Geography, mobility and Indigenous wellbeing in Australia

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Abstract

This study investigates: (1) the effect of remoteness or rural areas on life satisfaction; (2) if the effect on life satisfaction is experienced locally (3) if the effect on life satisfaction differs between Indigenous and non-Indigenous Australians; (4) trends in life satisfaction for Indigenous and non-Indigenous Australians in rural areas over time; and (5) whether or not moving between and within urban and rural areas is associated with different levels of life satisfaction for Indigenous and non-Indigenous Australians. The results indicate that across a range of measures living in a more remote or rural area is associated with higher levels of life satisfaction. Furthermore, we find evidence to suggest that unobserved local factors associated with more remote or rural living underpin the link to life satisfaction, although there is no evidence that this is experienced differently between Indigenous and non-Indigenous Australians. Similarly, we found no evidence to support declining life satisfaction in more remote or rural areas differs between Indigenous and non-Indigenous Australians. Finally, the results indicate that moving between and within rural and urban areas tends to be associated with higher levels of life satisfaction, especially for moving among rural areas and from urban to rural areas, independent of Indigenous status. Importantly, imprecise estimates such as those reported at times for Indigenous Australians in this study are not themselves evidence of a lack of heterogeneity, rather are a sign of a paucity of evidence of heterogeneity. We encourage future research efforts to extend these findings.

Keywords: Geography, Happiness; Indigenous; Life satisfaction; Mobility; Remote; Rural; Wellbeing

JEL: I31; J15; Z13

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1.   Introduction

Indigenous populations in countries such as Australia, Canada, New Zealand and the United States are severely disadvantaged according to a range of socioeconomic indicators (Kimmel, 1997; Kuhn & Sweetman, 2004; Maani, 2004). Globally, displacement of Indigenous groups from their land, social disadvantage, suicides, and alcohol and drug related problems are common in these communities. Moreover, the worldwide dominant notion of *progress* generally considered to be synonymous with economic growth, improvises us all. Around the world, strong features of Indigenous peoples' self-identification are links to the physical environment, however, extractive industries and agricultural activities threaten Indigenous peoples' access to land and harms environment quality (Stephens, Porter, Nettleton, & Willis, 2006). The cultural services provided by ecosystems while less tangible than other material ecosystem services are nonetheless highly valued by all societies and play an important role in supporting and enhancing social wellbeing (World Health Organization, 2005).

In Australia, a developed country, Indigenous Australians in 2012-2013 were: less likely to participate in the labour force (55.9% compared with 76.4%); more than 3 times likely to be unemployed (17.2% compared with 5.5%); almost half as likely to have completed year 12 or higher qualifications as their highest level of educational attainment (35.9% compared with 67.3%) and almost twice as likely to report fair or poor health (23.1% compared with 11.8%) (Australian Bureau of Statistics, 2014a). To place these figures in a global context, in 2011 Australia ranked second out of 187 countries on the United Nations' Human Development Index (HDI), with an index value of 0.928. The index value for Indigenous Australians, however, was 0.745,[4] a value similar to the HDI scores for Serbia (0.744), Jordan (0.744), Sri Lanka (0.740), Brazil (0.740) and Iran (0.733) (United Nations Development Programme, 2014).

It is not surprising that the United Nations through the Permanent Forum on Indigenous Issues, has made a strong recommendations, for both developing and developed countries. Specifically, the Permanent Forum has recommended public policy based on both self-determination and the principle of free, prior and informed consent. In addition to respect for Indigenous peoples' rights to their own lands and territories, Indigenous peoples, it is also argued that there is need to pursue development strategies based on Indigenous peoples' own definitions and indicators of poverty and well-being. A report on the *State of the World's Indigenous Peoples* made a clear link between strident efforts to perpetuate economic growth undermining the qualitative dimension of *development* (Secretariat of the United Nations Permanent Forum on Indigenous Issues, 2010).

In Australia, in 2008, the Council of Australian Governments (COAG), allegedly in consultation Indigenous Australians, committed to addressing Indigenous disadvantage, or 'Closing the Gap' faced by Indigenous Australians. Specifically; closing the life expectancy gap within a generation, halving the gap in the mortality rate for Indigenous children under five within a decade, ensuring all Indigenous four year olds in remote communities have access to quality early childhood programs within five years, halving the gap in reading, writing and numeracy achievements for children within a decade, halving the gap for Indigenous students in Year 12 attainment rates or equivalent attainment by 2020; and halving the gap in employment outcomes within a decade (Council of Australian Governments, 2014).

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[4] The value for Indigenous Australians was calculated using a similar method to that employed by Yap and Biddle (2010).

Despite the laudable intentions of these public policy efforts to improve the outcomes of Indigenous Australians, they have come under increasing criticism due to seemingly wasteful proliferation of government programs (more than 150 different programs) (Department of the Prime Minister and Cabinet, 2014), and per capita expenditure for Indigenous Australians that is more than double that for non-Indigenous Australians (SCRGSP (Steering Committee for the Review of Government Service Provision), 2012) amidst a lack of progress or even further deterioration on some outcomes for Indigenous Australians (Council of Australian Governments Reform Council, 2014).

The most recent report from the Steering Committee for the Review of Government Service Provision, *Overcoming Indigenous Disadvantage 2014* provides an indication of the wellbeing of Aboriginal and Torres Strait Islander Australians for a number of areas, including some COAG targets. The report noted: (1) improvements on measures of life expectancy, mortality rates for children, educational attainment and employment; (2) little or no change for the achievement of minimum standards for reading, writing and numeracy, the rate of family and community violence and the rate of disability and chronic disease; and (3) a worsening of the levels of psychological distress, hospitalisations from self-harm and adult imprisonment, particularly for juveniles. This report emphasises, in contrast to the 'Closing the Gap' agenda, the measurement of wellbeing and progress in terms of how they compare with earlier outcomes for Indigenous Australians rather than in terms of the gap between non-Indigenous and Indigenous Australians. Furthermore, another key development of the report is a broadening of the focus from *overcoming disadvantage* to *improving wellbeing* changes which represent a gradual movement towards a more positive narrative surrounding Indigenous Australians (Australian Broadcasting Corporation, 2014).

Typical of public policy discussions, even in Australia's new *Measures of Australia's Progress* (2013), wellbeing is operationalised using a dashboard of objectively measured (usually economic) outcomes. For Indigenous Australians, remoteness appears to be a key variable for some outcomes, with objectively measured outcomes worsening as remoteness increases (cf. Biddle, 2014a). A result which may be in part explained by a greater difficulty accessing services in more remote locations, with 30% of Indigenous Australians reporting difficulty accessing services in the previous 12 months, a figure highest, 48%, in the very remote areas (SCRGSP (Steering Committee for the Review of Government Service Provision), 2014). A finding corroborated by Biddle (2014b) noting a Indigenous Australians in remote areas are less likely to report a presence of a number of facilities and more likely to report barriers to accessing government facilities.

1.1.   The aim of this study

This study investigates one of Biddle's (2014a) main findings with regards to the use of retrospective measures, that is, that those in remote areas report higher levels of wellbeing than those in non-remote areas. A result in stark contrast to objective measures of socio-economic status and health found elsewhere with important implications for government policy in Australia. Dockery (2010), in line with arguments made by the United Nations through the Permanent Forum on Indigenous Issues, contends that what we should really care about is Indigenous people's wellbeing, an argument in line with developments in France and the United Kingdom (Stiglitz, Sen, & Fitoussi, 2009; The All Party Parliamentary Group on Wellbeing Economics, 2014), which refocus attention on wellbeing. An earlier study by Grieves (2006) for the New South Wales Department of Environment and Conservation seeks to apply the concept of Aboriginal wellbeing to government policy. Using a focus group of Aboriginal experts in the inner Sydney suburb of Redfern. Apart from education, the following intangible cultural dimensions were rated as being most important to wellbeing:

spirituality (or philosophy); knowing family history; being with immediate and extended family; knowing about and exercising my rights as an Aboriginal person; giving to family and friends; and knowing about Indigenous history and culture (Grieves, 2006, 2014).

It is hard to overstate the importance the need to focus on the subjective dimension of the wellbeing for Indigenous Australians. To begin with, in 2008-2012 Indigenous Australians were almost twice as likely to commit suicide than non-Indigenous Australians. Further, from 2004-2005 to 2012-2013 while the rate of hospitalisation for intentional self-harm has remained stable for other Australians for Indigenous Australians it has increased by almost 50% (SCRGSP (Steering Committee for the Review of Government Service Provision), 2014). Also, a focus on subjectively measured wellbeing provides one way to capture how more *intangible* factors such as the way that people think and what people believe can influence wellbeing. Among Indigenous Australians such intangible dimensions can rank very highly as determinants broader wellbeing (Grieves, 2006).

It may be the case that some factors that Indigenous Australians identify as being important to wellbeing are not measured in the Census and/or are even negatively correlated with conventional measures of socio-economic advantage or disadvantage such as, employment, education, housing and income (Biddle, 2009). A point reaffirmed by the finding that income surprisingly is not statistically significantly associated with income for Indigenous Australians (Biddle, 2014a). In contrast, for Indigenous Australians, some authors have suggested that living in remote Australia itself and an attachment to a traditional lifestyle (including communal home ownership) is the fundamental driver of Indigenous disadvantage (Hughes, Hughes, & Hudson, 2010; Lane, 2010). As expressed by Biddle (2014a, p. 722):

> *"It may be that living in remote Australia reduces the chance of home ownership, going to university or obtaining employment. However, with or without controlling for these and other differences, Indigenous Australians in remote Australia still tend to report a higher level of emotional wellbeing than those in non-remote Australia. One needs to ask, therefore, whether improving socioeconomic status should be the aim of government policy or whether these are just means to the end of improving Indigenous wellbeing. If it is the latter, then policies that explicitly or inadvertently encourage Indigenous Australians to move from remote to non-remote Australia may be counterproductive."*

The purpose of this study is quantify the net effect of living in a rural or urban are on subjectively measured Indigenous wellbeing in Australia using data from the Household, Income and Labour Dynamics in Australia (HILDA) survey, a longitudinal survey which takes the form of an indefinite life panel, following individuals over time. In particular, this study focuses on self-reported life satisfaction of Indigenous Australians investigating: (1) the effect of remoteness or rural areas on life satisfaction; (2) if the effect on life satisfaction is experienced locally (3) if the effect on life satisfaction differs between Indigenous and non-Indigenous Australians; (4) trends in life satisfaction for Indigenous and non-Indigenous Australians in rural areas over time; and (5) whether or not moving between and within urban and rural areas is associated with different levels of life satisfaction for Indigenous and non-Indigenous Australians. In doing so, this study sheds more light on the state of Indigenous wellbeing (as measured by life satisfaction) in Australia in rural and urban areas and the effect of movements between rural and urban areas.

In what follows this paper provides an overview of subjectively measured wellbeing of Indigenous Australians, the determinants of wellbeing and the role of geography. Section 2 discusses the data and method employed in the investigation while Section 3 reports the

results obtained. Finally, Section 4 discusses the findings and concludes offering insights for government policy.

1.2. Subjectively measured wellbeing of Indigenous Australians

While Indigenous Australians are widely known to have a greater degree of relative disadvantage compared to the non-Indigenous population, far less widely known is the nature of subjectively measured Indigenous wellbeing and how it may differ from non-Indigenous wellbeing. It seems Indigenous Australians experience considerably worse negative wellbeing. Indigenous Australians compared to non-Indigenous Australians are in 2012-2013 were almost 3 times more likely to experience psychological distress (Australian Bureau of Statistics, 2014d) and in 2012, were twice as likely to die from intentional self-harm (Australian Bureau of Statistics, 2014c). With regards to positive wellbeing, little comparable evidence exists (cf. Australian Institute of Health and Welfare, 2009) between Indigenous and non-Indigenous Australians on positive wellbeing as information on positive wellbeing is not collected in the National Health Survey or the General Social Survey, non-Indigenous comparisons from ABS collections are unavailable (Australian Bureau of Statistics, 2012).

Recent evidence from cross-sectional data indicates Indigenous Australians are less likely to report being happy a person in the last 4 weeks and more likely to report feeling so down in the dumps that nothing could cheer them up over the same period compared to non-Indigenous Australians. Despite the inclusion of socio-demographic covariates associated with happiness or sadness the lower (although now not statistically significant) likelihood of being happy remains as does the greater likelihood of being sad (still statistically significant) (Biddle, 2014a).

The characteristics of the life satisfaction of Indigenous Australians remains mixed and curious. According to Biddle's (2014a, p. 716) definition of above-average life satisfaction that is, a life satisfaction score of 9 or 10 Indigenous Australians are more likely to report above-average life satisfaction, whether controlling for other factors or not. However, paradoxically, Indigenous Australians are also more likely than non-Indigenous Australians to report below-average life satisfaction. These perplexing results are deserving of further investigation. It may be the case that the full spectrum of reports requires attention, in line with growing that positive and negative wellbeing are more than opposite ends of the same phenomenon, and that factors which increase satisfaction may not necessarily decrease dissatisfaction (Boes & Winkelmann, 2010).

Despite existing research efforts attempting to make sense of differences between Indigenous and non-Indigenous Australians at a point in time, to the extent of the authors' knowledge, there is currently no evidence on how subjectively measured wellbeing of Indigenous Australians differs from non-Indigenous Australians over time and across different areas. The design of the HILDA survey is particularly useful in this respect.

1.3. Determinants of wellbeing

Most of the existing literature focuses on what factors determine well-being independent of whether or not a person is Indigenous or non-Indigenous through the inclusion of an Indigenous identifier in model estimation. What is often reported are the average effects independent of whether an individual is Indigenous or non-Indigenous. these results are generally consistent with evidence for countries outside of Australia.

For instance, males are found to be on average less satisfied than females, although the reverse appears to be the case, if personality traits are held constant (Ambrey & Fleming, 2014). Life satisfaction is U-shaped with age typically reaching a minimum in an individual's

mid-forties. Blacks and other non-white races are less happy than whites, an effect which is both large, and well-defined (Blanchflower & Oswald, 2004). Further, immigrants from a non-English speaking country even after controlling for poor English speaking ability, which is itself is associated with lower levels of life satisfaction, are also observed to report being less satisfied with their lives (M Shields, Price, & Wooden, 2009).

Being married is associated with higher levels of life satisfaction (Evans & Kelley, 2004), some of this effect is attributable to happier people self-selecting into marriage. Similarly, there is some evidence for self-selection into divorce with people who get divorced not only less happy during marriage but also less happy before they get married (Stutzer & Frey, 2006). Lone parents even after controlling for the number of children report being less satisfied with their lives, while the number of children is often reported to be negatively associated with life satisfaction (M Shields et al., 2009). This association while a common finding is far more complex (cf. Margolis & Myrskylä, 2011) and can depend on the age of the children at home (M. Shields & Wooden, 2003). Poor health unsurprisingly is invariably associated with lower levels of life satisfaction (Powdthavee & van den Berg, 2011).

An additional year of compulsory schooling has been found to have meaningful and positive pecuniary and non-pecuniary impacts for individuals (Oreopoulos, 2007). Although tertiary education appears to be consistently linked to lower or not statistically significantly different levels of life satisfaction for an individual (Ambrey & Fleming, 2014; Gong, Cassells, & Keegan, 2011; M Shields et al., 2009). A gamut of possible explanations have been offered for this curious result, for instance; a lack of employment opportunities requiring high-level skills, or the earlier advantages of higher education fading in the context of social equalisation in more developed countries (Veenhoven, 1996), or the benefits of education flowing less through a direct impact on life satisfaction than through its positive effects on the creation and maintenance of human and social capital (Florida, Mellander, & Rentfrow, 2013; Helliwell, 2003). While likely not providing the final word on this puzzle; Powdthavee, Lekfuangfu, and Wooden (2014) have pointed to the different channels (e.g. income and health) through which education supports life satisfaction. Nevertheless, even after accounting for the health and income as mediators of higher education, the overall association remains negative.

Employment status in particular unemployment has been the focus of a great deal of research attention. A strong result is that unemployed individuals report lower levels of life satisfaction above and beyond the effect of income alone (Carroll, 2007; Kassenboehmer & Haisken-DeNew, 2009). Income is positively associated with life satisfaction although the relatively small magnitude of the observed association when compared to other non-economic factors is both surprising and concerning to many economists (Frijters, Haisken-DeNew, & Shields, 2004).

1.4. Geography and Indigenous wellbeing

In line with the global trend towards migration from rural to urban areas, the Indigenous population in Australia is increasingly concentrated on the urban eastern seaboard, particularly among older people (Biddle & Prout, 2014). Movement which is essential to the attainment of a university education (Lane, 2010). Migration to jobs and higher order services in urban centre or growth towns is regarded as an inevitable requirement of closing the gap (Hughes, 2007). However, in contrast to location equilibrium theory, living in an urban area is consistently found to be negatively associated with life satisfaction, whether or not one controls for other factors (Morrison, 2011; M Shields et al., 2009; Sørensen, 2013). Many studies have sought to uncover the role of geography in determining life satisfaction, in a

range of contexts including Australia, notably observing the effect independent of whether or not an individual is an Indigenous or non-Indigenous Australian (cf.Ambrey & Fleming, 2014; M Shields et al., 2009). However, Biddle (2014a) highlighted this point for the case of Indigenous Australians specifically, in stark contrast to other objective indicators.

This finding is at odds with the evidence which consistently shows that a greater degree of remoteness is associated with a worsening of many objectively measured outcomes. A result which may be in part explained by a greater difficulty accessing services in more remote locations, with 30% of Indigenous Australians reporting difficulty accessing services in the previous 12 months, a figure highest, 48%, in the very remote areas (SCRGSP (Steering Committee for the Review of Government Service Provision), 2014). Aspects identified by Indigenous Australians as being essential to health (Jackson & Ward, 1999). Moreover, across nine measures of employment, education, income and housing large capital cities were found to be the least disadvantaged while remote areas ranked relatively poorly, particularly for the Northern Territory. Between 2001 and 2006 while the overall distribution remained the same, there was a significant change due to high rates of inward migration. For instance, the Wepia Indigenous Area experienced a 30.6% net inflow of Indigenous Australians leading to a shift in the area's rank from 378th to 37th (Biddle, 2009).

For a number of reasons the characteristics of different areas may be expected to influence Indigenous Australians' wellbeing. Neighbourhoods and communities affects life chances and opportunities of people and institutions. "... a person's patterns and norms of behavior tend to be shaped by those with which he or she has the most frequent or sustained contact and interaction." (Wilson, 1987, p. 61) An individual's contacts and interactions occur locally, for this reason spatial segregation and concentration can be expected to have both negative effects, (e.g. perpetuating economic disadvantage and creating a climate which reinforces hardships) and positive effects (e.g. maintaining a minority culture and provide conditions for internally orientated enterprise) on the lives of people in the area (Bolt, Burgers, & Van Kempen, 1998). In a similar spirit, the mental wellbeing of unemployed individuals is found to be bolstered by higher rates of unemployment in their local area (Clark, 2003; M Shields et al., 2009).

In Australia, M Shields et al. (2009) show that neighbourhood characteristics, such as the percentage of, unemployed, lone parents, immigrants from non-English speaking countries, home owners, professionals and people aged over 64 years are linked to individual level life satisfaction irrespective of whether that individual identifies as Indigenous or a non-Indigenous Australian. While M Shields et al. (2009) find that these factors only explain a further 1.5 to 2.5% of the variance in life satisfaction over and above the 14% explained by individual level characteristics, the attributes of a particular area may be expected to matter more for Indigenous Australians than non-Indigenous Australians (Biddle, 2014b).

For Indigenous Australians, the wellbeing of the community in which one lives and/or has an ongoing attachment to is an important aspect of individual health and wellbeing. Specifically, Indigenous Australians in remote areas are less likely to report a presence of a number of facilities (e.g. hospitals, other health clinics and a number of commercially operated facilities) and more likely to report barriers to accessing government facilities (e.g. transport/distance and an absence or scarcity of services). Furthermore, non-remote areas compared to remote areas are found to differ in terms of the type of reported problems and incidence of those reported problems. For instance, non-remote areas there is a greater incidence of reported theft and dangerous or noisy driving while in remote areas there is a greater prevalence other problems reported (e.g. alcohol, illegal drugs and violence). Community level indices of these variables are likely to be related to Indigenous wellbeing

and as might be expected are found to be associated with emotional wellbeing (happiness and sadness). Above and beyond these community level indices living in a more remote area is associated with higher levels of happiness. It seems where Indigenous Australians live matters (Biddle, 2014b).

2.   Data

This paper undertakes a longitudinal panel data analysis of Indigenous wellbeing in Australia. This paper builds on significant contributions to the literature and considerable theoretical frameworks and measures already used in research into the economics of happiness or what has recently been termed *Wellbeing Economics* (The All Party Parliamentary Group on Wellbeing Economics, 2014). This area has also been spurred on by; readily available household panel datasets (cf. Haisken-DeNew, 2001), repeated representative cross-sectional surveys (e.g. the General Social Survey (GSS) data collected in many Organisation for Economic Co-operation and Development (OECD) countries), and surveys referring to several countries (e.g. World Values Survey or the Eurobarometer Survey). These datasets have become routinely employed and include single-item measures of happiness and/or life satisfaction (cf. Lucas & Donnellan, 2011), used to operationalise *experienced utility* (Kahneman & Thaler, 2006). Many authors (cf. Diener, Inglehart, & Tay, 2013; Diener & Suh, 1999; Frey & Stutzer, 2002; Lucas & Donnellan, 2011) including those of the school of hedonic psychology (cf. Kahneman & Krueger, 2006) have provided evidence on the validity of life satisfaction as a retrospective subjective measure of experience. The use of panel datasets which contain measures of life satisfaction or happiness and follow the same individuals over time allow the exploration of natural experiments (Metcalfe, Powdthavee, & Dolan, 2011), and permit researchers to control for time-invariant individual specific confounders such as stable personality traits (Bertrand & Mullainathan, 2001; Ferrer-i-Carbonell & Frijters, 2004).

Despite significant progress being made in terms of the measurement and collection of data on the wellbeing of Indigenous Australians, notably the National Aboriginal and Torres Strait Islander Social Survey (NATSISS) and the more recent Australian Aboriginal and Torres Strait Islander Health Survey (AATSIHS) there is a genuine lack of longitudinal data in particular, surveys designed to allow greater control of unobserved individual specific time invariant factors which may confound the key findings. Furthermore, while the NATSISS data are useful, it has a limited capacity to yield insight into the nature of mobility, especially over time (Taylor & Bell, 2012). The HILDA survey provides a distinct advantage in this respect and permits a research design not otherwise possible.

2.1.   Household, Income and Labour Dynamics in Australia (HILDA) survey

The data employed throughout this study is obtained from waves 1 (2001) to 12 (2012) of the Household, Income and Labour Dynamics in Australia (HILDA) survey, an unbalanced panel is used throughout the empirical analysis, unless otherwise stated. The survey takes the form of an indefinite life panel, following household members of the original sample and their offspring for an indefinite life. First conducted in 2001, the HILDA survey owes much to household panel studies conducted elsewhere in the world; particularly the German Socio-Economic Panel and the British Household Panel Survey. The reference population for the first wave of the survey was all members of private dwellings in Australia aged 15 years and over following coverage rules broadly in line with the monthly Labour Force Survey supplements undertaken by the Australian Bureau of Statistics (N Watson & M Wooden, 2002).

The key dependent variable employed throughout this study is the life satisfaction variable and is obtained from individuals' responses to the question: '*All things considered, how satisfied are you with your life?*' The life satisfaction variable is an ordinal variable, the individual choosing a number between 0 (totally dissatisfied with life) and 10 (totally satisfied with life). Presenting data from Wave 12, Figure 1 illustrates the distribution of responses.

[Figure 1 here]

Visual inspection of Figure 1 reveals that the distribution of the responses negatively skewed with more than half of the respondents reporting an 8 or higher. A life satisfaction score of 8 is both the median and modal response.

[Table 1 here]

Table 1 shows how the representation of Indigenous Australians in the HILDA data compares to that in the ABS Census data. In the first wave of HILDA in 2001, N. Watson and M. Wooden (2002, p. 7) show that the data over-represents Indigenous Australians compared to the ABS Census data (1.8% compared to 1.7%). The revision of the ABS data to 2.2% means that according to a chi-squared goodness-of-fit test Indigenous Australians somewhat underrepresented in the HILDA data in 2001. In 2006, there is no statistically significant between the percentage of Indigenous Australians in the HILDA data (2.2%) and that in the ABS Census data (2.3%). Finally, in 2011, it appears that Indigenous Australians are overrepresented in the sample (2.8%) compared to the ABS Census data (2.5%). This overrepresentation is statistically significant and likely reflects the refreshment or top-up sample in 2011. This top up consisted of a random sample of people living in non-remote parts of Australia. The aim was to alleviate to some degree any biases that may arise from non-random attrition in particular, non-random attrition of immigrants (Watson & Wooden, 2010, p. 329).

Table 2 below provides the definitions and descriptive statistics for the variables derived from the HILDA data by Indigenous status. The differences are consistent with *a priori* expectations. Notably, life satisfaction is higher on average for Indigenous Australians and statistically significantly so compared to non-Indigenous Australians.

[Table 2 here]

2.2.   Australian Bureau of Statistics (ABS) geographic classifications

The Australian Bureau of Statistics (ABS) defines rural and urban areas using the ABS Section of State (SOS) structure. The SOS structure defines four different categories which are then aggregated to define urban and rural areas. An urban area includes: the "Major Urban" category which represents a combination of all urban centres with a population of 100,000 or more and the "Other Urban" category which represents a combination of all urban centres with a population between 1,000 and 99,999. A rural area includes: the "Bounded Locality" represents a combination of all bounded localities and the "Rural Balance" category represents the remainder of state/territory (Australian Bureau of Statistics, 2014b). These are the definition of urban and rural that are used throughout this study unless otherwise stated.

The variables for moving between and within urban and rural areas are calculated by comparing the individual's current Census Collection District (CD) and their urban or rural location to that individual's CD and their urban or rural location in the previous (next available) wave, permitting gaps between waves. Note that Figure 2 and Figure 3 in Section 2.3 that follow rely instead on successive waves only.

2.3. Geography and mobility of Indigenous and non-Indigenous Australians

Both Indigenous and non-Indigenous Australians in the sample exhibit some geographic heterogeneity. Using the adjusted Wald tests, which appreciate the complex survey design of HILDA, it appears that Indigenous (8.2717) and non-Indigenous Australians (8.0786) in more rural areas report higher levels of life satisfaction than those in urban areas (7.8391 and 7.8559 respectively), statistically significant at conventional levels. *Prima facie*, it appears that despite Indigenous Australians in remote areas reporting higher levels of life satisfaction on average than non-Indigenous Australians this difference is not found to be statistically significant. These preliminary figures point to a difference in the experience of rural versus urban areas, although it is not precisely estimated.

The geographic differences are surprising given that for both groups average equivalised disposable household incomes are statistically significantly lower in rural areas ($27,869 for Indigenous and $34,877 for non-Indigenous) compared to urban areas ($29,348 for Indigenous and $39,403 for non-Indigenous). While some Indigenous Australians might choose to relocate to urban areas to obtain greater access to facilities, employment and a higher income this decision, even for those who may choose to relocate is does not appear to promote life satisfaction. Rather, Indigenous Australians who have moved to a rural area in the last 12 months (since the last wave of HILDA) report lower (although not statistically significantly so) levels of life satisfaction on average (7.7800) compared to those Indigenous Australians who have not (7.9264).

The proportion of Indigenous and the proportion of non-Indigenous Australians in the sample moving between and within rural and urban areas in the last 12 months from 2001 to 2011 is shown in Figure 2.

[Figure 2 here]

Figure 2 provides an indication of the year-to-year rate of flow between and within rural areas. To be specific, Figure 2 shows the percentage of either Indigenous or non-Indigenous Australians who resided in rural areas who has by the next wave moved CD to an urban area, another CD within an rural area or stayed in the same CD in a rural area. Figure 3 shows the percentage of either Indigenous or non-Indigenous Australians who resided in urban areas who has by the next wave moved CDs to an urban area, another CD within an urban area or stayed in the same CD in a urban area.

[Figure 3 here]

Comparing both Figure 2 and Figure 3 reveals that Indigenous and non-Indigenous Australians are overwhelmingly more likely to stay in their current CD rather than move. Year-to-year differences in the percentage moving to urban areas from rural areas between Indigenous and non-Indigenous Australians, while estimated to be fairly consistently larger for Indigenous Australians are only statistically significantly so for 2009-2010 and 2011-2012. On the whole without considering year-to-year changes and just the overall difference between Indigenous and non-Indigenous Australians; Indigenous Australians are almost twice as likely (13.2823%) as non-Indigenous Australians (7.3913%) to move from rural to urban areas by the next wave, a result statistically significant at the 5% level. These figures are calculated with weights.

While not reproduced here, Taylor and Bell (2012) find that those Indigenous Australians who move tend to be on average: younger, male, not married, unemployed, not in the labour force, receiving Community Development Employment Project wages, more highly educated, renting privately, no living in homeland, does not have neighbourhood problems, not in poor health and in a more remote area. That is, individuals who move are different from the

population more broadly. Furthermore, Figure 4 reveals that for both Indigenous and non-Indigenous Australians moving between rural areas or from urban to rural areas is associated with higher levels of life satisfaction.

[Figure 4 here]

3. Empirical analysis

What follows is an empirical analysis of: (1) the effect of remoteness or rural areas on life satisfaction; (2) if the effect on life satisfaction is experienced locally (3) if the effect on life satisfaction differs between Indigenous and non-Indigenous Australians; (4) trends in life satisfaction for Indigenous and non-Indigenous Australians in rural and urban areas over time; and (5) the effect of moving between and within urban and rural areas on life satisfaction and if this differs between Indigenous and non-Indigenous Australians.

3.1. More remote or rural areas and life satisfaction

To investigate the effect of more remote or rural areas on life satisfaction we estimate a micro-econometric life satisfaction function which takes the form of an indirect utility function as follows:

$$U_{i,k,t} = \alpha_0 + \alpha_1 r_{k,t} + \sum_{j=1}^{m} \beta_j z_{i,k,t} + \sum_{1}^{t} d_{1,t} \tau_t + \varepsilon_{i,k,t} \tag{1}$$

Where $U_{i,k,t}$ stands for the utility of individual i, at location k, at time t; $r_{i,k,t}$ is the variable for remoteness or rural areas; $z_{i,k,t}$ is a vector of socio-economic and demographic characteristics including, the natural log of equivalised disposable household income, marital status, employment status, education and so forth (similar to Ambrey and Fleming (2014)) and τ_t time or year fixed effects. Finally, $\varepsilon_{i,k,t}$ is the error term. In the model, the individual's true utility is unobservable; hence self-reported life satisfaction is used as a proxy. Table 2 provides a description of all variables employed.

Equation 1 is modelled employing a number of different measures of for $r_{i,k,t}$ using a pooled ordered probit model, estimated by maximum likelihood estimation. The key results are reported in Table 3.

[Table 3 here]

The different measures for $r_{i,k,t}$ include:

- **The ABS' urban and rural classification** (where urban is the base case) as detailed in Section 2.2.
- **The ABS' Accessibility/Remoteness Index of Australia (ARIA) classification** (where Major Cities of Australia is the base case):
  - Major Cities of Australia: CDs with an average Accessibility/Remoteness Index of Australia (ARIA) index value of 0 to 0.2
  - Inner Regional Australia: CDs with an average ARIA index value greater than 0.2 and less than or equal to 2.4
  - Outer Regional Australia: CDs with an average ARIA index value greater than 2.4 and less than or equal to 5.92
  - Remote Australia: CDs with an average ARIA index value greater than 5.92 and less than or equal to 10.53
  - Very Remote Australia: CDs with an average ARIA index value greater than 10.53

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- o Migratory: composed of off-shore, shipping and migratory CDs (Australian Bureau of Statistics, 2001)[5]
- **The linear function form of the Euclidean distance in metres** from the centroid or centre point of the individual's CD to the nearest centroid of the capital city's statistical division.
- **The natural log functional form of the Euclidean distance in metres** from the centroid or centre point of the individual's CD to the nearest centroid of the capital city's statistical division.
- **The inverse functional form of the Euclidean distance in metres** from the centroid or centre point of the individual's CD to the nearest centroid of the capital city's statistical division.

The results shown in Table 3, are reported as average marginal effects (based on observed values in the sample), and where the explanatory variable is dichotomous, as a discrete change. The results are interpreted in terms of the probability of reporting a life satisfaction score of ten. Across all different measures except for the inverse transformation of Euclidean distance (a p-value of 0.1220), independent of whether or not one identifies as an Indigenous or non-Indigenous Australian living in a more remote or rural area is associated with higher levels of life satisfaction, holding other things constant.

To be specific, Table 3 column 1 indicates that being in a rural area is associated with 2.16% greater likelihood of reporting being totally satisfied with one's life compared to living in an urban area. Table 3 column 2 shows that compared to living in a major city, living in an inner regional is associated with a 1.71% greater chance of reporting being totally satisfied with your life. Furthermore, greater levels of remoteness are associated with higher still levels of life satisfaction. Notably, distinct from an individual's Indigenous status an individual residing in a very remote area is approximately 1.75 times more likely to report being totally satisfied with their lives. Although this difference, between remote and very remote, while large is not quite statistically significant at conventional levels with a p-value of 0.1172. Table 3 column 3 indicates that living an extra metre further away from the nearest capital city is associated with a minuscule although statistically significant increase in the probability of reporting being totally satisfied with one's life.[6] Table 3 column 4 illustrates the that a natural log functional form is also statistically significant at the 1% level, implying life satisfaction increases with distance away from the nearest capital city at a decreasing rate. A similar functional form is modelled using the inverse transformation although is not quite statistically significant with a p-value of 0.1230.

In subsequent analyses we focus on the ABS' classification which draws the distinction between urban and rural areas. To put this variable in context of the other measures: approximately 86% of individuals who fall within an area defined as outer regional Australia, or remote Australia or very remote Australia or migratory areas also fall within ABS' definition of rural areas; further, on average individuals residing in a rural area are on average a little over 200 kilometres from the nearest capital city. The full ordered probit base model results, including control variables for Equation 1 using the rural variable are reported as

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[5] The ARIA index is based on measures of road distances between populated localities and service centres. These road distance measures are then used to generate a remoteness score for any location in Australia (Australian Population and Migration Research Centre, 2014). In statistical analysis very remote (0.4% of the sample) and migratory (0.0% of the sample) categories are grouped together.

[6] A one kilometre (1000 metre) increase in the distance from the nearest capital city is associated with a 0.27% greater chance of reporting a life satisfaction score of 10.

average marginal effects, alongside qualitatively equivalent Ordinary Least Squares (OLS) estimates in Appendix A Table A1.

3.1.1. Wellbeing determinants

While not the main purpose of this study it is useful to note briefly the estimates the controls included in Appendix A Table A1. An examination of variance inflation factors indicates that there is no worrisome multicollinearity. The explanatory variables included largely follow the existing literature described in Section 1.3 and are generally unsurprising. Focusing on the results in Table A1 column 1, life satisfaction is found to be U-shaped in age. Males are less satisfied with their life than females. Individuals who identify themselves as an Aboriginal and/or Torres Strait Islander report being more satisfied with their lives. Immigrants from a non-English speaking country even after controlling for reported poor English speaking ability (itself negatively associated with life satisfaction) are less satisfied with their life. Everything else held constant, on average individuals who are married, in a defacto relationship or widowed are more satisfied with their lives than single persons, who have never been married, while being separated is associated with statistically significantly lower levels of life satisfaction. Being a lone parent above and beyond the number of children an individual has resident in the home (which is negatively associated with life satisfaction) is linked to lower levels of reported life satisfaction.

Increasingly poor health is invariably associated with lower levels of life satisfaction. A perplexing, although nonetheless enduring result is that, higher levels of education are associated with lower levels of life satisfaction. Being employed part-time or identifying as a non-participant (e.g. a student, retired or undertaking home duties) is associated with reporting higher levels of life satisfaction compared to working full-time. Being unemployed is associated with lower levels of life satisfaction, while higher income is positively associated with life satisfaction. Finally, whether or not someone else was present at the interview (e.g. a respondent's spouse) is positively associated with life satisfaction, indicating the presence of social desirability bias. There appears to be some evidence of panel conditioning effects, with individuals reporting higher levels of life satisfaction in earlier interviews compared to interviews in later years. The results in Table A1 column 1 are very similar to the OLS results reported in Table A1 column 2, identical in terms of sign and almost identical in terms of statistical significance.

3.1.2. Fixed effects model

In addition, we also estimate the base model as a fixed effects model (as in Equation 2), using the "blow up and cluster" (BUC) estimator (cf. Baetschmann, Staub, & Winkelmann, 2015). A fixed effects model is used because; while a Breusch-Pagan Lagrangian multiplier test for random effects reveals a strong rejection (a p-value of 0.0000) in favour of a random effects model, an asymptotically equivalent test to the usual Hausman fixed versus random effects test (cf.Schaffer & Stillman, 2010) indicates that the assumption underlying such a model, that is, that the error term is not correlated with the explanatory variables is violated, strongly rejected with a p-value of 0.0000. In such an instance, a random effects estimator is inconsistent and a fixed effects estimator is consistent. For this reason a fixed effects model is preferred. The BUC estimator, which is a fixed-effect conditional logit estimator, conveniently allows us to address both the issue of the ordinal nature of the dependent variable and the potentially confounding influences of individual-specific time-invariant factors, such as relatively stable personality traits which are correlated with the explanatory variables such as income or unemployment.

$$U_{i,k,t} = \alpha_0 + \alpha_1 r_{k,t} + \sum_{j=1}^{m} \beta_j z_{i,k,t} + \sum_{1}^{t} d_{1,t} \tau_t + \iota_i + \varepsilon_{i,k,t} \tag{2}$$

The terms in Equation 2 are defined as in Equation 1, apart from ι_i which represents an individual-specific fixed effect. The estimated coefficient for the rural variable is 0.1827 again statistically significant at the 1% level. The full results are reported in Appendix A Table A2 column 1, for ease of comparison with other studies and for ease of interpretation traditional fixed effects estimates from the within estimator are also reported in Table A2 column 2.

3.2. More remote or rural places, experienced locally

In line with a view commonly held in urban studies that, neighbourhoods and communities affects life chances and opportunities of people and institutions and that, "... a person's patterns and norms of behavior tend to be shaped by those with which he or she has the most frequent or sustained contact and interaction." (Wilson, 1987, p. 61) We explore if more of the effect of living in a more remote or rural area is experienced locally using a difference-in-difference estimator. This is done by applying the BUC estimator to unique combinations of individuals and broader locations (Local Government Areas (LGA)[7]) relying on people moving over time between LGAs (and variables varying similarly) to identify coefficients. In doing so, this technique abstracts from not only individual-specific but also wider-reaching unobserved LGA-level time-invariant factors which may influence life satisfaction. The approach is particularly advantageous as it also circumvents unobserved time-invariant interactions between the individual and the location such as distinct preferences to live in a broader general location and how that may impact life satisfaction. The rural variable varies within LGAs hence we can identify the how local factors common to a rural area affect an individual's life satisfaction on average, independent of whether they are of Indigenous or non-Indigenous decent. Equation 3 illustrates the model estimated.

$$U_{i,k,t} = \alpha_0 + \alpha_1 r_{k,t} + \sum_{j=1}^{m} \beta_j z_{i,k,t} + \sum_{1}^{t} d_{1,t} \tau_t + \iota_i \kappa_k + \varepsilon_{i,k,t} \tag{3}$$

Where Equation 3 is defined as in Equation 1 apart from the term $\iota_i \kappa_k$ which represents the interaction between individual-specific and location-specific fixed effects. The term encapsulates all unique individual-level and location-level combinations.

The estimated coefficient for the rural variable is 0.2022 still statistically significant at the 1% level. While the estimate is larger than the individual-specific fixed effects model, it still falls within the 95% confidence interval of the earlier estimate, with a lower bound of 0.1041 and an upper bound of 0.2614. The full results are reported in Appendix A Table A3, fixed effects estimates from the within estimator are also reported in Table A3 column 2. While this key result falls short of explaining precisely what "local" attributes contribute to life satisfaction in rural areas, the results do suggest that whether or not an individual is an Indigenous or non-Indigenous Australian, there is a localised higher level of life satisfaction associated with living in a rural area. Despite this result being independent of whether a person identifies as Indigenous or non-Indigenous, it may be the case that more remote or rural living is experienced differently between Indigenous and non-Indigenous Australians.

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[7] The LGAs are administrative boundaries which are relatively large in area. The unique LGAs in the same have a mean (median) of 11,463 (1,866) km^2. To put this area in context, the United States county boundaries have a mean (median) area of 5,728 (1,614) km^2.

3.3. Heterogeneity in the experience of more remote or rural living

To explore potential heterogeneity begin Indigenous and non-Indigenous Australians we augment Equation 2 and Equation 3 with an interaction terms as shown in Equation 4 and Equation 5.

The interaction terms are Indigenous and non-Indigenous-specific rural variables in an individual-specific fixed effect model.

$$U_{i,k,t} = \alpha_0 + \alpha_1 r_{k,t} \text{Indigenous}_{k,t} + \alpha_2 r_{k,t} \text{nonIndigenous}_{k,t} + \sum_{j=1}^{m} \beta_j z_{i,k,t} + \sum_{1}^{t} d_{1,t} \tau_t +$$

$$\iota_i + \varepsilon_{i,k,t} \tag{4}$$

Equation 5 differs from Equation 4 in the inclusion of the individual and location fixed effects and their interactions.

$$U_{i,k,t} = \alpha_0 + \alpha_1 r_{k,t} \text{Indigenous}_{k,t} + \alpha_2 r_{k,t} \text{nonIndigenous}_{k,t} + \sum_{j=1}^{m} \beta_j z_{i,k,t} + \sum_{1}^{t} d_{1,t} \tau_t +$$

$$\iota_i \kappa_k + \varepsilon_{i,k,t} \tag{5}$$

The key results are presented in Table 4.

[Table 4 here]

The BUC results controlling for individual-specific fixed effects in Table 4 column1 point to, a negative coefficient although not at all statistically significant with a p-value of 0.8070. The BUC results controlling for interaction between individual-specific and location-specific fixed effects in Table 4 column 2 reveal a more precisely although still not statistically significant (a p-value of 0.3200) with a positive coefficient of 0.3120 for Indigenous Australians. For non-Indigenous Australians however, the positive coefficient (0.1981) is approximately two thirds of the size of that for Indigenous Australians and statistically significantly at the 1% level.

3.4. Life satisfaction trends in rural areas: Differences between Indigenous and non-Indigenous Australians

Given the broad trend observed globally of rural to urban migration and in particular, the migration of Indigenous Australians from predominantly more remote or rural areas to urban areas it is useful to understand how life satisfaction has changed in these areas over time. To examine how life satisfaction has changed in these areas over time and to explore the differences between Indigenous and non-Indigenous Australians we estimate Equation 6.

Equation 6 includes individual-specific fixed effects.

$$U_{i,k,t} =$$

$$\alpha_0 + \alpha_1 r_{k,t} \text{Indigenous}_{k,t} + \alpha_2 r_{k,t} \text{nonIndigenous}_{k,t} + \sum_{j=1}^{m} \beta_j z_{i,k,t} +$$

$$\eta \text{IndigenousTrend}_t + \rho \text{nonIndigenousTrend}_t + \gamma \text{IndigenousRuralTrend}_t +$$

$$\delta \text{nonIndigenousRuralTrend}_t + \iota_i + \varepsilon_{i,k,t} \tag{6}$$

All terms in Equation 6 is as previously defined. However, IndigenousTrend_t is a Indigenous-specific time trend $\text{Indigeneous}_i \times (\text{Year}_t - 2000)/100$; $\text{nonIndigenousTrend}_t$ is a non-Indigenous-specific time trend $\text{nonIndigenous}_i \times (\text{Year}_t - 2000)/100$. Further, $\text{IndigenousRuralTrend}_t$ is $\text{Rural}_{k,t} \times \text{Indigeneous}_i \times$

(Year$_t$ – 2000)/100 where Rural$_{k,t}$ takes a value of 1 if an individual resides in a rural area and 0 otherwise. nonIndigenousRuralTrend$_t$ represents Rural$_{k,t}$ × nonIndigeneous$_i$ × (Year$_t$ – 2000)/100.

The inclusion of these variables allows us to distinguish between broader indigenous-specific time trends, other things held constant. The key regression estimates are reported in Table 5.

[Table 5 here]

The BUC individual-specific fixed effects results in Table 5 shows no statistically significant coefficient estimates for Indigenous Australians, the estimated coefficient (-4.8680) is closer to being statistically significant than not being statistically significant with a p-value of 0.2210. Also the coefficient is several times that found for non-Indigenous Australians (coefficient of -1.0678) which is also close to being statistically significant with a p-value of 0.1280. These coefficient estimates are not statistically significantly different from each other with a p-value of 0.3472.

3.5. Mobility and life satisfaction for Indigenous and non-Indigenous Australians

In the context of migration from rural areas to urban areas, which is regarded as an inevitable pre-requisite for Indigenous Australians in order to close the gap between Indigenous and non-Indigenous Australians what this implies for subjectively measured wellbeing is worth understanding.

To do this we disaggregate Indigenous and non-Indigenous Australians into groups that move from rural to urban areas, from one rural area to another rural area, stay in their current rural CD or move from an urban to a rural area, from one urban area to another urban area, or stay in their current urban area. The calculation of these variables involves comparing the present wave with the previous wave and is described in full in Section 2.2. We start to explore the implications for subjectively measure wellbeing by estimating Equation 7.

Equation 7 includes a vector of Indigenous-specific mobility variables denoted by IndigenousMobility$_{i,k,t}$ and a vector of non-Indigenous-specific mobility variables denoted by nonIndigenousMobility$_{i,k,t}$. The variables vary at the individual level because they represent individual level movement.

$$U_{i,k,t} =$$

$$\alpha_0 + \alpha_1 r_{k,t} + \sum_{j=1}^{m} \beta_j z_{i,k,t} + \sum_{x=1}^{n} \lambda_x \text{IndigenousMobility}_{i,k,t} +$$

$$\sum_{x=1}^{n} \vartheta_x \text{nonIndigenousMobility}_{i,k,t} + \sum_{1}^{t} d_{1,t} \tau_t + \iota_i + \varepsilon_{i,k,t} \tag{7}$$

The key regression estimates are reported in Table 6.

[Table 6 here]

While Table 6 indicates that Indigenous Australians who move, on average, independent of whether it is from a rural area to an urban area or from an urban area to a rural area report being no more satisfied with their lives than those individuals who stayed in a rural or urban area. In contrast, for non-Indigenous Australians only moving from a rural area to an urban area is associated with not statistically different levels of life satisfaction. For all other categories, in particular, moving between rural areas and moving to rural areas from urban areas are changes associated with higher levels of life satisfaction, all statistically significant at the 1% level.

4. Discussion

This study set out to investigate: (1) the effect of remoteness or rural areas on life satisfaction; (2) if the effect on life satisfaction is experienced locally (3) if the effect on life satisfaction differs between Indigenous and non-Indigenous Australians; (4) trends in life satisfaction for Indigenous and non-Indigenous Australians in rural areas over time; and (5) whether or not moving between and within urban and rural areas is associated with different levels of life satisfaction for Indigenous and non-Indigenous Australians.

The results indicate that the effect of across a range of measures living in a more remote or rural area is associated with higher levels of life satisfaction whether or not other things are held constant. Furthermore, although this life satisfaction effect is experienced locally independent of whether one identifies as being a Indigenous or non-Indigenous Australian we find no evidence to support the notion that this is experienced differently between Indigenous and non-Indigenous Australians. Similarly, while for both Indigenous and non-Indigenous Australians in rural areas a negative trend term was identified, this was only statistically significant for non-Indigenous Australians and hence, did not differ in a statistically significant sense between the two groups. Finally, movement between and within rural and urban areas is imprecisely estimated for Indigenous Australians although for non-Indigenous Australians is associated with higher levels of life satisfaction, especially for moving among rural areas and from urban to rural areas. It must be remembered that the absence of statistical evidence for Indigenous Australians on the hypotheses investigated here does not constitute evidence that differences between Indigenous and non-Indigenous Australians simply do not exist. Rather, the results indicate that we cannot reject with the information we have that there are no differences. It could be speculated though, based on the point estimates provided here that there is indeed a difference which could be discovered in a statistically significant sense with a larger sample size.

The results show that living in a more remote or rural area is associated with higher levels of life satisfaction. This result remains surprising given that on many objective measures, wellbeing appears worse in more remote or rural areas. The fact that on average higher levels of life satisfaction are reported on average when other factors are not controlled for suggests that while objective circumstances may appear less favourable individuals are more than compensated through other channels not explicitly modelled. This finding mirrors the sentiments of Albert Ellis, an eminent American psychologist and one of the two most influential figures (the other being Aaron Beck) in the development of cognitive behaviour therapy that, "...you can still choose to be pretty damned happy even in a poor environment." (Bernard, 2010, p. 260). The result could also reflect a multitude of different time-and location-varying factors unique to people in more remote or rural areas. Existing research has already suggested some factors which might be experienced uniquely in more remote or rural areas such as sport as an important arena for the creation and maintenance of social capital (Tonts, 2005). Furthermore, the fact that this effect becomes more pronounced after controlling for individual- and location-specific fixed effects and their interactions suggests that local factors are experienced more intensely, although, appear not to differ between Indigenous and non-Indigenous Australians. Precisely what particular location factors matter to life satisfaction remains the task of future research.

Declining life satisfaction in rural areas which while only statistically significant for non-Indigenous Australians is worth noting in the context of the broader global trend of rural to urban migration. As a result of rural to urban migration it is now the case that, "...broad notions relating to Indigenous people (that drive policy) can no longer afford to conceptualise them as predominantly remote-living in community housing... Rather, most Indigenous

Australians live in urban areas and the largest tenure type is home ownership." (Biddle & Prout, 2014, p. 144) The trends in life satisfaction in rural areas might be the cause of or the result of this migration. Further research is needed to disentangle this phenomenon. We suggest this trend may reflect rural to urban migration involving the severing or weakening of cultural ties and social capital (Argent, 2008; Tonts, 2005) which results in declining life satisfaction. Alternatively, it may reflect the failure of the market mechanism to internalise the social and environmental costs of extractive industries which fall more heavily on more remote populations and/or potentially the failure of extractive industries (which experienced a boom over the period of the survey (Kent, 2014)) to generate benefits for more remote communities (O'Faircheallaigh, 2013).

Mobility within and between rural and urban areas is imprecisely estimated for Indigenous Australians, *prima facie*, the link between mobility and life satisfaction does not, on the face of it, appear to differ from non-Indigenous Australians. It seems that moving is almost always (except for moving from rural to urban areas) associated with higher levels of life satisfaction. These higher levels of life satisfaction might be explained by factors unique to the place and individual is moving from and the place that they are moving to. For many, although not all, moving is a decision or choice which they expect, *ex ante* will yield greater utility (Tiebout, 1956). Hence, moving is not necessarily exogenous to life satisfaction and may in part reflect preferences for moving to a particular area. More research effort is required to establish the causal effect of moving from a rural to an urban area.

A persistent challenge facing this study was the imprecision of estimates for Indigenous Australians. This made it difficult to identify statistically significant estimates even though the estimates may have appeared different in magnitude or qualitatively e.g. in terms of the coefficient sign. This difficulty may be mitigated by a larger sample size, however, oversampling Indigenous Australians would make the sample less representative, further, increasing the sample size in the HILDA survey would involve greater data collection costs. While outside of the control of the authors, a move to increase the sample size in the HILDA survey would improve the ability of the survey to support and inform policy decisions on a wide variety of issues and would be in line with more recent developments in the United Kingdom and the development of the UK Household Longitudinal Study which extends the earlier British Household Panel Survey.

In a policy context, increasingly, the deficit discourse, the idea that Indigenous Australians have to be more Western, is recognised as presenting a problem in itself, perpetuated by well-meaning advocates. Despite such virtuous intentions, there is a growing realisation that public policy which facilitates self-determination may be more likely to deliver outcomes that support Indigenous wellbeing and that Indigenous Australians consider worthwhile (Grieves, 2014). The approach taken in this study is broadly consistent with this philosophy emphasising subjectively measured wellbeing and in a similar manner, the Permanent Forum's recommendation to base public policy on both self-determination and for Indigenous peoples to develop their own definitions and indicators of poverty and wellbeing (Secretariat of the United Nations Permanent Forum on Indigenous Issues, 2010). In sum, greater autonomy and a better understanding of Indigenous wellbeing in more remote or rural areas would necessarily yield more meaningful outcomes and support the wellbeing of Indigenous Australians.

Acknowledgements

Appendix A

Table A1: Ordered probit average marginal effects and OLS estimates

	(1) Ordered probit		(2) OLS	
Age (15-19)	0.0784***	(0.0049)	0.5486***	(0.0333)
Age (20-29)	0.0248***	(0.0035)	0.1756***	(0.0236)
Age (40-49)	-0.0028	(0.0031)	-0.0319	(0.0217)
Age (50-59)	0.0228***	(0.0040)	0.1385***	(0.0270)
Age (60 or greater)	0.0945***	(0.0048)	0.6318***	(0.0321)
Male	-0.0086***	(0.0021)	-0.0653***	(0.0144)
Indigenous	0.0386***	(0.0130)	0.2027**	(0.0826)
Immigrant English	0.0015	(0.0041)	0.0033	(0.0267)
Immigrant non-English	-0.0280***	(0.0042)	-0.2053***	(0.0292)
Poor English	-0.0760***	(0.0091)	-0.5065***	(0.0690)
Married	0.0645***	(0.0041)	0.4496***	(0.0280)
Defacto	0.0366***	(0.0038)	0.2656***	(0.0256)
Separated	-0.0521***	(0.0069)	-0.4327***	(0.0530)
Divorced	-0.0087	(0.0059)	-0.0937**	(0.0428)
Widowed	0.0554***	(0.0070)	0.3743***	(0.0458)
Lone parent	-0.0126**	(0.0063)	-0.0845*	(0.0449)
Number of children	-0.0070***	(0.0014)	-0.0420***	(0.0096)
Severe health condition	-0.1524***	(0.0084)	-1.1137***	(0.0659)
Moderate health condition	-0.1089***	(0.0032)	-0.7859***	(0.0225)
Mild health condition	-0.0286***	(0.0027)	-0.2071***	(0.0175)
Bachelors degree or higher	-0.0260***	(0.0035)	-0.1197***	(0.0237)
Certificate or diploma	-0.0172***	(0.0032)	-0.0780***	(0.0213)
Year 12	-0.0182***	(0.0036)	-0.0785***	(0.0244)
Employed part-time	0.0200***	(0.0024)	0.1119***	(0.0157)
Unemployed	-0.0312***	(0.0045)	-0.3022***	(0.0331)
Non-participant	0.0256***	(0.0029)	0.0880***	(0.0194)
ln(Disposable income)	0.0114***	(0.0013)	0.0854***	(0.0091)
Others present	0.0159***	(0.0018)	0.0949***	(0.0116)
Years interviewed^{-1}	0.0275***	(0.0042)	0.1130***	(0.0277)
Rural	0.0216***	(0.0036)	0.1401***	(0.0227)
Constant			6.7094***	(0.1033)
Observations	160,485		160,485	
Wald χ^2 test	4,135.8600			
Prob > χ^2	0.0000			
Pseudo R^2	0.0309			
F test			107.0300	
Prob > F			0.0000	
Adjusted R^2			0.1020	

Unconditional standard errors are in parentheses. Time (year) fixed effects are also included as controls.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2: Individual-specific BUC and FE estimates

	(1) BUC		(2) FE	
Age (15-19)	0.2643***	(0.0651)	0.1391***	(0.0333)
Age (20-29)	-0.0279	(0.0434)	-0.0086	(0.0205)
Age (40-49)	0.0157	(0.0405)	0.0067	(0.0206)
Age (50-59)	0.0933	(0.0610)	0.0409	(0.0307)
Age (60 or greater)	0.4083***	(0.0822)	0.1949***	(0.0430)
Poor English	-0.2529**	(0.1014)	-0.1758***	(0.0677)
Married	0.4773***	(0.0541)	0.2431***	(0.0285)
Defacto	0.5156***	(0.0413)	0.2623***	(0.0225)
Separated	-0.5566***	(0.0761)	-0.4034***	(0.0446)
Divorced	-0.0729	(0.0759)	-0.1053**	(0.0434)
Widowed	-0.2188**	(0.1040)	-0.1891***	(0.0622)
Lone parent	-0.0671	(0.0664)	-0.0337	(0.0390)
Number of children	-0.0846***	(0.0164)	-0.0391***	(0.0091)
Severe health condition	-0.7703***	(0.0685)	-0.4898***	(0.0530)
Moderate health condition	-0.5903***	(0.0269)	-0.3290***	(0.0163)
Mild health condition	-0.1480***	(0.0252)	-0.0714***	(0.0132)
Bachelors degree or higher	-0.2678***	(0.0893)	-0.1180***	(0.0418)
Certificate or diploma	-0.2126***	(0.0649)	-0.1089***	(0.0346)
Year 12	-0.3187***	(0.0526)	-0.1394***	(0.0251)
Employed part-time	0.1123***	(0.0253)	0.0506***	(0.0132)
Unemployed	-0.3039***	(0.0423)	-0.1910***	(0.0255)
Non-participant	0.0157	(0.0326)	-0.0012	(0.0174)
ln(Disposable income)	0.0569***	(0.0101)	0.0347***	(0.0057)
Others present	0.0839***	(0.0156)	0.0395***	(0.0079)
Years interviewed^{-1}	0.2461***	(0.0727)	0.1204***	(0.0357)
Rural	0.1827***	(0.0401)	0.0935***	(0.0229)
Constant			7.4729***	(0.0777)
Observations	398,648		160,539	
Wald χ^2 test	1,613.4565			
Prob > χ^2	0.0000			
Pseudo R^2	0.0186			
ρ			0.5957	
R^2 within			0.0213	
R^2 between			0.0887	
R^2 overall			0.0710	

Standard errors in parentheses are adjusted for clustering. Time (year) fixed effects are also included as controls.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3: Individual-specific × location-specific BUC and FE estimates

	(1) BUC		(2) FE	
Age (15-19)	0.2852***	(0.0730)	0.1528***	(0.0366)
Age (20-29)	0.0250	(0.0496)	0.0198	(0.0235)
Age (40-49)	0.0309	(0.0433)	0.0154	(0.0214)
Age (50-59)	0.0991	(0.0641)	0.0463	(0.0331)
Age (60 or greater)	0.3936***	(0.0867)	0.1855***	(0.0448)
Poor English	-0.2195**	(0.1042)	-0.1476**	(0.0711)
Married	0.5263***	(0.0645)	0.2704***	(0.0343)
Defacto	0.5436***	(0.0497)	0.2705***	(0.0274)
Separated	-0.5262***	(0.0880)	-0.3862***	(0.0528)
Divorced	-0.0284	(0.0878)	-0.0862*	(0.0512)
Widowed	-0.1360	(0.1118)	-0.1497**	(0.0658)
Lone parent	-0.1032	(0.0724)	-0.0531	(0.0423)
Number of children	-0.0924***	(0.0177)	-0.0418***	(0.0092)
Severe health condition	-0.7114***	(0.0708)	-0.4424***	(0.0528)
Moderate health condition	-0.5573***	(0.0273)	-0.3022***	(0.0159)
Mild health condition	-0.1361***	(0.0259)	-0.0636***	(0.0131)
Bachelors degree or higher	-0.2449**	(0.1003)	-0.0999**	(0.0437)
Certificate or diploma	-0.1676**	(0.0695)	-0.0864**	(0.0365)
Year 12	-0.2668***	(0.0549)	-0.1148***	(0.0258)
Employed part-time	0.1150***	(0.0274)	0.0504***	(0.0135)
Unemployed	-0.3028***	(0.0457)	-0.1856***	(0.0279)
Non-participant	0.0132	(0.0351)	-0.0040	(0.0183)
ln(Disposable income)	0.0518***	(0.0107)	0.0305***	(0.0060)
Others present	0.0694***	(0.0163)	0.0319***	(0.0078)
Years interviewed^{-1}	0.2895***	(0.0780)	0.1451***	(0.0370)
Rural	0.2022***	(0.0647)	0.1087***	(0.0347)
Constant			7.4831***	(0.0811)
Observations	344,322		160,539	
Wald χ^2 test	1,422.9077			
Prob > χ^2	0.0000			
Pseudo R^2	0.0182			
ρ			0.6272	
R^2 within			0.0199	
R^2 between			0.0805	
R^2 overall			0.0684	

Standard errors in parentheses are adjusted for clustering. Time (year) fixed effects are also included as controls.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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Table 1: Indigenous representation in the HILDA data and ABS Census data

Year	HILDA data	ABS Census data
2001	1.85%***	2.20%
2006	2.20%	2.30%
2011	2.80%**	2.50%

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Variables by Indigenous status

Variable name	Definition	Indigenous Mean (std. dev.)	Indigenous %	Non-Indigenous Mean (std. dev.)	Non-Indigenous %
Dependent variable					
Life satisfaction	Individual's self-reported life satisfaction where 0 is totally dissatisfied and 10 is totally satisfied	7.98*** (1.78***)		7.91*** (1.49***)	
Independent variables					
Age (15-19)	Individual is between 15 and 19 years of age		16.7%***		7.6%***
Age (20-29)	Individual is between 20 and 29 years of age		29.1%***		17.1%***
Age (40-49)	Individual is between 40 and 49 years of age		17.7%**		19.3%**
Age (50-59)	Individual is between 50 and 59 years of age		15.7%***		9.4%***
Age (60 or greater)	Individual is 60 years of age or greater		8.7%***		22.5%**
Male	Individual is male		41.5%***		47.5%***
Immigrant English	Individual is born in a Main English Speaking country (Main English speaking countries are: United Kingdom; New Zealand; Canada; USA; Ireland; and South Africa)		0.0%***		10.1%***
Immigrant non-English	Individual is not born in Australia or a Main English Speaking country		0.0%***		12.3%***
Poor English	Individual speaks English either not well or not at all		0.01%***		1.3%***
Married	Individual is legally married		21.1%***		49.6%***
Defacto	Individual is in a defacto relationship		21.5%***		12.7%***
Separated	Individual is separated		3.3%*		2.8%*
Divorced	Individual is divorced		6.3%		6.0%
Widowed	Individual is a widow		2.9%***		5.2%***
Lone parent	Individual is a lone parent		2.0%		1.7%
Number of children	Number of individual's own resident children in individual's household at least 50 per cent of the time and number of own children who usually live in a non-private dwelling but spend the rest of the time mainly with the individual	0.89*** (1.09***)		0.71*** (1.32***)	

Severe health condition	Individual has a long-term health condition and cannot work	1.2%**	0.9%**
Moderate health condition	Individual has a long-term health condition limiting the amount or type of work that the individual can do	17.5**	19.0%**
Mild health condition	Individual has a long-term health condition, that is a condition that has lasted or is likely to last for more than six months and this condition does not limit the type or amount of work the individual can do	8.6%	8.0%
Bachelors degree or higher	Individual's highest level of education is a Bachelors degree or higher	7.3%***	20.1%***
Certificate or diploma	Individual's highest level of education is a certificate or diploma	23.3%***	27.9%***
Year 12	Individual's highest level of education is Year 12	14.7%	15.3%
Employed part-time	Individual is employed and works less than 35 hours per week	17.4%***	20.7%***
Unemployed	Individual is not employed but is looking for work	12.6%***	3.4%***
Non-participant	Individual is a non-participant in the labour force, including retirees, those performing home duties, non-working students and individuals less than 15 years old at the end of the last financial year	40.5%***	32.5%***
Disposable income	Equivalised disposable household income	$28,096.42*** ($18,314.20***)	$38,612.12*** ($30,783.39***)
Others present	Someone other than the individual was present during the interview	37.0%	37.5%
Years interviewed	The number of years the individual has been interviewed in the survey	5.43*** (3.52)	5.65*** (3.50)
Rural	Individual resides in a rural area	16.6%	15.7%
Inner regional	Individual resides in inner regional Australia	28.2%***	24.4%***
Outer regional	Individual resides in outer regional Australia	22.5%***	11.3%***
Remote	Individual resides in a remote Australia	6.0%***	1.5%***
Very remote	Individual resides in a very remote or migratory region of Australia	1.6%***	0.3%***

Nearest city	Distance to nearest capital city in metres (median distance for Indigenous Australians is 82,748.6m and for non-Indigenous Australians is 39,489.5m)	191,435.5m*** (291,733.7***)	113,544.9m*** (210,884.8***)
Individual-time observations		3689	158442

Table 3: Ordered probit average marginal effects for different measures of more remote or rural areas

	(1) Ordered probit	(2) Ordered probit	(3) Ordered probit	(4) Ordered probit	(5) Ordered probit
Rural	0.0216*** (0.0036)				
Inner regional		0.0171*** (0.0032)			
Outer regional		0.0310*** (0.0046)			
Remote		0.0342*** (0.0108)			
Very remote		0.0600*** (0.0119)			
Nearest city			2.73e-08*** (7.26e-09)		
ln(Nearest city)				0.0071*** (0.0010)	
Nearest city^{-1}					-20.2346 (13.1120)
Observations	160,485	160,485	160,485	160,485	160,485
Wald χ^2 test	4,135.8600	4,447.2900	4,161.9600	4,280.9500	4,109.0300
Prob > χ^2	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.0309	0.0313	0.0307	0.0310	0.0305

Unconditional standard errors are in parentheses. Includes controls shown in Appendix A Table A1.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Interaction effects with individual-specific BUC (column 1) and individual-specific × location-specific BUC (column 2)

	(1) BUC		(2) BUC	
Rural – Indigenous	-0.0414	(0.1694)	0.3120	(0.3137)
Rural – non-Indigenous	0.1933***	(0.0412)	0.1981***	(0.0661)
Observations	398,648		344,322	
Wald χ^2 test	1,612.8317		1,423.0339	
Prob $> \chi^2$	0.0000		0.0000	
Pseudo R^2	0.0186		0.0182	

Standard errors in parentheses are adjusted for clustering. Includes controls shown in Appendix A Table A1.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Life satisfaction trends in rural areas

	(1) BUC	
Rural – Indigenous	0.2372	(0.2954)
Rural – non-Indigenous	0.2600***	(0.0624)
Trend – Indigenous	-1.1210	(1.8691)
Trend – non-Indigenous	-1.7445***	(0.4229)
Rural – Trend – Indigenous	-4.8680	(3.9803)
Rural – Trend – non-Indigenous	-1.0678	(0.7023)
Observations	398,602	
Wald χ^2 test	1,517.2549	
Prob $> \chi^2$	0.0000	
Pseudo R^2	0.0179	

Standard errors in parentheses are adjusted for clustering. Includes controls shown in Appendix A Table A1.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Mobility and life satisfaction

	(1) BUC	
Rural to urban – Indigenous	-0.0093	(0.2822)
Rural to urban – non-Indigenous	0.0253	(0.0603)
Rural to rural – Indigenous	-0.0092	(0.3712)
Rural to rural – non-Indigenous	0.3454***	(0.0810)
Urban to rural – Indigenous	-0.1639	(0.2398)
Urban to rural – non-Indigenous	0.2430***	(0.0590)
Urban to urban– Indigenous	-0.0165	(0.1363)
Urban to urban– non-Indigenous	0.0629***	(0.0229)
Observations	321,039	
Wald χ^2 test	1,342.1780	
Prob > χ^2	0.0000	
Pseudo R^2	0.0178	

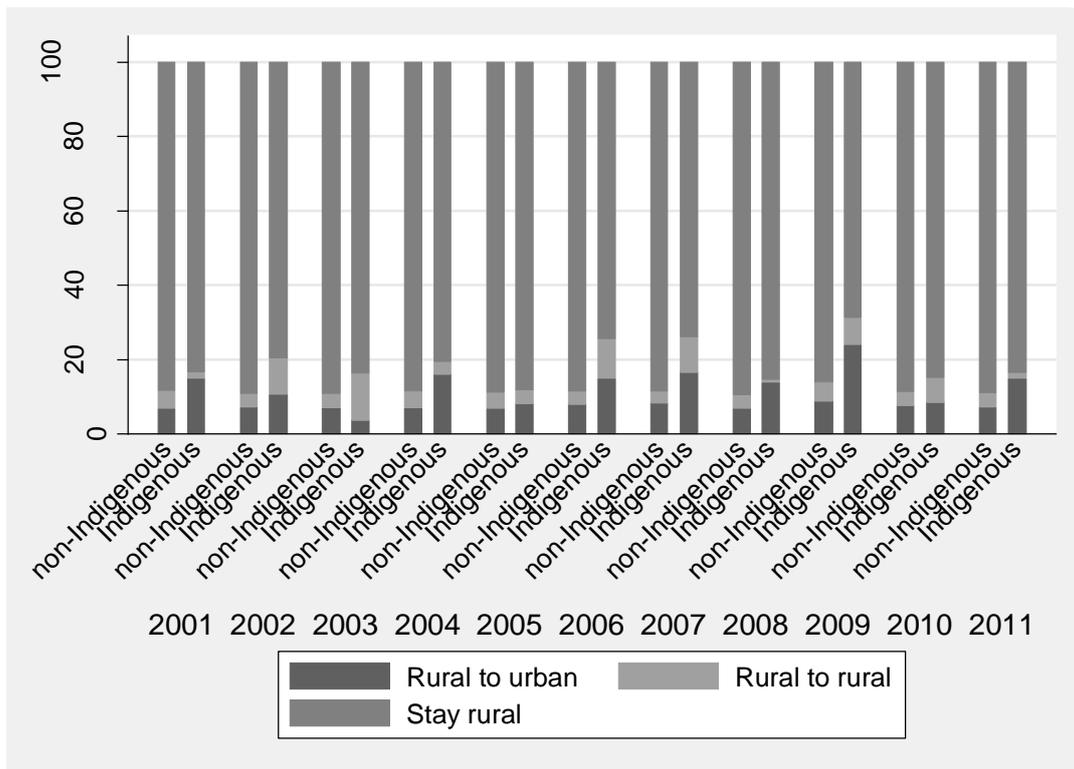Standard errors in parentheses are adjusted for clustering. Includes controls shown in Appendix A Table A1.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure 1: Frequency distribution of life satisfaction scores (2012)
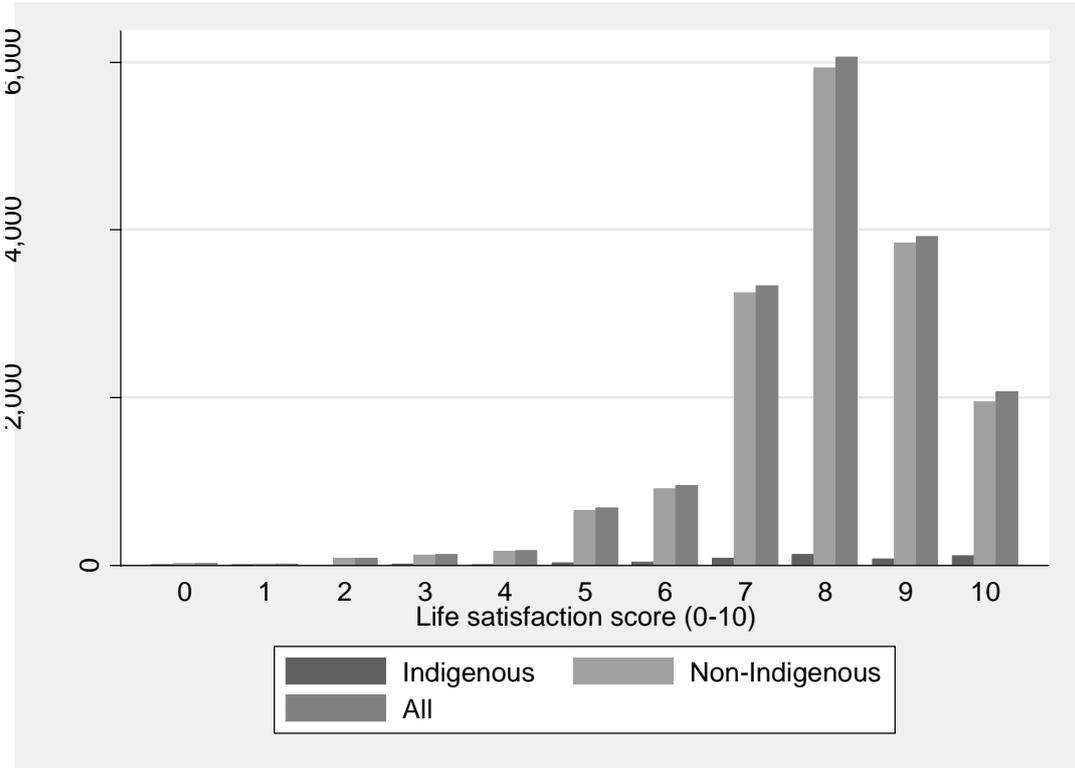
Figure 2: Percentage of rural residents who have moved or stayed by the next wave
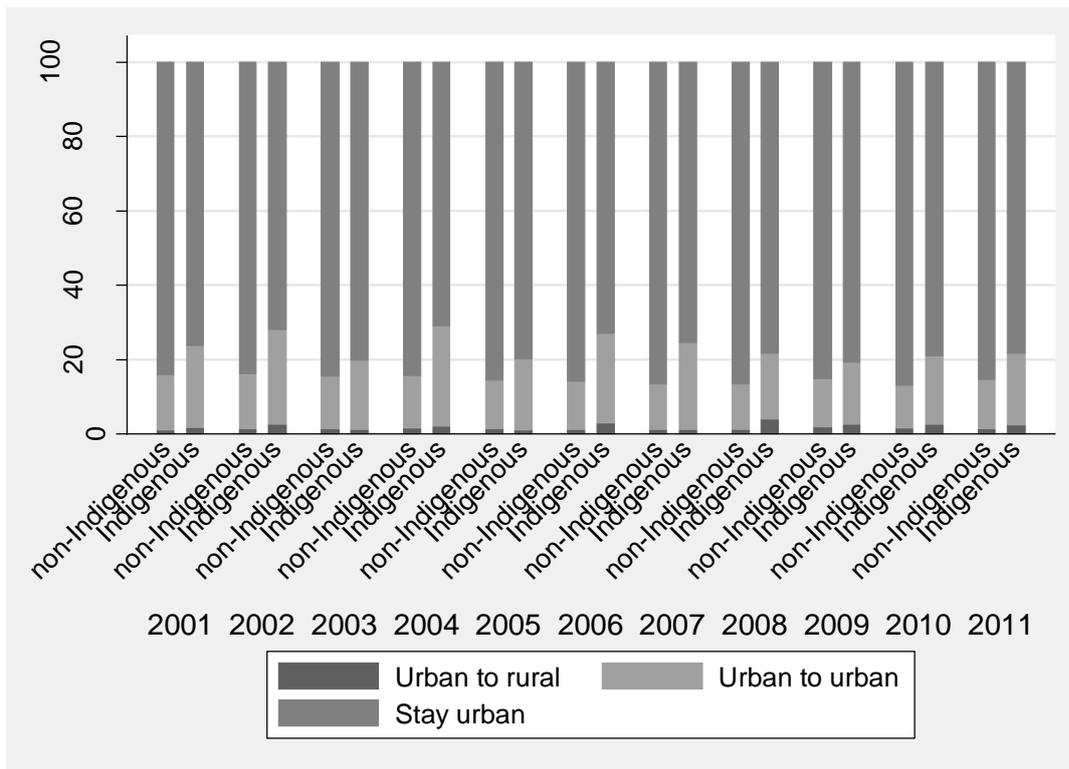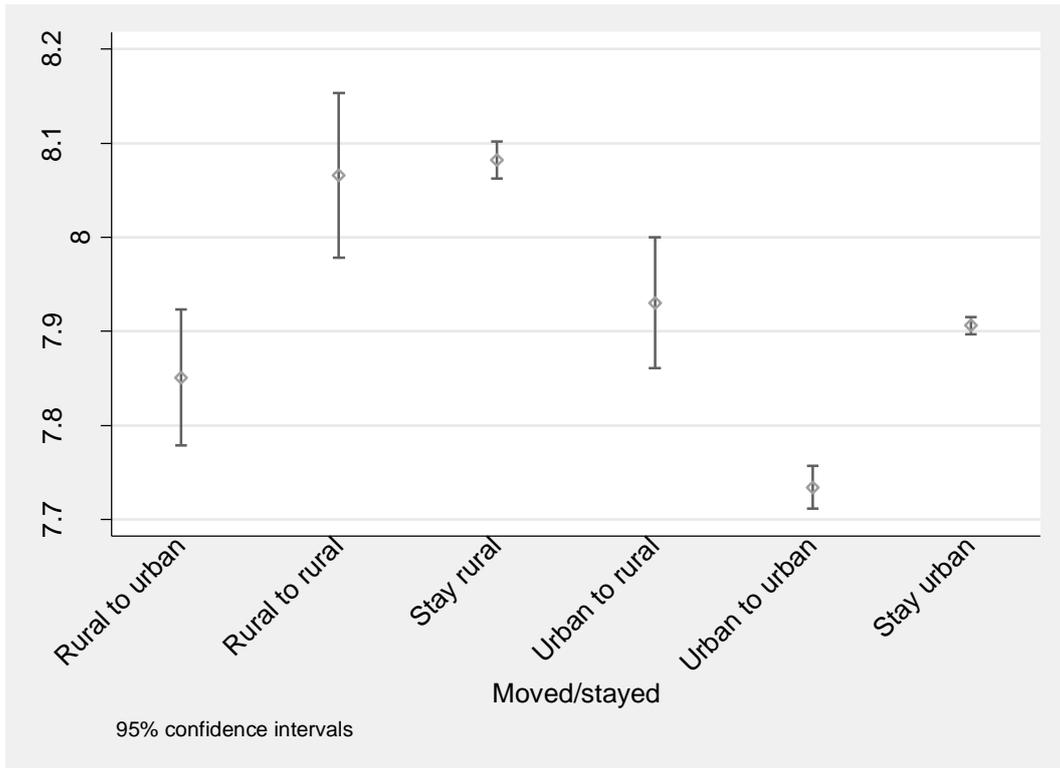

Source: Derived from HILDA survey

Figure 3: Percentage of urban residents who have moved or stayed by the next wave

Source: Derived from HILDA survey

Figure 4: Mean life satisfaction by moving/staying

95% confidence intervals

Source: Derived from HILDA survey