) and all usual residents (Indigenous and non-Indigenous) in order to capture the strength of the overall labour market, as opposed to the distribution of Indigenous employment only.[6]

A separate set of estimates is carried out for all IAREs in Australia, non-remote Indigenous IAREs and remote IAREs. Parameters of the model are once again estimated using OLS.

The majority of the coefficients in Model 1 follow a priori expectations. For example, IAREs where the Indigenous population has a relatively high level of education also have a relatively high percentage of the population employed, whereas current education attendance is associated with low levels of employment. The importance of education in explaining Indigenous employment outcomes was also found using individual-level data in Biddle (2007), Daly (1995), Hunter (2004) and Junankar and Liu (2003). After controlling for education and other characteristics, there was still a significant difference across LTypes in employment, with those IAREs in remote towns and remote dispersed settlements having a higher employment percentage than city areas.

After controlling for the variables in Model 1, the results in Model 2 show that for Australia as a whole, those Indigenous Australians who live in IAREs with a higher number of jobs in the local area per usual resident have a higher probability of being employed. To put the results in perspective, an IARE that has the mean characteristics for all the explanatory variables is predicted to have 39.8 per cent of the population employed. An IARE with 1.06 jobs in the local area per usual residence compared to 0.71 (an increase by one standard deviation from the mean), that has otherwise identical observable characteristics, is predicted to have an employment-to-population percentage of 41.2.

The size of the association between the number of jobs in the area and the level of employment is much larger when the non-remote population is analysed separately. Using the same methodology as above, a one-standard deviation in the number of jobs in the local area is associated with a 2.4 percentage point increase in the percentage of the population employed. For remote Australia on the other hand, there was no association. This is in part because of the low sample size in remote Australia leading to relatively large standard errors. It may also be because an IARE has a much larger geographic size, or the role of the CDEP Program in a given IARE. Whatever the cause, it would appear that the strength of the local labour market has the strongest association with Indigenous employment outcomes in non-remote Australia.

SUMMARY AND CONCLUSIONS

The aim of this paper was to consider the relationship between the place of usual residence of Indigenous Australians and their own and others' place of work. With regards to their own journey to work, a much smaller percentage of the employed population (34.2%) worked in a different IARE to their place of usual residence compared to the non-Indigenous population. However, most of the difference between the two populations could be explained by the types of areas where Indigenous Australians lived. City areas had the highest rate of outward movement for employment for both the Indigenous and non-Indigenous population, although these areas have the lowest Indigenous share in Australia. Compared to this, remote areas where Indigenous Australians are much more likely to live than the non-Indigenous population had the lowest rate of outward movement for employment.

Those Indigenous workers who were away from their SLA of usual residence for work were on average much further away (62.8 km) than non-Indigenous workers (32.1 km). These results were skewed somewhat by a few outliers and by the fact that it was in remote areas where distance to work was greatest. Nonetheless, the results show that once their geographic distribution has been controlled for, Indigenous Australians are just as likely to travel outside their area of usual residence for work, and just as likely (if not more likely) to travel large distances. It is therefore not an unwillingness to travel that is impacting on Indigenous employment disparities. The question is whether spatial mismatch of jobs provides an explanation.

At first look, it would appear that Indigenous Australians are disadvantaged in terms of proximity to employment. On average, in 2006 there were 153,080 jobs in and around the areas in which Indigenous Australians lived, compared to 365,834 jobs for the non-Indigenous population. However, Indigenous Australians live in areas with much lower population densities. When the number of usual residents that those jobs are spread across is controlled for, there were in fact slightly more jobs per usual resident in the areas in which Indigenous Australians live (0.69 jobs per usual resident) compared to those in which non-Indigenous Australians live (0.66 jobs).

There is a large literature on spatial mismatch and job accessibility in populations, both internationally and within Australia, with many of the techniques potentially applicable to the questions posed in this paper. This includes the incorporation of average journey time rather than distances between centroids, spatial econometrics to control for spatial dependence in the data, and the incorporation of functional economic regions to better capture labour markets. However, while exploratory, the results presented in this paper raise a number of key points for policy.

Even if the distribution of employment opportunities did not explain the difference between the Indigenous and non-Indigenous populations, it did explain some of the variation in employment outcomes within the Indigenous population. This highlights a potential role for policies related to employment demand in reducing disparities within the Indigenous population. However, these policies should be highly targeted and locationally specific in terms of matching job needs with local Indigenous aspirations. In essence,

these results support the call by Taylor (2005: 118) for 'detailed regionally-based quantitative assessments of the supply of, and demand for, different economic activities that already exist, or that may be created at the local level'.

It is not possible to completely eliminate the role of spatial mismatch in explaining Indigenous employment disparity using aggregate data. Ideally, individual data like that used in Hellerstein, Neumark and McInnerney (2008) should be used to analyse Indigenous employment disparities, as this would allow the researcher to control for other human capital characteristics. In addition, it would allow for a matching of the types of jobs available in terms of industry or occupation with the particular characteristics of the individual. Unfortunately, the data required to undertake an individual analysis is only available for internal research within the ABS.

Even without individual data, there is much additional research that could be carried out on location and Indigenous employment outcomes. Alternative measures of Indigenous employment could be used, including unemployment, labour force participation or part-time work. In addition, different types of employment could be used as explanatory variables, including making a distinction between skilled and unskilled jobs in the area.

A final point to make is that, for some locations, the employment prospects in the areas in which Indigenous Australians live may change substantially as CDEP employment is withdrawn. Indigenous Australians in remote parts of the country were estimated to have a similar or slightly higher number of jobs per usual resident compared to the rest of the country. However, at the time of the 2006 Census, CDEP employment constituted a large part of the labour demand in a number of remote and regional areas (Biddle, Taylor and Yap forthcoming). To put it another way, government policy and programs were masking the underlying spatial mismatch of jobs. This is an issue that will need to be revisited when 2011 Census data becomes available.

Ultimately, the results presented in this paper support a policy emphasis on Indigenous labour supply in meeting COAG's employment targets. There are recognised and well documented structural constraints that limit the government's ability to Close the Gap in Indigenous education and skills development (Biddle 2007). Nonetheless, it would appear that it is the ability of the Indigenous population to secure the jobs that are available, rather than the location of jobs, that is most important in explaining Indigenous labour under-utilisation.

NOTES

1. This was based on the Socio-Economic Indexes for Areas advantage/disadvantage rank of the neighbourhood, constructed by the ABS.

2. IAREs are the middle level of the AIGC. There were 897 Indigenous Australians on average per IARE (standard deviation = 814) and 36,793 non-Indigenous Australians (standard deviation = 56,464). Most IAREs are larger in size than an SLA and therefore could be found by aggregating upwards. Where a single SLA was made up of more than one IARE, on the other hand, those IAREs were combined. However, for the regression analysis that uses IAREs, the rates calculated on these aggregated IAREs are allocated to each of the constituent IAREs, and the independent variables calculated separately.

3. In order to reduce the effect of outliers, inward and net employment migration is capped at 100 per cent of the usual resident population.

4. This is the median distance between the centroid of a person's SLA of usual residence and the SLA of their place of work for the total (Indigenous and non-Indigenous) population who worked outside their SLA of usual residence. The conclusions drawn from the analysis were not sensitive to different distance measures.

5. Unfortunately, it is not possible in the census to separately identify a person's income derived from their main job (for which location is identified), and income derived from other sources.

6. It is not possible to undertake a similar set of estimates for the non-Indigenous population using an area-level analysis. This is because there is a direct causal relationship between the employment-to-population ratio of the Indigenous population and the measured number of jobs available. Because of the relatively small size of the Indigenous usual resident population (especially in non-remote Australia), this is less of an issue and one that is ignored. Ultimately though, only individual-level data would enable the researcher to remove this issue entirely.

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