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Proximity to Labour Markets: Revisiting Indigenous Employment Through an Analysis of Census Place of Work Data

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Abstract

One of the six targets as part of the current 'Closing the Gap' agenda is to halve the gap in employment outcomes between Indigenous and non-Indigenous Australians within a decade (by 2018). Much of the focus around meeting this target has been the availability of jobs in remote Australia. However, given that the majority of the Indigenous population lives in cities and regional Australia where employment gaps are still quite high, most of the additional jobs required to meet CoAG's target will need to be found in our major cities and large regional towns. Across Australia, there are important labour demand issues resulting from uneven geographic access to labour markets. Utilising place of work and place of usual residence data from the 2006 Census, the analysis presented in this paper considers the proximity of Indigenous Australians to various urban labour markets and the likely impact on entrenching Indigenous socioeconomic disadvantage.

JEL Classification: J150; J600; R230

1. Introduction and Overview

In his apology to the stolen generations in early 2008, Prime Minister Kevin Rudd outlined a 'new partnership on closing the gap'. The focus of this partnership was six targets aimed at eliminating or at least substantially reducing the disparity between Indigenous and non-Indigenous Australians in relevant outcomes. In addition to targets related to life expectancy and education, the Council of Australian Governments (CoAG) also committed to 'halve the gap in employment outcomes between Indigenous and non-Indigenous Australians within a decade' (FaHCSIA, 2009). At the time of

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the 2006 Census, 46.0 per cent of the Indigenous population aged 15 years and were employed compared to 61.7 per cent of the non-Indigenous population.

There are three major constraints on achieving CoAG's employment target:

- Qualifications – Across almost all indicators, Indigenous Australians have relatively low levels of human capital. This makes it difficult to compete for available jobs, especially those that are relatively well remunerated;
- Inclination – Whether it be because of 'passive welfare' (Pearson, 2009, p.159) or alternative activities in the 'hybrid economy' (Altman, 2009, p.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 compared to non-Indigenous Australians.
- Location – It has been noted by a number of authors including Tesfaghiorghis (1991), Hughes and Warin (2005) and Biddle (2009a) that the respective geographic distributions of the Indigenous and non-Indigenous populations is a key factor in explaining the former's relative socioeconomic disadvantage.

This paper focuses on the last of these constraints (location). One feature of the existing 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 for the Indigenous population (as outlined in Morphy, 2008) the main problem with relying solely on usual residence is that where a person lives is not always related to where they work. 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.

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 and Stone, 2008), the spatial distribution of work origin and destination (O'Connor, Stimson and Daly, 2001) and the development of Functional Economic Regions (Mitchell, Bill and 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; 1992), this research has used the distribution of jobs relative to usual residents as an explanation for poor minority employment outcomes.

Spatial mismatch research tends to focus on poor employment outcomes of Blacks in the US and is often explained by discrimination in the suburban housing market where much of the jobs growth over the last few decades has occurred (Gobillon *et al*. 2007). This discrimination can be actual (landlords or agents have

a real preference against Blacks) or statistical (minority status is used as a predictor of default risk) and can also take place in the credit, mortgage or insurance markets (Tootell, 1996). The alternative concept of skills mismatch (Houston, 2005) or racial mismatch (Hellerstein, Neumark and 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 on spatial mismatch 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. The aim of this current paper is to fill that gap. Biddle (2009b) has shown significant residential segregation between Indigenous and non-Indigenous Australians whereas Biddle (2008) showed generally poor housing outcomes. While the Indigenous population is a relatively non-urban population (at least relative to the non-Indigenous population) there is no reason why insights from the spatial mismatch literature can't be extended from the spatial distribution of minority populations within cities to differences in labour market opportunities between urban and rural parts of a country or between particular cities/towns.

The analysis in this paper is structured sequentially around the following research questions. All four questions build towards an improved knowledge of the impact of location on Indigenous employment and hence the appropriate policy focus for meeting CoAG's Closing the Gap targets.

1. How is Indigenous employment distributed across Australia and how does this compare to the distribution of the usual resident Indigenous population?
2. What are the patterns of employment flows for the Indigenous and non-Indigenous population?
3. Focussing on those who do work outside their area of usual residence, how does the distance that people travel to work vary by geography?
4. What is the average number and type of jobs in the areas in and around those which Indigenous Australians live in? How do these employment prospects vary once the number of usual residents that these jobs are likely to be spread over is controlled for?
5. How are these local employment prospects related to actual employment outcomes? That is, to what extent does 'spatial mismatch' explain the variation in employment outcomes between Indigenous and non-Indigenous Australians and within the Indigenous population?

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, however, outlines the data and geography used in the analysis.

2. Data and Geography

The data for this paper comes from the 2006 Census of Population and Housing. In particular, 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 Australian Bureau of Statistics (ABS) at the SLA level of

which there were 1,415 usable areas. Clearly, this level of aggregation will hide a lot of commuting that occurs within regions. However, for all but the largest SLAs jobs within the area are likely to be accessible to local job seekers.

As the analysis focuses on people's place of work, 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. This is compared to a usable sample of 7,988,788 non-Indigenous Australians.

Given the relatively small Indigenous sample size and the confidentialising that is carried out by data released by the ABS, the 1,415 SLAs were aggregated into 531 Indigenous Areas (IAREs) for the majority of the analysis. 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 34.2 per cent of the population who worked outside their IARE.

On the other hand, by using IAREs which are designed to have relatively consistent Indigenous 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 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 to 9 usual residents and a further 373 with 10 to 29 usual residents.

The other benefit of using IAREs as the base for the analysis is that it allows analysis to be carried out by the Location Type (LType) classification developed in Taylor and Biddle (2008). While based on the standard five-category remoteness classification (ARIA) used by the ABS, 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 (2009c) 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 standard ARIA classification, hence its use in this paper.

3. The Distribution of Indigenous Employment

This first section of results (presented in table 1) summarises the distribution of Indigenous employment across Australia. The first part of the table looks at the Indigenous population whereas the second part looks at the per cent of the relevant population who identified as being Indigenous.

Table 1 - Indigenous Population Counts and Share of Total Population by Location Type – Usual Resident Population, Usual Resident Population 15 Years and Over and Place of Work Population, 2006

	Total Usual Resident Population		*Usual Resident Population 15 Years and Over*		*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 4	3,173	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
Indigenous share of count						
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.

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. Furthermore, a higher per cent of Indigenous workers identified city areas as their place of work compared to the per cent 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 per cent of the population 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 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.

4. Indigenous Employment Flows

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 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). 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 whose place of work 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 employment migration has the potential to change substantially the relative geographic distribution of the two populations.

Understanding the patterns of travelling or commuting for employment can give important insights into the distribution and causes of poor employment outcomes. If Indigenous Australians appear to be less inclined to travel for work, then this may explain why their employment outcomes are worse. In this section three aspects are considered: outward flows (the per cent of the population who left a given IARE for employment); inward flows (the per cent of the population who worked in a given IARE but did not live there); and net flows (the difference between the two).[1]

A regression approach is used to analyse the distribution in these three aspects of employment flows across the IAREs. The explanatory variables include the LType and State/Territory of the IARE as well as a number of additional variables that capture geographic, demographic and socioeconomic characteristics of the area. This includes the size of the area, the socioeconomic rank of the usual resident Indigenous and non-Indigenous population (calculated in Biddle 2009a)[2] and the level of population migration into and out of the area between 2001 and 2006.

[1] In order to reduce the effect of outliers, inward and net employment migration is capped at 100 per cent of the usual resident population.
[2] In Biddle (2009a) a separate index is calculated for the Indigenous and non-Indigenous population with each also IARE ranked separately into one of four quartiles. Nine input variables from the 2006 Census were used to create the index including three for employment, three for education, two for housing and one for income.

Table 2 - Association between Rates of Employment Migration and Location Type, State/Territory and Other Characteristics of Indigenous Area – 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 ***	-3.6
Small regional towns and localities	-22.1 ***	-27.8 ***	-10.0 *	-25.4 ***	-26.9 ***	-5.2
Regional rural areas -	7.6 *	-21.7 ***	-17.7 **	-13.0 ***	-24.5 ***	-13.9
Predominantly non-Indigenous remote towns	-38.5 ***	-31.2 ***	0.1	-41.0 ***	-21.8 ***	14.4 *
Predominantly Indigenous remote towns	-50.1 ***	-49.8 ***	-9.9	-55.5 ***	-23.5 ***	24.7 **
Town camps	-63.1 ***	-37.1 *	7.3	-68.2 ***	-30.5	24.9
Remote dispersed settlements	-36.8 ***	-35.4 ***	-5.9	-38.5 ***	-8.5	27.1 **
Victoria	-1.3	0.5	3.3	-2.6	4.0	7.7
Queensland	3.5	1.8	-3.0	1.5	5.1	3.6
South Australia	4.8	-1.4	-8.2	2.6	2.3	-0.6
Western Australia	8.9 ***	0.0	-9.6 *	5.4 *	12.1 ***	7.4
Tasmania	1.9	10.1 *	10.1	5.1	13.5 **	10.8
Northern Territory	19.6 ***	-0.6	-19.6 ***	18.7 ***	5.4	-12.8 *
Australian Capital Territory	-5.6	-8.5	-4.4	-8.5	-2.2	7.2
Geographic size of area (ln_sqkm)	-2.4 ***	-1.5 ***	0.4	-2.5 ***	-1.8 ***	0.0
Indigenous outcomes in 2nd quartile	-10.7 ***	3.8	18.2 ***	-9.4 ***	3.0	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-Indig. outcomes in 2nd quartile	8.3 ***	-19.4 ***	-37.4 ***	8.3 ***	-12.6 ***	-24.9 ***
Non-Indig. outcomes in 3rd quartile	2.8	-24.8 ***	-41.1 ***	3.4	-15.6 ***	-25.8 ***
Non-Indig. outcomes in 4th quartile	4.7	-28.1 ***	-45.9 ***	3.7	-16.7 ***	-28.1 ***
Indigenous population out migration	-0.1	0.2	0.1	-0.1	0.1	0.1
Non-Indig population out migration	0.0	-0.5 ***	-0.6 ***	0.0	-0.3 *	-0.4 *
Indigenous population in migration	0.1	0.1	0.2	0.0	0.0	0.1
Non-Indig population in migration	0.1	0.1	0.0	0.2 **	0.1	0.1
Constant	68.5 ***	79.1 ***	28.9 ***	69.0 ***	65.9 ***	9.2
Adjusted R-Squared	0.6653	0.4385	0.1490	0.6644	0.2959	0.2269

Source: Customised calculations using the 2006 Census.
Note: Variables that were significant at the 1% level of significance are marked with a ***, those significant at the 5% level with a ** and those significant at the 10% level with a *.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.

IAREs which are large in terms of geographic size (measured by the natural log of the area in square kilometres) had lower rates of outward and inward employment flows. This is not surprising as those who lived in those areas would have to travel greater distances to work in another IARE. Furthermore, 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.

Looking down the remainder of the first column, it is clear that those Indigenous Australians whose usual residence is in a city area are much more likely to work outside their IARE than those in other LTypes. Regional rural areas and large regional towns have the next highest levels of outward migration with town camps and predominantly Indigenous remote towns having the lowest level of outward migration. Although the scale was slightly different, these patterns were also found for the non-Indigenous population.

While city areas had the highest rate of outward flows, they also had the highest rate of inward flows. This implies that city areas have higher rates of employment mobility than the rest of the country rather than having particular attractive or unattractive employment prospects. Nonetheless, there were still some differences by LType in net flows, albeit at the 10 per cent level of significance only. There was net employment flows for the Indigenous population out of regional areas but, for the non-Indigenous population, there was net employment flows into three of the four remote LTypes. 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 (2009a), are defined such that the 1st quartile (the base case) has the most advantaged socioeconomic outcomes and the 4th 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.

Ultimately, one of the most important things to note from table 2 was the constant term for the rate of outward movement. Holding 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 per cent compared to 51.0 per cent) is, therefore, mostly as a result of the types of areas in which Indigenous Australians live, rather than any unwillingness to commute for work.

Taking the distance between a person's SLA of usual residence and the SLA of their place of work, Indigenous Australians travelled on average 27.4 kilometres. This was somewhat larger than the 20.9 kilometres that non-Indigenous Australians on average travelled for work. Once those who worked within their SLA of usual residence were excluded, however, the average distance travelled for work was 62.8 kilometres for Indigenous commuters and 32.1 kilometres for non-Indigenous commuters.

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, 25 per cent of Indigenous commuters worked within 6.9 kilometres of their place of usual residence. Furthermore, 50 per cent of the population worked within 13.0 kilometres (the median) and 75 per cent worked within 25.9 kilometres.

So, while there was a relatively small minority of people whose place of work was 100s or even 1000s of kilometres away from their place of usual residence, the vast majority of Indigenous and non-Indigenous travelled only a relatively short distance for work. Ultimately though, Indigenous Australians appear more than willing to travel or commute large distances for work.

5. Proximity to Employment

To gauge the potential role of job location in influencing Indigenous employment outcomes, the first step is to consider the average residential proximity to employment. This is done by calculating the total number of people employed in a given SLA and those SLAs that were either adjacent to or within a reasonable distance (11.7 kilometres)[3] from a person's SLA of usual residence - that is, all local jobs held either by Indigenous and non-Indigenous Australians. This is taken as a rough proxy for the size of the local labour market. The average Indigenous Australian aged 15 to 64 years old has 153,080 jobs within close proximity, less than half the number of jobs that the typical non-Indigenous Australian has within the same distance (365,834).

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 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 to 64 years, 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). The following table shows the variation in employment prospects by LType for the Indigenous and non-Indigenous population.

Table 3 - Average Number of Jobs in Local Area by Location Type – Indigenous and Non-Indigenous Australians, 2006

	Number of Jobs			*Non-Indigenous Per Usual Resident*		
	Indig.	*Non-Indig.*	*Ratio*	*Indig.*	*Non-Indig.*	*Ratio*
City areas	353,196	474,393	0.74	0.67	0.65	0.97
Large regional towns	70,951	82,499	0.86	0.65	0.78	1.20
Small regional towns and localities	59,450	103,955	0.57	0.60	0.63	1.06
Regional rural areas	116,031	151,088	0.77	0.56	0.54	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	0.70	0.65	0.93
Town camps	6,850	8,676	0.79	0.66	0.65	0.98
Remote dispersed settlements	11,054	32,757	0.34	0.74	0.75	1.01
Australia	153,080	365,834	0.42	0.69	0.66	1.04

Source: Customised calculations using the 2006 Census

[3] 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.

Table 3 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, those 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 greatest number of jobs in the local area are in large regional towns and town camps with the fewest in remote dispersed settlements and small regional towns.

The picture on 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 in average predominantly non-Indigenous remote town (weighted by the Indigenous population) at one extreme compared to 0.56 jobs per usual resident in regional rural areas at the other.

Clearly, there is substantial variation across Australia in the number 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 local area employment prospects have with actual employment outcomes. Previous discussion in this paper has shown that many Indigenous and non-Indigenous Australians are willing to travel large distances for employment. It is impossible with the data available to distinguish, but this may be as part of a daily commute or through temporary residence near the workplace during the working week. With 46.5 per cent of the Indigenous and 43.1 per cent of the non-Indigenous population changing their place of usual residence between 2001 and 2006, there is also 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 (in, for example, Biddle, Taylor and Yap, 2009).

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, as well as the industry/occupation that they have skills or training for. 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. However, the individual level data that is available to researchers outside the ABS does not include a sufficient level of geographic detail to undertake such an analysis. 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, the dependent variable is the per cent of the population in the area aged 15 years and over who were employed at the time of the 2006

Census.[4] 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. 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.

Table 4 - Factors Associated with Per Cent of Population Employed – Indigenous Australians, 2006

	Australia		*Non-remote*		*Remote*	
	Model 1	*Model 2*	*Model 1*	*Model 2*	*Model 1*	*Model 2*
Per cent completed Year 10 or 11	0.438 ***	0.375 ***	0.532 ***	0.511 ***	0.328 ***	0.323 ***
Per cent completed Year 12	0.736 ***	0.678 ***	0.910 ***	0.850 ***	0.483 **	0.487 **
Per cent without qualifications	-0.557 ***	-0.567 ***	-0.421 ***	0.454 ***	-0.674 ***	-0.673 ***
Per cent aged 15 to 24 attending secondary education	-0.229 ***	-0.216 ***	-0.178 ***	0.159 ***	-0.389 ***	-0.384 ***
Per cent aged 15 to 24 attending other education	-0.059	-0.052	-0.027	-0.029	-0.132	-0.130
Per cent aged 25 years and over attending any education	-0.393 ***	-0.364 ***	-0.442 ***	0.458 ***	-0.031	-0.023
Per cent of population aged 0 to 14	0.460 ***	0.475 ***	0.448 ***	0.489 ***	0.480	0.489 **
Per cent of population aged 15 to 24	0.487 ***	0.519 ***	0.415 ***	0.447 ***	0.480 **	0.476
Per cent of population aged 55 plus	0.517 ***	0.439 **	0.481 ***	0.455 ***	0.401	0.402
Per cent Torres Strait Islander	-0.091 ***	-0.096 ***	-0.127 **	-0.13 2**	-0.082	-0.083
Per cent married	0.274 ***	0.310 ***	0.337 ***	0.374 ***	0.112	0.114
Per cent away from their place of usual residence on Census night	0.223 **	0.168 *	0.154	0.173 *	0.229	0.212
Per cent who changed usual residence between 2001 and 2006	-0.119 **	-0.111 **	-0.138 ***	0.145 ***	0.006	0.011
Large regional towns	0.265	-0.654	0.206	-0.141		
Small regional towns and localities	1.471	1.267	1.487	1.103		
Regional rural areas	-0.512	-0.719	-0.867	-1.158		

[4] One limitation of using employment as the dependent variable is that those who are not in the labour force are included with those who are unemployed (the more traditional measure of underutilisation). However, given the long history of poor labour market outcomes for Indigenous Australians, it could be argued that many of those Indigenous Australians who are not in the labour force are likely to fall under the category of discouraged jobseekers who would re-enter the labour market were they to feel their employment prospects had improved substantially. This is implicitly recognised by COAG through their target of halving the gap in employment percentages, as opposed to halving the gap in unemployment rates. Nonetheless, it is important to note that the same conclusions are drawn from the analysis if the unemployment rate of the area is used as the dependent variable.

Table 4 - Factors Associated with Per Cent of Population Employed – Indigenous Australians, 2006 (continued)

	Australia		*Non-remote*		*Remote*	
	Model 1	*Model 2*	*Model 1*	*Model 2*	*Model 1*	*Model 2*
Predominantly non-Indigenous remote towns	7.764 ***	7.450 ***				
Predominantly Indigenous remote towns	10.412 ***	10.604 ***			4.448	4.647
Town camps	4.684	5.905			-3.347	-3.116
Remote dispersed settlements	19.737 ***	19.473 ***			12.679 ***	12.742 ***
Victoria	1.369	1.609	1.117	1.248		
Queensland	3.621 ***	3.596 ***	1.841	1.832	11.229 **	10.978 **
South Australia	-0.407	-0.220	-0.954	-0.932	2.759	2.661
Western Australia	-2.208	-2.617 *	-4.569 ***	4.633 ***	3.429	3.047
Tasmania	1.939	2.174	0.768	0.696		
Northern Territory	0.123	-2.593	3.360 *	-7.509	1.435	1.561
Australian Capital Territory	2.641	2.018	1.139	0.403		
Number of jobs in the local areas per usual resident		4.135 ***		6.238 **		1.795
Constant	21.239 ***	21.321 **	3.396	1.173	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.
Note: Variables that were significant at the 1% level of significance are marked with a ***, those significant at the 5% level with a ** and those significant at the 10% level with a *. 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.

The majority of the coefficients in Model 1 follow a priori expectations. IAREs where the Indigenous population has a relatively high level of education also have a relatively high per cent of the population employed, whereas current education attendance is associated with low levels of employment. 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.

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. In order to appreciate the significance of the results, it is worth considering a few predictions from the model. 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 per cent of the population employed. For remote Australia on the other hand, there was no significant association. This is in part because of the low sample size in remote Australia leading to relatively large standard errors. It also may be because of much larger geographic sizes of the IARE or the role of the Community Development and Employment Projects (CDEP) Program.[5] Whatever the cause, it would appear that the size of the local labour market relative to the usual resident population has the strongest association with Indigenous employment outcomes in non-remote Australia.

6. Summary and Implications

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 per cent 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. Those Indigenous workers who were away from their SLA of usual residence for work were on average much further away (62.8 kilometres) than non-Indigenous workers (32.1 kilometres). Indigenous Australians are therefore 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, there were 153,080 jobs in and around the areas that Indigenous Australians lived in compared to 365,834 jobs for the non-Indigenous population. However, when the number of usual residents that those jobs are spread across is controlled for, there was in fact slightly more jobs per usual resident in the areas in which Indigenous Australians live in (0.69 jobs per usual resident) compared to those which non-Indigenous Australians live in (0.66 jobs).

There is a large literature on spatial mismatch and job accessibility 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 as opposed to 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 would tend to suggest that there are plenty of jobs in the areas that Indigenous people live in. The major constraint appears to be taking up those jobs that are available. The results presented in this paper therefore raise a number of key points for policy.

[5] In essence, the CDEP Program allows Indigenous Australians in certain areas to forego social security benefits and instead receive a form of wages for employment. At least up until the time of the 2006 Census the CDEP Program made up a substantial component of the remote Indigenous labour market (Biddle, Taylor and Yap, 2009).

Firstly, the favourable employment outlook identified in remote Australia may change significantly if jobs in the CDEP scheme that are lost due to recent policy changes are not replaced. Secondly, even if it did not explain the difference between the Indigenous and non-Indigenous populations, the distribution of employment opportunities 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.

Ultimately though, the ability of the Indigenous population to secure the jobs that are available, rather than the location of Indigenous Australians, would appear to be the most important policy direction for improving Indigenous employment outcomes. In many cases it may be that the skills that Indigenous Australians have are not those that are valued by employers in the local area. Or it may be that given the choice between an Indigenous and non-Indigenous Australian with otherwise identical qualifications, an employer will opt for hiring the latter. Alternatively, their own or their families poor health may make it difficult to maintain stable employment. It would appear that it is qualification or inclination, rather than location that is most important.

References

Alexander, I. (1979), 'Job Location and Journey to Work: Three Australian Cities, 1961-1971', *Australian Geographical Studies,* 17(2), 155-174.

Altman, J.C. (2009), 'Beyond Closing the Gap: Valuing Diversity in Indigenous Australia', *CAEPR Working Paper* No.54/2009.

Australian Bureau of Statistics (ABS), (2008) *Population Characteristics: Aboriginal and Torres Strait Islander Australians,* 2006, Cat. No. 4713.0, ABS, Canberra.

Biddle, N. (2009a), 'Ranking Regions: Revisiting an Index of Relative Socioeconomic Outcomes', *Australasian Journal of Regional Studies*, 15(2).

Biddle, N. (2009b), *Location and Segregation: The Distribution of the Indigenous Population Across Australia's Urban Centres,* CAEPR Working Paper No.53.

Biddle, N. (2009c), *The Geography and Demography of Indigenous Migration: Insights for Policy and Planning,* CAEPR Working Paper No.58.

Biddle, N. and Hunter, B.H. (2007), 'An Analysis of the Internal Migration of Indigenous and Non-Indigenous Australians', *Australian Journal of Labour Economics,* 9(4).

Biddle, N. and Prout, S. (2009), *Indigenous Temporary Mobility: An Analysis of the 2006 Census Snapshot*, CAEPR Working Paper No.55.

Biddle, N., Taylor, J. and Yap, M. (2009), 'Are the Gaps Closing? - Regional Trends and Forecasts of Indigenous Employment', *Australian Journal of Labour Economics,* 12(3), 263-280.

Bolt, G., Burgers, J. and van Kempen, R. (1998), 'On the Social Significance of Spatial Location: Spatial Segregation and Social Inclusion', *Netherlands Journal of Housing and the Built Environment,* 13(1), 83-95.

Buck, N. (2001), 'Identifying Neighbourhood Effects on Social Exclusion', *Urban Studies,* 38(12), 2251-75.

Durlauf, S.N. (2004), 'Neighborhood Effects', in Henderson, J.V. and Thisse, J.F. (eds.), *Handbook of Regional and Urban Economics*, Volume 4, Elsevier B.V., Amsterdam.

Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) (2009), *Closing the Gap on Indigenous Disadvantage: The Challenge for Australia,* FaHCSIA, Canberra.

Gobillon, L., Selod, H. and Zenou, Y. (2007), 'The Mechanisms of Spatial Mismatch', *Urban Studies,* 44(12), 2401-2427.

Hellerstein, J.K., Neumark, D. and McInerney, M. (2008), 'Spatial Mismatch or Racial Mismatch', *Journal of Urban Economics,* 64(2), 464-479.

Houston, D. (2005), 'Employability, Skills Mismatch and Spatial Mismatch in Metropolitan Labour Markets', *Urban Studies,* 42(2), 221-243.

Hughes, H. and Warin, J. (2005), 'A New Deal for Aborigines and Torres Strait Islanders in Remote Communities', *Issue Analysis,* 54.

Kain, J. (1968), 'Housing Segregation, Negro Employment and Metropolitan Decentralization', *Quarterly Journal of Economics,* 82(2), 175-92.

Ksin, J. (1992), 'The Spatial Mismatch Hypothesis: Three Decades Later', *Housing Policy Debate,* 3(2), 371-392.

Mees, P., O'Connell, G. and Stone, J. (2008), 'Travel to Work in Australian Capital Cities, 1976-2006', *Urban Policy and Research,* 26(3), 363-378.

Mitchell, W., Bill, A. and Watts, M. (2007), 'Identifying Functional Regions in Australia using Hierarchical Aggregation Techniques', *Centre of Full Employment and Equity Working Paper,* No.07-06.

Morphy, F. (2008), *Agency, Contingency and Census Process: Observations of the 2006 Indigenous Enumeration Strategy in Remote Aboriginal Australia,* CAEPR Research Monograph No.28.

O'Connor, K., Stimson, R. and Daly, M. (2001), *Australia's Changing Economic Geography: A Society Dividing,* Oxford University Press, Melbourne.

Pearson, N. (2009), Up from the Mission: Selected Writings, Black Inc., Melbourne.

Taylor, J. and Biddle, N. (2008), *Locations of Indigenous Population Change: What Can We Say?,* CAEPR Working Paper No.43.

Tesfaghiorghis, H. (1991), *Geographic Variations in the Economic Status of Aboriginal People: A Preliminary Investigation,* CAEPR Discussion Paper No.2.

Tootell, G. (1996), 'Redlining in Boston: Do Mortgage Lenders Discriminate Against Neighborhoods?', *Quarterly Journal of Economics*, 111, 1049-1079.