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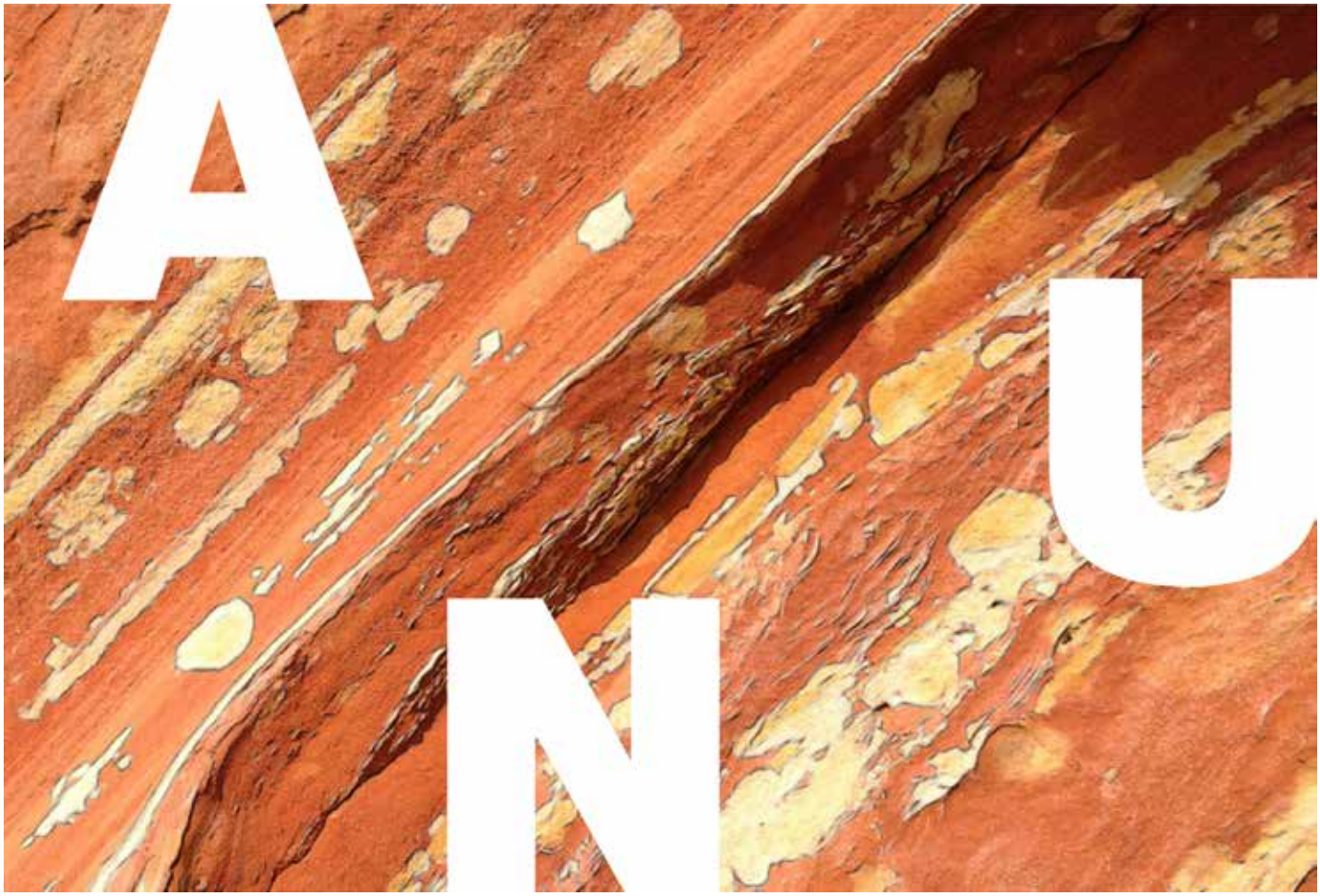

INCOME, WORK AND EDUCATION: INSIGHTS FOR CLOSING THE GAP IN URBAN AUSTRALIA

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Centre for Aboriginal Economic Policy Research
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Income, work and education: Insights for closing the gap in urban Australia

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Abstract

Many factors contribute to differences in an individual's command over resources. One of the factors is differences in labour market engagement and the level of education attainment across different geographical areas. However, existing analysis of the Closing the Gap outcomes is limited by the lack of adequate wage data for Indigenous Australians. Using the newly introduced geography Significant Urban Areas (SUAs), which distinguish between major cities, regional centres and remote areas, this paper analyses average personal income while adjusting for labour force status and education levels. We impute average wage data by focusing on the personal income of people who are employed full-time and assuming that the average weekly personal income is a reasonable approximation of wages. The findings suggest that wage differences between Indigenous and non-Indigenous Australians in urban areas are minimal after education attainment levels are adjusted for, with a gradient in wages according to the level of qualification. There are gender differences in wages in favour of men, both across SUAs and by education level. This is partly a reflection of the structure of employment and segregation in the labour market, which can reach as high as 40 per cent in some the SUAs. Considering the importance of wage data in the theory of economic development, it is essential that direct information on wages is collected in future surveys with a substantial sample of Indigenous Australians.

Keywords: Personal Income, wages, education, Closing the Gap, Policy

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Acronyms

ABS	Australian Bureau of Statistics
ANU	The Australian National University
CAEPR	Centre for Aboriginal Economic Policy Research
NATSIS	National Aboriginal and Torres Strait Islander Survey
NATSISS	National Aboriginal and Torres Strait Islander Social Survey
SUA	Significant Urban Areas

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Tables and figures

Introduction

One of the papers in this series has examined 2011 Census data on household income and provided substantial insights into the welfare of Indigenous households (Biddle 2013). This paper focuses on personal income, which is a major determinant of an individual's contribution to a household's monetary resources.

Personal income includes wages, business income, interest payments and dividends from investment, and transfer payments from government or private individuals. Wages are likely to be a substantial component of personal income for Indigenous Australians considering the historical impediments to wealth accumulation and social exclusion that limit the ability to set up business and dividend income (Hunter 2013). Following Daly's (1994) research strategy, this paper analyses census data on personal income of people who are employed full-time (i.e. working 35 or more hours per week) to gain some insight into Indigenous wages.

In mainstream economics, the wage is a price signal that provides crucial information about the scarcity of labour in the local market. Without information on wages, it is not possible to directly analyse the demand and supply of labour, and our ability to construct an informed policy response to Indigenous disadvantage is severely restricted. Because wages are critical to understanding the economics of disadvantage, the historical lack of accurate wage data for Indigenous Australians clearly needs to be addressed.

The 1994 National Aboriginal and Torres Strait Islander Survey (NATSIS) collected detailed information on income by source, including wage data in a highly grouped form, but few researchers have used that data because of concerns about the accuracy of information provided for analysis. The failure to use that data is likely to be one reason why the ABS has not collected direct information on wages in the later National Aboriginal and Torres Strait Islander Social Survey (NATSISS).[1]

All censuses since 1976 collect information on gross personal and household income; that is, income from all sources. However, it is not possible to identify the portion of this that is derived from employment, let alone the wage received from a particular job. Historically, the most credible wage research involving Indigenous Australians imputes a wage by calculating personal income for people employed full-time. This is based on the assumption that historical disadvantage means that few Indigenous people have accumulated substantial wealth, and payments from government are minimal when a person receives substantial wage income (Daly 1994, 1995). However, the growth of the Indigenous middle class (Taylor et al. 2012) may be associated with some accumulation of wealth, and families who have substantial income from employment may still receive family tax benefits. Despite these assumptions, imputing wages from census data on income received by people who are employed full-time is still the best proxy for wages until surveys collect sufficient direct data about Indigenous wages.

Another under-researched topic is the situation facing non-remote Indigenous Australians. Public debate on Indigenous issues invariably drifts towards the chronic and distinctive problems facing remote populations (Biddle & Markham 2013). Indigenous populations in remote Australia make up a greater share of the resident population and also experience outcomes in education, housing, employment and income that are dramatically worse than that experienced by other Australians. The excessive focus on remote issues effectively means that the issues affecting almost four-fifths of the Indigenous Australians who live in non-remote areas is often overlooked. This paper attempts to redress this situation by using a geography recently developed by the ABS—Significant Urban Areas (SUAs)—to document the crucial relationships between income, labour force status and education. The SUA geography allows us to analyse major cities and regional centres separately, thereby partially controlling for the accessibility to services, and we also build on Biddle and Markham (2013), who also distinguished between high and low population growth SUAs.

Data sources and methods

Geographical classification by Significant Urban Areas

SUAs represent aggregations of whole Statistical Area Level 2 (SA2) boundaries and are used to define and contain major urban and near-urban concentrations of over 10,000 people (ABS 2011). They include the urban population, any immediately associated populations, and may also incorporate one or more closely associated Urban Centre and/or Locality (UC/L) and the areas in between. They are designed to incorporate any likely growth over the next 20 years. SUAs do not cover the whole of Australia, and may cross state boundaries.

Biddle and Markham (2013) use the SUA geography to explore some of the unique demographic and

socioeconomic trends for Indigenous people in 43 regional centres based on three criteria:

- they must be classified by the Australian Bureau of Statistics (ABS) as a SUA, which implies a population of 10,000 usual residents or more
- they cannot have a population of 250,000 usual residents or more (this would classify them as a 'major city' in the ABS's remoteness hierarchy)
- they must have had an Indigenous population estimate of at least 1,000 usual residents in 2011.

Biddle and Markham (2013) impose the third criterion so that the statistical estimates for each centre are reasonably reliable and their Indigenous analysis is robust.

Population growth

In this paper, we use Biddle and Markham's classification of SUAs to distinguish personal incomes in major cities from those in other regional and remote SUAs. This SUA classification also considers the growth in the Indigenous populations, with each centre being also classified into either low-growth or high-growth urban categories.

From an economic point of view, major cities have a developed labour market that requires a range of jobs and a relatively steady demand for workers with a range of skills. Regional centres may have concentrations of particular industries and potentially a less buoyant and reliable labour demand (National Economics 2012).[2] However, regional centres associated with industries with a strong record of growth may pay relatively high wages. For example, high demand for resources during the recent mining boom means that miners pay higher wages to ensure that their workforce is not motivated to take up alternative job opportunities in local or other areas (i.e. demand for labour increases and all local wages tend to increase). Of course, adverse economic conditions for mining could mean that the wages can be temporarily decreased in the same regions.

Even though some regional centres may be associated with certain pockets of growth, we expect the regions with high population growth to have higher wages, incomes and costs of living than regions with low population growth or remote regions. Because labour demand is largely derived from the needs of the local market and number of residents, controlling for accessibility to other labour markets and the extent of population growth allows us to account for several important factors that are normally ignored in studies of Indigenous income.

Fig. 1 presents a map of the geography used in this paper to illustrate the spatial distribution of the SUA classification by population growth used in Biddle and Markham (2013).

Personal income

Data on gross personal income has been collected in all censuses since 1976 (ABS 2011).[3] As income from most sources is reported before expenses are deducted, these incomes are always a positive figure.[4] There is a tendency for incomes to be slightly understated in the census; however, the distribution is largely consistent with that obtained from the ABS income surveys (ABS 2011). Therefore, census income data are useful as an indicator of relative advantage or disadvantage and economic wellbeing for small areas and small population groups such as Indigenous Australians.

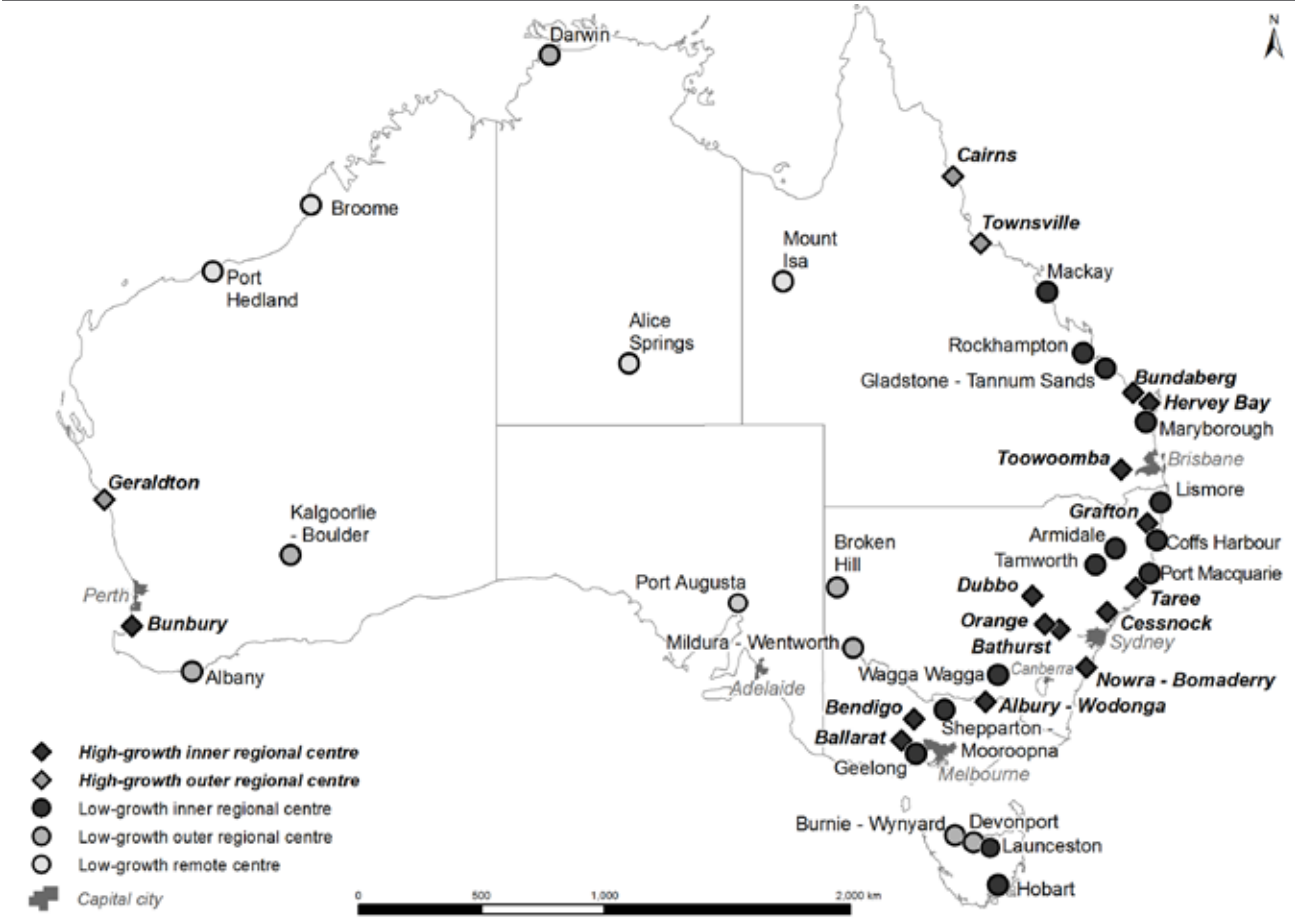
Census income is reported in ranges, so to estimate the average income received by individuals, we need to make assumptions about the distribution of income in that range. We have followed the convention of assuming a uniform distribution in each income range and using the midpoint value to estimate the average.

Labour force status

We focus on disaggregating personal income by labour force status because it allows greater insight into wages and non-wage income. By focusing on the incomes of full-time employed people, we minimise the amounts of non-wage income included in the estimate. Clearly, this assumption may not be valid for all family types (e.g. sole parents will be eligible for substantial family tax benefit payments). However, in the absence of direct information on wages for Indigenous workers, associating personal income with full-time employment is the best approach to gain insight into individual wages. This paper does not seek to provide definitive claims about wages, but merely provides an indicative analysis.

People who are outside the labour force have no wages, at least in the two weeks before the census (as specified in the census questions that asks about work status), and hence all the income they receive is likely to be from non-wage sources. The income may come from income support and transfer payment, although it is unlikely to come from unemployment benefit payments in the last two weeks (because they indicated they are not looking for work on the census form). However, income may include other income such as returns on investment, dividends or interest payments associated with financial assets and accumulated wealth. Given

FIG. 1. Map of 43 regional centres based on Indigenous population growth and remoteness hierarchy



Source: Biddle and Markham (2013), based on 2011 Census data.

the history of long-term disadvantage of Australia's Indigenous population, it is reasonable to assume that accumulated wealth would be minimal; however, this would not necessarily be the case for many non-Indigenous Australians.

One complication is that the census data on labour force potentially has a different time frame to that for the census question on income. Labour force status relates to the two weeks before the census, while the reference period for the income data is in the week before (although it is also reported as the annualised equivalent to that amount). However, these times are close enough to expect that income may not have changed even if employment status changed in the preceding week.

Another method of summarising data in a multivariate context is regression analysis. However, this was not used because of the number of assumptions required to construct average data for areas with respect to income and other variables. Not only is the estimated income driven by distributional assumptions within each income range, but the need to limit the analysis to people who are working full-time (to infer information on

Income and labour force status

wages) means that there is inherent uncertainty in the measurement and interpretation of personal income. Although we stand by the underlying data assumption, using regression analysis to interpret small changes in expected income would potentially place too much stress on the assumptions underlying the construction of the data. Therefore, we simply estimate the average income for selected groups and place conditions on a few variables to provide tentative insights into underlying socioeconomic relationships.

Education

The education classification used to compare the differences in personal income of individuals follows the strategy used by Biddle and Cameron (2012), who combined the information on Year 12 completion with the attainment of various qualifications. These data maximised the amount of information contained in the census education variables in an efficient way (i.e. in five mutually exclusive and relatively homogenous categories).

Table 1 reports the average weekly income in 2011 dollars by labour force status, gender, Indigenous status and SUA categories. We are primarily interested in personal income of people who are employed full-time; however, we report income for all major labour force states: employed full-time, employed part-time, unemployed and people not in the labour force.

The weekly incomes of the Indigenous workers employed full-time, or our estimate of wages, are broadly similar in both major cities and regional areas (approximately $1,100 and $1,000 for Indigenous males and females, respectively). However, the wages for non-Indigenous workers are much more variable. Non-Indigenous females in inner regional centres have slightly higher wages ($1,023) than Indigenous females in these areas $949), but other non-Indigenous wages tend to be significantly

TABLE 1. Average weekly income (in 2011$) by labour force status, Significant Urban Area status, gender and Indigenous status, 2011

	Male		Female	
	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous
Major cities				
Employed full-time	1165	1481	1065	1218
Employed part-time	580	685	527	609
Unemployed	244	326	260	237
Not in the labour force	255	370	310	313
Inner regional high population growth				
Employed full-time	1002	1268	949	1023
Employed part-time	503	605	500	550
Unemployed	238	280	286	248
Not in the labour force	246	369	324	328
Inner regional low population growth				
Employed full-time	1081	1342	943	1062
Employed part-time	520	638	495	561
Unemployed	233	287	268	248
Not in the labour force	266	376	319	328
Outer regional high population growth				
Employed full-time	1147	1365	991	1068
Employed part-time	625	678	537	577
Unemployed	262	336	305	259
Not in the labour force	240	379	333	306
Outer regional low population growth				
Employed full-time	1144	1400	1040	1130
Employed part-time	612	712	551	580
Unemployed	247	331	280	255
Not in the labour force	253	367	315	314
Remote low population growth				
Employed full-time	1488	1802	1164	1250
Employed part-time	777	945	616	692
Unemployed	273	448	282	287
Not in the labour force	245	396	287	272

Note: Average income is calculated using the midpoint for income ranges and 1.5 times the bottom cut-off for the open-ended category.
Source: Customised tables from 2011 Census data and using SUA categories from Biddle and Markham (2013)

higher, especially in major cities. For example, the difference in wages between non-Indigenous and Indigenous females in major cities is more than $150 ($1,218 and $1,065, respectively). Non-Indigenous male wages are more than $300 higher than Indigenous male wages in major cities ($1,481 and $1,165, respectively).

Why might the differential between Indigenous and non-Indigenous wages be smaller for women than for men? It is possible that Indigenous and non-Indigenous women are working in more similar sorts of jobs than Indigenous and non-Indigenous men. This is further explored in the section on employment structure and segregation, and in Appendix A. Overall, Indigenous and non-Indigenous jobs are more dissimilar for males than for females.

Wages appear to be especially high in remote SUAs, especially for male populations. This is consistent with the fact that 25 per cent of Indigenous and 21 per cent of non-Indigenous males in these SUAs work in the mining sector, which had experienced an almost decade-long boom by 2011. Females are less likely to work in the mining sector, which could be a reflection of the implicit gender division of labour in our society, where some occupations are seen to be more masculine than others (Tallichet 2000). Although only 5 per cent of Indigenous and non-Indigenous females work in the mining sector, the presence of high-paying mining jobs in an area will also drive up other local wages (Hunter, Howlett & Gray 2014). The overall scarcity of suitable workers (because many suitably qualified people are reluctant to move to remove areas) is likely to be an important factor driving up wages in remote urban areas.

Indigenous people working in the mining sector in remote mining areas (i.e. remote areas where at least 5% of the local workforce worked in mining) had a weekly income of $1,800, which is 50 per cent higher than the average income of all Indigenous males working full-time in the same area (Hunter, Howlett & Gray 2014). There was a similar wage differential between mining workers and those employed in other industries for the non-Indigenous population. For workers in other remote areas, the wages in both the mining and other industries are significantly lower because substantial mining investments add to the overall buoyancy of the local economy. Clearly, the industrial composition of the local economy will have an important effect on wages, depending on the demand for the goods and services.

A comparison of wage estimates for high-growth and low-growth areas (adjusting for the accessibility/remoteness of the areas, which is embedded in the SUA classification) shows that growth in the Indigenous population is not associated with higher wages. This confirms that population growth, mobility and migration are not entirely driven by labour market factors, at least for the Indigenous population (Biddle & Hunter 2006).

For the non-employed (i.e. people who are unemployed or not in the labour force), differences in personal income between Indigenous and non-Indigenous people in Table 1 are generally small. For example, Indigenous and non-Indigenous females in major cities who are not in the labour force have almost identical incomes ($310 and $313, respectively). This suggests that the labour market advantage of non-Indigenous females relative to Indigenous females (in terms of higher wages and the higher probability of being in work) is not that substantial.

Note that Indigenous incomes are sometimes higher than non-Indigenous incomes for females in various SUAs. Given the evidence of the labour market advantages of non-Indigenous females (Gray, Howlett & Hunter 2013), the higher incomes for non-unemployed Indigenous females is likely to be associated with Indigenous families being larger than non-Indigenous families and attracting larger welfare payments to support their dependents. However, the average difference is usually less than $30 per week (or 10% of estimated income).

The exception to this is the income differences between non-employed Indigenous and non-Indigenous males. These differences are larger than for females in the same groups, and non-Indigenous incomes are uniformly higher than Indigenous incomes. For example, non-Indigenous males who are not in the labour force have income around $120 higher than their Indigenous counterparts. Note that the income differentials for non-employed people are still much smaller than the wage differentials described above for people who are employed full-time.

The primary reasons for this difference are larger initial holdings of wealth and associated assets accumulated over a person's lifetime, and the fact that non-Indigenous males are more likely to have had paid employment recently (or to be between jobs at the time of the census). Intergenerational transmission of wealth may also play a role for some non-Indigenous males. Similar differences are not seen in Indigenous and non-Indigenous non-employed females, suggesting that the transfer of wealth over time to non-Indigenous females is not as large as for males, or that Indigenous females have a higher income due to welfare payments.

The estimated income for those employed part-time falls between the income of the non-employed and those who work full-time in the respective SUAs. People who are not

working full-time are likely to have a lower income than the average weekly wage received for working longer hours; however, their income may also be affected by eligibility for family tax payments for low-income families. Furthermore, some welfare payments taper off as income increases, and this is more likely to affect the income of part-time workers. Therefore, the income for this group reflects both wages and welfare payments, and readers should pay more attention to the income patterns between SUA categories for people who are employed full-time, which is likely to largely reflect wages.

Income and education

We are interested in the economic interpretations of Indigenous labour market and patterns in wages for Indigenous and non-Indigenous residents in various SUAs. We therefore focused on people who are employed full-time in order to discuss wage differences among people with various educational outcomes (Table 2).

If labour markets work the way that economic textbooks suggest, we expect people with higher educational achievements to have higher wage income (Becker, Murphy & Tamura 1990; McConnell & Brue 1992). This is demonstrated in Table 2, where wage estimates within SUAs are very similar after adjusting for educational attainment.

Returns to education are smallest in remote SUAs where labour is relatively scarce compared to regional areas and major cities.

However, the wage differential between remote SUAs and major cities can be an important consideration for

TABLE 2. Average weekly income of people who are employed full-time (in 2011$) by educational attainment and gender, 2011

	Major cities		Inner regional high population growth		Inner regional low population growth		Outer regional high population growth		Outer regional low population growth		Remote low population growth	
	Indig.	Non-Indig.	Indig.	Non-Indig.	Indig.	Non-Indig.	Indig.	Non-Indig.	Indig.	Non-Indig.	Indig.	Non-Indig.
Males												
No Year 12, no qual.	963	1075	881	1003	960	1054	1075	1122	1042	1130	1367	1566
No Year 12, some qual.	1227	1378	1135	1265	1147	1328	1220	1387	1192	1426	1678	1917
Year 12, no qual.	1037	1215	876	1057	998	1114	961	1119	1112	1209	1240	1507
Year 12, non-degree qual.	1257	1420	1077	1312	1232	1405	1234	1411	1299	1483	1649	1924
Year 12, degree qual.	1814	1961	1520	1831	1559	1869	1767	1879	1633	1906	2122	2039
Females												
No Year 12, no qual.	876	920	785	819	796	848	868	878	893	891	1103	1042
No Year 12, some qual.	1061	1087	991	955	996	994	1044	1030	1090	1067	1200	1205
Year 12, no qual.	952	1005	748	837	833	878	879	897	1013	967	1077	1089
Year 12, non-degree qual.	1010	1090	1014	957	922	988	974	978	1024	1085	1167	1207
Year 12, degree qual.	1498	1545	1333	1415	1455	1446	1395	1444	1564	1537	1571	1561

Indig. = Indigenous; qual. = qualification

Note: Given the focus of full-time employed individuals in this table, the assumption that the average weekly income personal income is a good approximation of the wages earned by the individuals across the different SUAs by their education attainment

Source: Customised tables from 2011 Census data and using SUA categories from Biddle and Markham (2013)

workers with various levels of educational attainment. In remote areas, unqualified Indigenous and non-Indigenous males without Year 12 have wages that are $400–500 higher than in major cities, but highly educated males earn only $100 more than their city counterparts. This means that the loss of amenity in moving to a remote area for only a small wage advantage is unlikely to be very attractive for highly educated males, but there may be a larger incentive for unskilled workers.[5] Male wages for the least highly educated workers in outer regional SUAs also tend to be higher than those in the cities, but not as high as those in remote SUAs. The wages in inner regional SUAs tend to be slightly lower than the cities.

Indigenous males in the highest education category are actually paid more than their non-Indigenous counterparts in remote SUAs, but the wage differential between remote and major city SUAs for educated Indigenous males is still substantially smaller that the analogous differential for the lowest education category. The incentive for the low-education groups to move to remote areas is constrained by the fact that the supply of Indigenous workers with similar levels of education in those areas is substantial.

Indigenous and non-Indigenous wages are very similar in urban areas within educational attainment groups. That is, wage differences between Indigenous and non-Indigenous Australians are compressed by disaggregating the statistics by educational attainment.

The biggest difference in wages between various SUA categories is for the most highly qualified groups. This is consistent with the heterogeneity of this group, which can include doctorates and degree-level qualifications in high-demand occupations, along with less well-paid occupations and people with the minimum level of educational attainment to be classified in this group. Despite these differentials between wages for the various SUAs, the striking feature of the data in Table 2 is how similar the wage estimates are after adjusting for educational attainment.

Even after we adjust for educational attainment, female wages for Indigenous and non-Indigenous full-time workers are more similar than the equivalent male wages. More importantly, the additional wages for females who choose higher levels of education are relatively compressed compared with the wage variation across educational attainment among males. That is, males appear to be concentrated in educational qualifications that are better paid than either Indigenous or non-Indigenous females (Taylor et al. 2012). For example, the nursing profession is still highly feminised, while medical practitioners are disproportionately males.

Income and population growth

To adjust for whether Indigenous population growth is responding to any price signals from wage differentials in inner regional and outer regional SUAs, we examined whether there are systematic differences in wages according to population growth given the local accessibility of an area. We follow the Biddle and Markham (2013) classification which divides urban Australia by the level of accessibility to services, and also on whether the Indigenous population was growing strongly between 2006 and 2011.

For Indigenous people in inner regional SUAs, the low-growth SUAs almost always have higher wages for males and females than analogous individuals in high-growth SUAs. The only exception to this is Indigenous females with Year 12 and a non-degree qualification. At least in inner regional areas, it is clear that the high rates of population growth are not driven by high wages and migration to those areas. After adjusting for the level of educational attainment, the wage differentials between high and low-growth outer regional SUAs are more random that those in inner regional SUAs. Nonetheless, it is clear that the relatively high population growth in certain SUAs is not driven by wages that attract more Indigenous migrants.

Employment structure and segregation in the labour markets

The general scarcity of suitable labour is an important factor driving the observed difference in wages, especially with respect to the labour market difference between remote and other SUAs (also see the discussion on mining wages, above). Scarcity in the labour market is driven by the supply of suitable workers and the demand for those workers. In a market economy, the demand for workers depends on, and is derived from, the goods and services provided by employers that define the industry that an individual is employed in. This section explores the extent to which Indigenous and non-Indigenous workers of various SUAs are employed in different types of jobs (further details are shown in Appendix A). That is, if employers of Indigenous and non-Indigenous workers face very different market conditions, then their ability to pay wages may vary significantly. This has implications for the Indigenous labour market and our interpretation of wages and income data.

One way to appreciate the demands for Indigenous labour is to identify the industry of employment and calculate whether the types of employers who employ Indigenous workers are different from those who employ non-Indigenous Australians (Hunter 2004).

To measure this industry segregation between all Indigenous and non-Indigenous Australian workers over time, Hunter (2004) calculated the Duncan Index using 12 broad industry divisions between 1971 and 1991 (Duncan & Duncan 1955). This index is easy to interpret because it represents the proportion of Indigenous workers (or non-Indigenous workers) that would have to change their industry of employment in order to eliminate any racial difference in the statistical distributions. Overall, there has been a substantial and steady reduction in the index since 1971 (Hunter 2004). Almost 40 per cent of Indigenous workers in 1971 would have been required to change their industry of employment to achieve an industry profile equivalent to that of non-Indigenous Australians; in 2001, this was just under 25 per cent.

Table 3 reports this racial segregation index in labour market using the industry of employment data for the 2011 Census by SUA categories. It is apparent that measured segregation is much lower in all SUA categories in 2011 than it was in 2001 across the whole of Australia. Remote SUAs have the highest segregation between Indigenous and non-Indigenous workers, but even in these areas less than one-fifth of workers were affected (i.e. index values of 16.3% and 17.8% for males and females, respectively). The lowest measure of segregation was 9.3 per cent in inner regional areas. In outer regional areas, measured segregation was as low as 10 per cent. The stereotype of highly segregated regional communities appears to no longer be accurate. Although rural communities were more segregated in 1960s and 1970s (Hunter, Arthur & Morphy 2005), Indigenous workers have made considerable progress at being integrated into the mainstream labour market.

Hunter (2013) analyses recent trends in Indigenous self-employment and infers that another aspect of this integration into the market economy is that Indigenous entrepreneurs are more likely to be 'following the money' and are conducting business in the profitable sectors of the economy like other businesses. Segregation between Indigenous and non-Indigenous businesses in 2011 is similar to that observed in Table 3, and segregation has also decreased substantially since 2001 (compared with Chapter 5 in Hunter 2004).

The important implication is that the employers of Indigenous workers are similar to employers of non-Indigenous workers, at least in terms of the industries in which they operate. Hence, the capacity to pay wages is reasonably similar. Residual wage differentials are most likely attributable to the types of jobs being done, which is itself highly contingent on educational attainment and the level of skills held by individuals. There is always potential for unobservable characteristics of workers and discrimination to play a role, but both of these issues are notoriously difficult areas to enact effective policy.

The segregation index can also be used to measure the differences between industrial distribution of male and female employment—that is, to measure gender segregation in the labour market. Table 3 shows that gender segregation is substantially higher than the racial segregation measured in the other columns. Gender segregation between non-Indigenous males and females is almost 30 per cent in major cities and closer to 40 per cent in the regional and remote SUAs. Indigenous people are working in a similar labour market in all SUA categories, and one of the major inequalities in the structure of the urban labour market is based

TABLE 3. Segregation index by SUA category, Indigenous status and gender, 2011

	Racial segregation in employment		Gender segregation in employment	
SUA category	Male	Female	Non-Indigenous	Indigenous
Major cities	13.5	13.0	29.3	38.3
Inner regional high population growth	9.3	12.3	38.3	42.0
Inner regional low population growth	10.2	9.3	36.9	41.4
Outer regional high population growth	12.0	14.7	37.3	38.0
Outer regional low population growth	10.0	14.0	37.1	38.0
Remote low population growth	16.3	17.8	39.8	41.6

Source: Customised tables from 2011 Census data and using SUA categories from Biddle and Markham (2013)

on gender. This point is underscored by the fact that gender segregation between Indigenous male and female employment is always higher than the gender segregation in non-Indigenous employment in all SUA categories, and is as high as 42 per cent in high population growth inner regional SUAs.

In summary, while gender differences in the Australian labour market are persistently large with substantial differences in the industrial distribution of male and female workers, racial segregation is a relatively minor issue. Indigenous males and Indigenous females work in dissimilar industries, but both are 'following the money' in the sense they are seeking and securing employment in jobs in businesses that are thriving in the areas according to the distribution of other employees of the same gender by industry.

Conclusions

This paper considered personal income, adjusting for educational attainment for different labour force states, with a particular focus on full-time employed people to gain some insight into wages in a range of urban labour markets.

Overall, the main finding of this paper is that the wage differentials between Indigenous and non-Indigenous Australians are smaller after adjusting for educational attainment than is evident in overall income (both personal and household income). Accordingly, education policy is central to any attempt to address Indigenous disadvantage.

The remaining wage difference after adjusting for education could be driven by the type of jobs that Indigenous and non-Indigenous people hold and access to employment. Discrimination in the labour market is likely to play an important role in explaining this residual (Biddle et al. 2013). However, the challenges for addressing discrimination are considerable, and it is not clear whether existing policies have been effective (Hunter 2005). Reconciliation Australia has recently joined with some of Australia's leading community organisations, businesses and government agencies to support the 'Racism: it stops with me' campaign, which has compelling videos and advertisements that raise awareness of the issue. While policy makers, researchers and concerned citizens should continue to apply their minds to these challenges, providing education that is both relevant and useful to Indigenous people in the labour market must be a priority.

The importance of comparing like with like

The Closing the Gap policies do not directly target income, although the effect of personal and household resources on the 'building blocks' and relevant contextual factors is likely to be crucial (SCRGSP 2010). This paper argues that analysis of the Closing the Gap outcomes is limited by the lack of adequate wage data for Indigenous Australians. Our analysis attempts to impute average wage data by focusing on the personal income of people who are employed full-time and assuming that the average weekly personal income is a reasonable indicator of wages. The historical inability to accurately estimate Indigenous wages has led to an inadequate economic understanding of the drivers of Indigenous disadvantage, and a better proxy needs to found. Until accurate wage data can be provided, it will be difficult for researchers to separately identify the relative roles of supply and demand in the Indigenous labour market. This should be a priority, as policy emphasis is fundamentally different depending on which side of the labour market is more important.

Despite these limitations, we have made some useful observations using imputed wage data. The increasing integration of Indigenous workers into the mainstream labour market in urban Australia is one reason why the differences in wages of Indigenous and non-Indigenous workers is smaller than one might expect, considering the clear differences in resources available to different households. After adjusting for differences in educational attainment, wage differences between Indigenous and non-Indigenous workers are minimal for both males and females.

Clearly, the ongoing differentials in employment prospects are one of the major reasons for the differences in personal and household incomes. Clustering of individuals with poor employment prospects in particular households will mean that inequality in household income is much larger than personal income.

The extent of recent growth in the Indigenous population in various SUA categories is interesting because labour market analysis assumes that individuals will be attracted to areas where the wages are relatively high. Remote urban areas have higher wages, but they nonetheless tend to stagnate in terms of population growth. The likely reason is that most Indigenous people do not move for employment reasons.

Economic factors are clearly important for income and an individual's command over resources, but they are not a major factor in the growth of the Indigenous population in

various SUAs. Previous literature on migration indicates that personal and cultural reasons are the major drivers of Indigenous mobility, but economic factors still have an important role to play in explaining non-Indigenous mobility (Biddle & Hunter 2006; Taylor 2009).

Policy needs to focus on educational outcomes, but should not ignore other factors. At least in non-remote Australia, there is much less inequality after adjusting for the access to educational qualifications in an area. In remote urban areas, the overall scarcity of labour and the difficulty in attracting suitably qualified people mean that employers may settle for relatively uneducated workers. However, the wages of Indigenous people with low educational attainment in remote urban areas remain high despite the apparent substantial supply of such workers in these areas. Clearly, there is still some mismatch between the employment demands and needs of employers, and the labour supply preferences of Indigenous residents in remote areas.

Although education, scarcity of suitable labour, structure of the labour market and location of the job are all important, labour market discrimination is likely to be another major impediment to accessing jobs and securing a fair pay. Discrimination is a difficult issue to address effectively, but policy makers need to be aware of historically contingent cultural and social factors in the supply of Indigenous labour. Addressing educational disadvantage of Indigenous Australians relative to non-Indigenous Australians will account for the majority of the deficit in command over resources in terms of market income, and will also greatly enhance access to market income through improved job prospects (Gray, Hunter & Lohoar 2012).

The conclusions of this research resonate with other recent analyses of the Indigenous labour market. Kalb et al.'s (2012) regression analysis of employment among Indigenous and non-Indigenous Australians showed that lower education, poorer health and larger families explain the lower labour market attachment of Indigenous Australians to a substantial extent (particularly for women). Like almost all previous studies, Kalb et al.'s analysis was constrained by the fact that wage data were not available. The current study has illustrated the difficulty of imputing wages from census data and underscores the need to include direct wage information in future surveys of Indigenous Australians.

This paper shows that data on Indigenous disadvantage can be better interpreted by comparing like with like. It is not sufficient to report the overall gap in outcomes of Indigenous and non-Indigenous Australians—policy makers need to adjust for both educational attainment and location to provide clear evidence about where program resources should be allocated.

Notes

1. Gray and Chapman (2006) used the 2002 NATSISS data to analyse imputed wages by assuming personal income is equivalent to wages when the main source of income is identified by the respondent as being from wages. Their indigenous analysis provides qualitatively different results to the analysis of non-Indigenous wages calculated in the Household, Income and Labour Dynamics in Australia (HILDA) Survey. HILDA includes an impressive array of income data, including a direct measure of wages. Of course, the results may be due to population differences, although it is not possible to discount the issue of measurement error for the 2002 NATSISS wage data.
2. Lack of diversity in industrial activity can lead to industry-specific factors making regional growth more variable than the national growth.
3. In the 2011 Census, total income (that the person usually receives each week), also referred to as gross income, is the sum of income received from all sources before any deductions such as income tax, the Medicare Levy or salary sacrificed amounts. It includes wages, salaries, regular overtime, business or farm income (less operating expenses), rents received (less operating expenses), dividends, interest, income from superannuation, maintenance (child support), workers' compensation, and government pensions and allowances (including all payments for family assistance, labour market assistance, youth and student support, and support for the aged, carers and people with a disability).
4. However, income from some sources may be negative. Income from own unincorporated businesses and income from rental property are collected net of operating expenses. If the operating expenses are greater than receipts, total income is negative.
5. Migration is, of course, affected by many other factors, including amenity and price differentials.

Appendix A Distribution of industry sector of employment by SUA category and Indigenous status, 2011

TABLE A1. Percentage of employment by industry sector and Indigenous status: major cities

	Indigenous		Non-Indigenous	
Industry sector	Male	Female	Males	Females
Agriculture, forestry and fishing	0.7	0.5	0.2	0.4
Mining	2.9	1.6	1.0	0.5
Manufacturing	12.2	12.8	3.3	5.4
Electricity, gas, water and waste services	1.8	1.5	0.5	0.6
Construction	16.4	13.4	1.8	2.4
Wholesale trade	4.0	5.5	2.0	3.5
Retail trade	7.6	8.7	11.3	12.8
Accommodation and food services	5.6	5.7	9.2	7.2
Transport, postal and warehousing	8.7	7.1	2.9	2.5
Information media and telecommunications	1.5	2.4	1.3	1.9
Financial and insurance services	1.5	4.3	2.9	5.2
Rental, hiring and real estate services	1.1	1.6	1.5	1.8
Professional, scientific and technical services	3.5	9.4	4.4	8.2
Administrative and support services	3.6	3.2	3.7	3.8
Public administration and safety	11.3	7.0	12.7	6.8
Education and training	4.9	4.8	12.6	12.0
Health care and social assistance	6.2	4.9	23.2	19.7
Arts and recreation services	2.5	1.6	1.9	1.7
Other services	3.9	3.9	3.6	3.7

Source: Customised tables from 2011 Census data and using SUA categories from Biddle and Markham (2013)

TABLE A2. Percentage of employment by industry sector and Indigenous status: inner regional high population growth SUAs

	Indigenous		Non-Indigenous	
Industry sector	Male	Female	Males	Females
Agriculture, forestry and fishing	2.3	2.5	0.6	1.1
Mining	4.3	3.3	0.8	0.4
Manufacturing	15.5	15.6	2.8	4.5
Electricity, gas, water and waste services	1.9	2.0	0.5	0.6
Construction	14.4	14.8	1.6	2.3
Wholesale trade	4.0	4.1	1.2	1.7
Retail trade	7.9	10.3	12.4	16.2
Accommodation and food services	5.6	5.4	11.5	9.4
Transport, postal and warehousing	5.9	6.3	1.3	1.7
Information media and telecommunications	0.8	1.4	0.6	1.2
Financial and insurance services	0.4	1.9	1.9	3.0
Rental, hiring and real estate services	1.0	1.3	1.3	1.5
Professional, scientific and technical services	1.7	4.4	2.7	4.4
Administrative and support services	3.7	2.5	4.0	2.9
Public administration and safety	10.9	7.6	9.7	6.3
Education and training	5.6	5.3	13.5	13.4
Health care and social assistance	9.1	6.1	29.6	24.4
Arts and recreation services	1.4	1.1	0.8	1.2
Other services	3.7	4.4	3.0	3.9

Source: Customised tables from 2011 Census data and using SUA categories from Biddle and Markham (2013)

TABLE A3. Percentage of employment by industry sector and Indigenous status: inner regional low population growth SUAs

	Indigenous		Non-Indigenous	
Industry sector	Male	Female	Males	Females
Agriculture, forestry and fishing	1.7	2.1	0.4	0.8
Mining	3.9	2.9	0.8	0.4
Manufacturing	13.7	13.9	2.9	4.0
Electricity, gas, water and waste services	2.0	2.5	0.8	1.0
Construction	17.0	14.6	1.5	2.2
Wholesale trade	4.3	4.7	1.4	1.9
Retail trade	8.3	9.9	13.6	15.5
Accommodation and food services	6.2	5.7	12.0	9.4
Transport, postal and warehousing	6.6	7.1	1.8	1.9
Information media and telecommunications	0.9	1.4	1.0	1.3
Financial and insurance services	0.8	2.0	2.4	3.2
Rental, hiring and real estate services	0.7	1.4	1.3	1.7
Professional, scientific and technical services	2.8	5.4	3.0	4.9
Administrative and support services	4.0	2.5	4.5	3.1
Public administration and safety	9.5	7.3	8.6	7.5
Education and training	4.1	5.7	12.6	13.5
Health care and social assistance	7.3	5.1	26.1	22.5
Arts and recreation services	1.4	1.3	1.1	1.3
Other services	4.7	4.5	4.0	3.8

Source: Customised tables from 2011 Census data and using SUA categories from Biddle and Markham (2013)

TABLE A4. Percentage of employment by industry sector and Indigenous status: outer regional high population growth SUAs

	Males		Females	
Industry sector	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous
Agriculture, forestry and fishing	0.7	1.0	0.0	0.4
Mining	7.1	4.3	1.5	0.6
Manufacturing	8.8	9.7	1.6	2.7
Electricity, gas, water and waste services	1.9	2.0	0.3	0.7
Construction	16.7	15.8	2.2	2.9
Wholesale trade	3.2	4.3	1.1	2.0
Retail trade	7.2	8.9	9.9	15.0
Accommodation and food services	5.6	6.4	10.9	10.1
Transport, postal and warehousing	7.2	8.8	2.2	3.2
Information media and telecommunications	0.9	1.3	1.0	1.2
Financial and insurance services	0.4	1.2	1.2	2.4
Rental, hiring and real estate services	0.8	1.6	1.1	2.2
Professional, scientific and technical services	2.0	4.8	3.2	5.1
Administrative and support services	3.8	3.0	5.0	3.6
Public administration and safety	14.5	11.9	14.4	8.5
Education and training	4.8	4.3	14.5	12.7
Health care and social assistance	8.2	5.0	24.9	21.3
Arts and recreation services	2.5	1.4	1.7	1.5
Other services	3.5	4.3	3.1	3.7

Source: Customised tables from 2011 Census data and using SUA categories from Biddle and Markham (2013)

TABLE A5. Percentage of employment by industry sector and Indigenous status: outer regional low population growth SUAs

	Indigenous		Non-Indigenous	
Industry sector	Male	Female	Males	Females
Agriculture, forestry and fishing	2.1	3.2	0.6	1.5
Mining	8.2	7.2	1.4	1.5
Manufacturing	8.1	9.8	1.6	3.1
Electricity, gas, water and waste services	2.0	2.4	0.4	0.7
Construction	13.5	13.4	1.1	2.3
Wholesale trade	2.9	4.2	0.8	1.9
Retail trade	7.4	8.6	10.1	14.3
Accommodation and food services	4.3	5.0	8.3	9.2
Transport, postal and warehousing	6.9	7.8	1.3	2.5
Information media and telecommunications	1.4	1.0	1.0	1.1
Financial and insurance services	0.3	1.1	1.7	2.5
Rental, hiring and real estate services	0.7	1.3	1.5	1.9
Professional, scientific and technical services	2.7	4.2	3.5	4.8
Administrative and support services	3.7	2.9	4.0	3.7
Public administration and safety	16.4	13.8	22.2	12.2
Education and training	4.6	4.2	13.2	12.7
Health care and social assistance	8.6	4.2	22.1	19.1
Arts and recreation services	1.3	1.3	1.5	1.4
Other services	4.7	4.6	3.6	3.5

Source: Customised tables from 2011 Census data and using SUA categories from Biddle and Markham (2013)

TABLE A6. Percentage of employment by industry sector and Indigenous status: remote low population growth SUAs

	Indigenous		Non-Indigenous	
Industry sector	Male	Female	Males	Females
Agriculture, forestry and fishing	1.4	0.6	0.2	0.3
Mining	24.7	21.1	5.1	5.2
Manufacturing	4.4	6.0	1.0	1.8
Electricity, gas, water and waste services	1.9	1.9	0.0	0.7
Construction	14.3	14.1	2.2	3.1
Wholesale trade	1.1	3.0	0.6	1.5
Retail trade	3.3	6.8	5.6	12.5
Accommodation and food services	3.2	4.5	5.6	9.0
Transport, postal and warehousing	4.3	7.8	1.9	3.3
Information media and telecommunications	1.4	1.0	2.1	1.0
Financial and insurance services	0.3	0.5	0.7	1.5
Rental, hiring and real estate services	0.9	1.7	1.9	2.4
Professional, scientific and technical services	1.8	4.6	3.5	4.3
Administrative and support services	3.3	2.7	4.0	3.5
Public administration and safety	13.8	9.1	16.6	11.4
Education and training	4.6	3.9	17.9	13.6
Health care and social assistance	9.8	4.8	26.1	19.6
Arts and recreation services	1.6	1.3	1.1	1.6
Other services	3.8	4.2	3.8	3.5

Source: Customised tables from 2011 Census data and using SUA categories from Biddle and Markham (2013)

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