

Decomposing differences in labour force status between Indigenous and non-Indigenous Australians

Guyonne Kalb, Trinh Le and Felix Leung

Melbourne Institute of Applied Economic and Social Research

Acknowledgements

This research was commissioned by the Australian Government Department of Education, Employment and Workplace Relations (DEEWR) under the Social Policy Research Services Agreement (2010–12) with the Melbourne Institute of Applied Economic and Social Research. The paper uses the confidentialised unit record file from FaHCSIA's Household, Income and Labour Dynamics in Australia Survey, which is managed by the Melbourne Institute of Applied Economic and Social Research. The views expressed in this paper are those of the authors alone and do not represent the views of DEEWR, the Minister for Families, Housing, Community Services and Indigenous Affairs, FaHCSIA, or the Commonwealth Government. We would like to thank Boyd Hunter for providing comments and feedback on an earlier preliminary draft and a number of model specifications. Any remaining errors are our own.

December 2011

Table of Contents

List of Tables	3
List of Figures	3
List of Appendix Tables.....	4
Executive summary.....	5
1. Introduction.....	9
2. Literature review	12
2.1 Theories to explain ethnic differences in labour market outcomes	13
2.1.1 Human capital (investment) theory.....	14
2.1.2 Dual labour market theory	14
2.1.3 Discrimination.....	14
2.1.4 Other explanations	15
2.2 Indigenous Australians.....	15
2.2.1 Decomposition studies and other in-depth research	15
2.2.2 Community Development Employment Projects (CDEP) Program.....	17
2.3 General overview of the empirical literature	18
2.3.1 Background	18
2.3.2 Determinants of labour force status	19
3. Data.....	24
3.1 NATSISS and NATSIHS.....	25
3.2 HILDA	27
4. Descriptive analysis	29
4.1 Comparison across data sets	29
4.2 Labour force status.....	43
4.3 Comparison of characteristics by labour force status	49
4.3.1 Demographic, geographic and labour market characteristics	49
4.3.2 Health and social capital	60
5. Methodology	65
5.1 Ordered logit models and summary statistics of the samples of analysis.....	65
5.2 Non-linear decomposition.....	68
5.3 Detailed decomposition	69
6. Estimation results on labour force status	71
6.1 Indigenous population.....	71
6.1.1 Basic versus benchmark specifications.....	71
6.1.2 Male versus female	74
6.1.3 Remote versus non-remote areas	76
6.1.4 Extended specification.....	78
6.2 Non-Indigenous population	80
6.2.1 Non-Indigenous versus Indigenous.....	80
6.2.2 Male versus Female	82
7. Decomposition analysis	83
7.1 Aggregate decomposition	83
7.1.1 Indigenous population as the reference group	83
7.1.2 Non-Indigenous people as the reference group	84
7.1.3 Robustness checks	85

7.2	Detailed decomposition	87
7.3	Summary and discussion.....	90
8.	Conclusions.....	93
	References.....	96
	Appendices.....	103
	Appendix A: Literature summary	103
	Appendix B: Supplementary tables and figures.....	115
	Appendix C: Control variables	133

List of Tables

Table 1:	Sample size by Indigenous status	24
Table 2:	Demographic statistics, by data source.....	30
Table 3:	Geographic and residency statistics, by data source.....	33
Table 4:	Labour market statistics, by data source.....	34
Table 5:	Additional labour market variables (not available in Census data).....	40
Table 6:	Health and cultural variables (not available in Census data).....	42
Table 7:	Demographic statistics for Indigenous Australians by labour force status, 2008.....	50
Table 8:	Residency statistics for Indigenous Australians by labour force status, 2008.....	52
Table 9:	Labour market statistics for Indigenous Australians by labour force status, 2008....	54
Table 10:	Demographic statistics for non-Indigenous Australians by labour force status, 2008	56
Table 11:	Residency statistics for non-Indigenous Australians by labour force status, 2008 ..	58
Table 12:	Descriptive statistics for non-Indigenous Australians by labour force status, 2008	59
Table 13:	Health and social capital variables by labour force status, NATSISS 2008.....	61
Table 14:	Health and social capital by labour force status, HILDA 2008.....	63
Table 15:	Descriptive statistics by Indigenous status and gender.....	67
Table 16:	Marginal effects on the probabilities of employment for Indigenous Australians ..	72
Table 17:	Marginal effects on the probabilities of employment by gender for Indigenous Australians	75
Table 18:	Marginal effects on the probability of full-time employment for Indigenous Australians in remote versus non-remote areas	77
Table 19:	Marginal effects on the probability of employment for Indigenous Australians in the extended specification.....	78
Table 20:	Marginal effects on the probability of employment for non-Indigenous Australians	81
Table 21:	Decomposition of the gap in labour market attachment between Indigenous and non-Indigenous population	84
Table 22:	Contribution of each factor in explaining the gap in labour market attachment between Indigenous and non-Indigenous Australians	88

List of Figures

Figure 1:	Age by gender for NATSIHS, NATSISS and the Census	31
Figure 2:	Occupation (ANZSCO 2006) by Indigenous status and by part-time versus full-time employment, 2008 (in %)	37
Figure 3:	Industries by Indigenous status in non-remote areas and by part-time versus full-time employment, 2008 (in %)	38
Figure 4:	Labour force status by subpopulation, 2008	44
Figure 5:	Labour force status by highest year of school completed, 2008	45
Figure 6:	Labour force status by post-school qualification, 2008	46

Figure 7: Occupation by highest educational attainment, 2008.....	47
Figure 8: Labour force status by self-assessed health status, 2008.....	48
Figure 9: Self-assessed health status by age groups, 2008	49
Figure 10: Labour force status by remoteness for Indigenous Australians, 2008	53
Figure 11: Labour force status by remoteness for Indigenous Australians, 2008 (CDEP as unemployed)	53
Figure 12: Distribution of occupation by subpopulation, 2008	91

List of Appendix Tables

Appendix Table 1: Alcohol consumption comparison: NATSISS 2002 and 2008	115
Appendix Table 2: Descriptive statistics for Indigenous Australians by labour force status, 2004.....	116
Appendix Table 3: Descriptive statistics for non-Indigenous Australians by labour force status, 2004	120
Appendix Table 4: Descriptive statistics: Additional variables by labour force status, NATSIHS 2004.....	124
Appendix Table 5: Descriptive statistics: Additional variables by labour force status, HILDA 2004.....	125
Appendix Table 6: Marginal effects on the probability of employment for Indigenous Australians in the extended specification using multinomial logit.....	127
Appendix Table 7: Marginal effects on the probabilities of full-time employment for 2004.....	129
Appendix Table 8: Marginal effects on the probabilities of employment by gender for Indigenous Australians, with CDEP categorised as unemployed.....	130
Appendix Table 9: Marginal effects on the probabilities of employment in the ‘compact’ specification	131
Appendix Table 10: Contribution of each factor in explaining the gap in labour market attachment between Indigenous and non-Indigenous Australians.....	132

Executive summary

This report has four aims:

- to identify the factors that play a role in the labour force status of Indigenous Australians;
- to determine whether these factors differ from those affecting non-Indigenous Australians;
- to determine whether the effects of these factors on participation and employment differ between these two populations;
- to determine how much of the difference in labour force status is explained by observed factors.

The data and descriptive statistics

This report analyses data from the 2004 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS), the 2008 National Aboriginal and Torres Strait Islander Social Survey (NATSISS) and the Household, Income and Labour Dynamics Australia (HILDA) survey (2004 and 2008 waves) to examine the factors that affect labour force status (distinguishing four outcomes: not in labour force (NILF), unemployed, part-time employed and full-time employed, which are assumed to reflect an increasing attachment to the labour market) of Indigenous and non-Indigenous Australians. It then decomposes the gap in labour market attachment between the two populations into a component explained by observed characteristics and an unexplained component which could represent a range of things, such as unobserved characteristics, differences in the effect of observed characteristics, but also potentially discrimination.

On average, Indigenous Australians participate less in the labour force than non-Indigenous people while the gender gap in labour force participation is greater among Indigenous people. The data for 2008 show that while 79 percent of Indigenous men aged 15-64 (excluding full-time students) participated in the labour force, only 56 percent of Indigenous women participated. The corresponding figures for non-Indigenous people were 87 percent and 75 percent respectively.

The multivariate analyses in this report are preceded by a wide range of descriptive statistics for two reasons. First, to assess whether the survey data are appropriate to use in the multivariate analysis by comparing the survey statistics to the statistics computed from the 5%-sample of the 2006 Census. Although there are significant differences between the two

surveys and the Census, these differences are mostly small, providing sufficient coverage of most groups. The second reason is to describe the associations of labour force status with a wide range of individual, household and location characteristics for Indigenous and non-Indigenous Australians.

The main finding from the descriptive analysis is that similar factors are associated with labour market outcomes for both populations, but that in general Indigenous men and women observed in the same category as non-Indigenous men and women have lower full-time employment rates and higher unemployment and non-participation rates. The only exception to this are Indigenous individuals with a postgraduate degree who are on average more likely to be in full-time employment and less likely to be out of the labour force than non-Indigenous individuals with a similar qualification. However, this observation is based on a relatively small group of 96 Indigenous postgraduate degree holders. Nevertheless, this result is interesting, and qualification levels just below this highest level seem to have a relatively low participation gap between Indigenous and non-Indigenous Australians compared to those with lower or no post-school qualifications.

Results from the multivariate analysis

Using an ordered logit approach in the multivariate analysis the following main results are obtained. Significant factors that shape labour force status include age, education, health, smoking, drinking habits and number of children in the household. However, the size of the effects varies markedly across genders and the two broad ethnic populations. The effects of the education variables are weaker for non-Indigenous people than for Indigenous people, whereas English language difficulty, number of children in the household and poor health show stronger effects for non-Indigenous Australians.

Among Indigenous people, education has a larger effect on men's labour force status than on women's, while the opposite is true for non-Indigenous people. Health has significant effects on employment for both men and women, but the effects are much larger for the former in both populations. Having a partner is associated with lower part-time employment and higher full-time employment among men in both populations. No significant impact of partnership is found among Indigenous women, whereas among non-Indigenous women it increases the probability of part-time employment and reduces the probability of full-time employment.

Over a quarter of Indigenous Australians reside in remote areas, and the control variables have quite different effects on labour force status in remote areas compared to the effects in

non-remote areas. In an extended specification, we find that connection with Indigenous culture only has a weak impact on labour force status among Indigenous people. By contrast, while some previous studies find Indigenous cultural attachment to have a positive relationship with labour market outcomes (Dockery, 2009), others find a negative association (Hunter and Gray, 2001; Stephens, 2010). The results in this report are also somewhat sensitive to the model specification. However, in both specifications we find both positive and negative effects arising from different aspects of cultural identity, such as speaking an Indigenous language, having a connection to homelands, attending cultural events and identifying with a tribe or language group.

Results from the decomposition analysis

We use the estimated models to decompose the difference in labour market attachment into explained and unexplained components. Our models appear to be able to explain most of the gap in labour market attachment between Indigenous and non-Indigenous women. That is, most of the gap can be attributed to differences in the characteristics between the two populations. Indeed, if Indigenous women were to have the same returns to characteristics as non-Indigenous women, their labour market attachment would not be much higher, and sometimes even lower, than their current outcome.

However, for men, the difference in characteristics of the two populations can only account for 18 to 51 percent of the gap, depending on the specification. That is, the explained component is at most half of the gap. This could be because other factors influence men's labour market attachment than women's and these factors may be absent from our models. In addition, the effects of characteristics on labour force status between the two populations may be more different for men than for women, causing a larger proportion of the gap to be part of the unexplained component.

Compared with previous studies (e.g. Hunter, 2004), this study is able to explain a larger proportion of the gap in labour market participation between Indigenous and non-Indigenous people. This is because the models in this report can control for more variables which are available from NATSISS and HILDA surveys but are not available in the Census (which was used in earlier studies).

A detailed decomposition shows that lower education, worse health, greater difficulty with English and larger families than non-Indigenous people contribute to a substantial extent to the lower attachment to the labour market of Indigenous Australians. Indigenous people are

on average five years younger than non-Indigenous people, but that age gap appears to work to the former population's advantage, as among the non-Indigenous population, younger individuals are more attached to the labour market than older individuals. If the two populations were similar in age, the gap in labour market attachment between the two populations would be even larger.

There is limited evidence of discrimination for Indigenous women. As mentioned before, if Indigenous women were to have the same returns to characteristics as non-Indigenous women, their labour market attachment would be lower than their current outcome. For men the unexplained component, which potentially includes the effect of discrimination, is much larger than for women.

1. Introduction

Various data sources show that labour force participation by Indigenous Australians is much lower than that of the general population.¹ Unemployment rates are also much higher. For instance, the Indigenous Economic Development Strategy (IEDS) document (Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA), 2011) reports that 36 percent of working-age Indigenous Australians (15–64 years) were not in the labour force in 2008, compared to 22 percent of their non-Indigenous counterparts. Moreover, employment rates were lower for Indigenous persons (51 to 52 percent in regional and remote areas, 59 percent in major cities)² than for non-Indigenous people (75 percent). Indigenous Australians also have poorer outcomes in a range of other areas, including in education and health. They are younger than the general population and more likely to live in areas of high unemployment.

Given the COUNCIL OF AUSTRALIAN GOVERNMENTS' commitment to 'Close the Gap' between Indigenous and non-Indigenous Australians, and in particular its commitment to halve the Indigenous employment gap by 2018, it is important for policymakers to understand to what extent differences in observable factors explain the gap in labour force status between the Indigenous and non-Indigenous populations.

The aim of this project is four-fold: first, to identify the factors that play a role in the labour force status of Indigenous Australians; second, to determine whether these factors differ from those affecting non-Indigenous Australians; third, to determine whether the effects of these factors on labour force status differ between these two populations; and fourth, to determine how much of the difference in labour force status is explained by observed factors. The analyses aim to improve our understanding of the extent to which the differences in labour market outcomes between Indigenous and non-Indigenous Australians can be explained by differences in characteristics of the two populations and to what extent they can be explained by differences in the effects that characteristics have on labour market outcomes. This allows policy makers to determine what particular factors they could target and what approach might be successful.

¹ Whenever the terms Indigenous Australians, Indigenous individuals or Aboriginal Australians are used, we refer to individuals of Aboriginal, Torres Strait Islander, or of both Aboriginal and Torres Strait Islander origin.

² These employment data count individuals who are participating in Community Development Employment Projects (CDEP) as employed.

Since Indigenous Australians only make up around 2.5 percent of the country's population, no general household survey contains enough Indigenous respondents for a meaningful analysis. The Census of Population and Housing, despite its size advantage, contains few individual and family characteristics. This study avoids these limitations by drawing on different surveys for Indigenous and non-Indigenous populations. In particular, analyses of Indigenous people are based on the 2008 National Aboriginal and Torres Strait Islander Social Survey (NATSISS), which is the most recent cross-sectional data set focussing on the Indigenous population. Data from the 2004 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) are to be used as a robustness check against the 2008 NATSISS results. Non-Indigenous Australians are drawn from general household surveys, particularly from the 2004 and 2008 waves of the Household, Income and Labour Dynamics Australia (HILDA), and from the sample of the non-Indigenous population of the 2004-05 National Health Survey (NHS).³

The NATSI(H/S)S data enable us to estimate detailed models of labour force status for Indigenous persons (men and women separately) by controlling for variables such as education, language skills, location, health, household composition and connection with Indigenous culture. In observing labour force status, we distinguish between not in the labour force (NILF), unemployment, and part-time and full-time employment, which are assumed to reflect an increasing attachment to the labour market. To allow a comparison of determinants of labour force status for Indigenous and non-Indigenous Australians, we also estimate the model based on variables that are available in both the HILDA and NATSI(H/S)S. The gap in labour market attachment between the two populations is decomposed using the Blinder (1973)-Oaxaca (1973) technique which has been generalised to non-linear models by Bauer and Sinning (2008). After decomposing the gap in labour market attachment into the part due to differences in characteristics and the part due to differences in the effects of the characteristics, we use Powers and Pullum's (2006) detailed decomposition method to examine how much each characteristic contributes to explaining the gap.

Several studies have decomposed the gap in labour force participation between Indigenous and non-Indigenous Australians (e.g. Gray and Hunter, 1999; and Hunter, 2004). The current

³ We use the Confidentialised Unit Record Files (CURFs) for all Australian Bureau of Statistics (ABS) data. The ABS defines a CURF as "a file of responses to ABS surveys or censuses that have had specific identifying information about persons and organisations confidentialised. CURFs contain the most detailed information available from the ABS." (see: <http://www.abs.gov.au/websitedbs/D3310114.nsf/home/About+CURF+Microdata>). Confidentialisation can be achieved through aggregation or removal of potentially identifying information.

study makes three contributions to the literature. First, while most previous studies only distinguish two labour force states (in versus out of the labour force, or in versus out of employment), we distinguish four states: not in the labour force, unemployed, part-time employed, and full-time employed. Second, by combining the NATSI(H/S)S and HILDA data we are able to control for a wider range of factors than previous studies have used. Third, we use new econometric methods that not only decompose the gap in labour market attachment between Indigenous and non-Indigenous people into the part due to differences in characteristics and the part due to differences in the effects of the characteristics, but also allow us to present results on the contribution of each characteristic to explaining the gap.

The rest of the report proceeds as follows. Section 2 (and Appendix A) summarise the literature on labour force participation of Indigenous people. The data sets used in the analyses in this report are briefly described in Section 3 while descriptive statistics of the data are presented in Section 4. Section 5 describes the methods that are used in the analyses. Section 6 reports the estimation results on labour force status of Indigenous people and non-Indigenous people, before a decomposition of the gap in labour market attachment between the two populations is carried out in Section 7. Section 8 summarises and concludes.

2. Literature review

This section provides a brief overview of the existing international and Australian literature on labour market participation by Indigenous peoples. Outside Australia, we focus on New Zealand and Canada, since these two developed countries have several characteristics in common with Australia and each country has a sizeable indigenous, disadvantaged minority. There is a relatively limited literature on developed countries outside these three countries, such as for example the US. Developing countries, such as Mexico which also has a substantial Indigenous population, are quite different from Australia, since the Indigenous populations face deep poverty and disadvantages regarding health and education, so that research has focused on these issues rather than on labour market issues.⁴

Although it is clear that, across the globe, Indigenous populations are disadvantaged on a range of outcomes, there are differences in the extent of disadvantage. See, for example, Zietsma (2010) for statistics on the Canadian Aboriginal population, who fare worse than the general population in Canada, but compared to the Australian Aboriginal population, those living off-reserve appear to do relatively better with regard to employment and unemployment. However, over the global financial crisis in the late 2000s, the situation for the Canadian Aboriginal population has worsened relative to the general population, particularly for youth. In 2009, the unemployment rate of the Aboriginal population aged 25 to 54 years is 4.7 percentage points higher (7.7 percentage points for 15-24 year old Aboriginal youth) and the employment rate is 12.1 percentage points lower (10.5 percentage points for the younger group) than that of the general population of the same ages. The group over 55 years old is not so much affected by the downturn and has slightly higher employment rates than the general population, for whom employment rates are low at those ages. There are large differences between different Aboriginal groups in Canada, and education appears a protective factor among all age groups.

Similarly, the Maori population also does worse on a range of outcomes compared to other population groups in New Zealand, but again they appear relatively better off than the Aboriginal population in Australia (Dixon and Maré, 2007), where the gap between Indigenous and non-Indigenous populations is particularly wide. Similar to Canada, the economic downturns in the 1980s and early 1990s seemed to have affected Maori

⁴ See, for example, de Alba (2010) who focus on poverty and inequality at the individual level (individual-level data is still a fairly new phenomenon for Mexico); or de Janvry and Sadoulet (2001) who focus on extra income from off-farm activities in rural areas in Mexico, where subsistence farming is common.

disproportionally, widening the gap between Maori and those of European descent, especially those who identify as Maori only rather than identifying with other ethnic groups as well (Winkelmann and Winkelmann, 1997; Chapple and Rea, 1998; Maani, 2002; Singley and Callister, 2004). However, with improving economic growth from the early 1990s onwards, the gap between Maori and those from European descent has narrowed again (Dixon and Maré, 2007).

Despite these obvious differences, it is interesting to compare the approaches used to study disadvantage among Indigenous populations, and compare quantitative results in the three countries. There is some literature on factors contributing to labour market outcomes of Indigenous populations in other developed countries such as Canada and New Zealand. Appendix A provides a summary overview of the literature related to labour market outcomes, organised by country. Compared to Canada and New Zealand, Australia has the advantage to researchers of having special surveys among Indigenous people. The studies in Canada and New Zealand are mostly based on the Census data, which have relatively few explanatory variables available, so that many studies in these two countries are relatively descriptive.⁵

Before discussing the empirical results from the literature, we discuss some of the possible theories to explain differences in labour market outcomes of different groups briefly in Section 2.1. Some in-depth methodology used in analysis of Indigenous Australians and the Community Development Employment Projects (CDEP) Program are discussed in Section 2.2. This is followed, in Section 2.3, by a review of the determinants of labour force status as found in the literature analysing outcomes for Indigenous Australians.

2.1 Theories to explain ethnic differences in labour market outcomes

There are different theories to explain ethnic (and other) differences in socio-economic outcomes. An awareness of these theories is important not only because they are explicitly or implicitly tested in many of the empirical studies on ethnic socio-economic differences, but also because they are often the basis of Indigenous policy formulation (Altonji and Blank, 1999, p. 3164; Patrinos, 1994, p. 45).

⁵ Although this tends to be fairly descriptive there are a few exceptions, such as Scobie, Gibson and Le (2005), who decompose wealth gaps using an Oaxaca decomposition method. They find that age, income and education characteristics explain a large proportion of the wealth gap between the Maori and European populations in New Zealand.

2.1.1 Human capital (investment) theory

The human capital (investment) theory was originally developed to provide context for the estimation of the economic return to high-school education (Becker, 1993, pp. 29-30), but has subsequently been used to explain earnings differentials and differences in labour market outcomes between occupations, ethnic groups, and genders, in terms of the differences in human capital (Altonji and Blank, 1999, pp. 3166-3168). Under this human capital framework, investments in education, training and health increase a person's productivity and relative competitiveness in the labour market, and therefore lead to higher earnings and better labour market outcomes (Becker, 1993).

2.1.2 Dual labour market theory

The dual labour market theory describes the labour market phenomenon in which there appear to be two self-contained sectors: a primary and a secondary sector. The primary sector is characterised by "high wages, good working conditions, employment stability, chances of advancement, equity, and due process in work rules"; whereas the secondary sector is characterised by "low wages and fringe benefits, poor working conditions, high labour turnover, and little chance of advancement" (Doeringer and Piore, 1971, p. 165). In a dual labour market, economic returns to investments in human capital will be limited in the secondary sector.

2.1.3 Discrimination

Differences in labour market outcomes can also be due to discrimination. In Becker's (1971) model of discrimination certain employers have a 'taste', or preference, for or against certain members of the society, without further explaining the existence of such a preference. However, in a competitive labour market wage discrimination will be eliminated over time as long as some employers prefer profits over prejudice in the context of Becker's model (Patrinos, 1994, p. 47).

Two main types of audit studies have been used to detect the presence of possible discrimination. In the first, resumes which are identical in all respects except for the use of different names that are suggestive of the applicant's gender or ethnicity are sent out, and the probability of obtaining an interview is compared across the two groups. In the second, auditors are sent to job interviews (Altonji and Blank, 1999, p. 3192). Booth, Leigh and Varganova (2010), following the first approach, find that a resume with an Indigenous name is much less likely than a resume with an Anglo-Saxon name to receive a positive response from employers.

2.1.4 Other explanations

Alternatively, beliefs that one is being discriminated or is experiencing prejudices could lead to self-exclusion (Buvinic, 2004). Social exclusion could have tangible and persistent effects on individuals' earnings as a result of a change in expectation and a lack of confidence (Hoff and Pandey, 2006). A more direct effect is that socially excluded people are also expected to miss out on the benefits associated with social contact and inclusion, such as informal access to information, new opportunities, contacts and informal job offers. Furthermore, children of parents with low levels of education may be disadvantaged in the acquisition of human capital, and that socio-economic differences could result from differences in class background such as family background, parents' education and occupation (see, for example: Kelley, 1988).

2.2 Indigenous Australians

Before discussing the labour market outcomes of Indigenous populations more generally and in a systematic way by potential determinants in Section 2.3, this section focuses on a few in-depth Australian studies using decomposition approaches and other sophisticated econometric approaches, followed by a discussion of the role of CDEP in outcomes for Indigenous Australians.

2.2.1 Decomposition studies and other in-depth research

One of the earlier studies exploring the income differences between Indigenous and non-Indigenous Australians is by Daly (1993), who estimated the sources of income differences using the Blinder-Oaxaca decomposition method. Daly (1993) finds that for Indigenous males 70 percent of the estimated difference in earnings could be attributed to their lower levels of education and labour market experience and 30 percent to their lower returns to human capital and other attributes. For Indigenous females, the percentages were 44 and 56 respectively. It is pertinent to note that the difference in returns to the various characteristics could be due to a range of factors from discrimination, omission of other relevant variables in the estimated model, to simply measurement error in the explanatory variables, or to a combination of two or more of these factors (Hunter, 2004).

Hunter (2004) studies participation and employment rates, and in particular the role of potential discrimination in securing employment. The extent to which the difference in employment rate is not accounted for by differences in observed characteristics is referred to as the potential scope for labour market discrimination in employment. The probability of employment of Indigenous Australians in the absence of 'discrimination' is calculated by

imposing the same returns to the observed characteristics on Indigenous Australians as estimated for non-Indigenous Australians. That is, if the returns to observed characteristics for Indigenous and non-Indigenous Australians were the same, what would the Indigenous employment probability be.

By comparing the hypothetical and actual employment probabilities, Hunter (2004, pp. 79-80) concludes that “potential discrimination explains more than two-thirds of the average employment differential in almost all cases”. However, he explains that there are a few alternative explanations, such as the possible omission of relevant variables, the inability of the employment regression analysis to distinguish between differences in preferences (between Indigenous and non-Indigenous Australians), or actual constraints on employment opportunities, such as discrimination.

In addition to these papers utilising decomposition approaches, some papers have applied alternative approaches aiming to come closer to identifying causal relations. Hunter and Daly (2008) analysed labour force participation of Indigenous women while allowing for the possible endogeneity of fertility and participation in crime. They find that arrest in the last five years is exogenous with respect to female labour supply and that it is not sensitive to the inclusion of a measure of fertility in the participation equation. Arrest has a clear negative effect on female labour supply. Examining the endogeneity of fertility, they find that this cannot be taken as an exogenous variable with respect to labour supply. Once the endogeneity of fertility is controlled for, fertility (as measured by ever having had children) no longer has a significant effect on labour supply when included together with arrest. This works through the fact that fertility is correlated with the age of first arrest due to possibly lower employment opportunities and therefore lower opportunity costs of having children.

A pseudo-panel approach was applied by Gray and Hunter (2002) using the 1981, 1986, 1991 and 1996 Census data. They try to control for unobserved heterogeneity by using 10-year age cohorts. Cohort-specific variables (cohort dummies or fixed effects) are included to pick up unobserved differences between cohorts. The authors find that simple OLS results differ from the results accounting for fixed effects by age cohort, but that the direction and relative size of effects are similar between the two approaches. The negative and positive effects on employment and labour force participation of low and high education levels respectively are larger for Indigenous men and women than for non-Indigenous men and women, while not speaking English well has a smaller to no effect for Indigenous men and women.

2.2.2 *Community Development Employment Projects (CDEP) Program*

It is estimated that increasing the life expectancy and labour force participation of Indigenous Australians would have long-run economic benefits, including a 1 percent higher GDP in 2029 with government revenue \$4.6 billion higher and government expenditure \$3.7 billion lower than otherwise (Access Economics, 2008). These estimates are based on the assumption that improved health and educational attainment of Indigenous Australians would lead to an increased proportion of the Indigenous population being able to participate in the labour market and secure ‘higher-skilled and better-paid’ jobs similar to those held by other Australians (Access Economics, 2008, p. 19). However, with the Indigenous adult population projected to grow at 2.9 percent each year from 2006 to 2016 (Biddle, Taylor and Yap, 2009), over 82,000 additional jobs in total would be needed to halve the gap in employment outcomes by 2016 (Biddle and Yap, 2010). Yet, between 1996 and 2006, just over 49,000 jobs were created (Biddle, Taylor and Yap, 2009). In fact, it is argued that “equality, based on mainstream notions of development, will be impossible to deliver in many remote and very remote parts of Australia where Indigenous Australians reside” (Altman, Buchanan and Biddle, 2006: p.18). Over a period of 35 years, the employment gap between Indigenous and non-Indigenous Australians has only narrowed very slightly: the ratio of Indigenous to non-Indigenous employment rates was 0.73 in 1971 and 0.75 in 2006 (Biddle, Taylor and Yap, 2009: p. 264).

The aim of CDEP is to strengthen and support Aboriginal and Torres Strait Islander remote communities through community development and participation opportunities that develop skills, improve capacity, work readiness and employability and link with local priorities.⁶ It is meant to contribute to the Australian Government’s aim of halving the gap between Indigenous and non-Indigenous employment within a decade. CDEP is a large program: the Steering Committee for the Review of Government Service Provision (2009: p. 8.8, or 501 in the pdf file) states that “the CDEP program accounted for 21.9 percent of all Indigenous employment, ranging from 4.0 percent in major cities to 68.0 percent in very remote areas”. The same report then states that although CDEP has benefitted Indigenous Australians “there are greater economic and employment opportunities for Indigenous people, particularly in non-remote areas, in the mainstream economy in either the private or public sectors”. However, in its evaluation of the effectiveness of the CDEP, the Office of Evaluation and Audit (OEA 2009: pp. 23-24) finds that placements into non-CDEP employment on leaving

⁶ As mentioned on the Centrelink website <http://www.centrelink.gov.au/internet/internet.nsf/services/cdep.htm>

CDEP were low overall in the period from 2004 to 2008. For example, just over 10 percent of participants found non-CDEP work in 2006-07 and 2007-08, and of these only 2 percent and 3 percent, respectively, remained in the job for 26 weeks. Although the cost per placement has dropped from \$37,478 in 2005-06 to \$15,515 in 2007-08, in the absence of survey and administrative data required to conduct a net impact study, OEA (2009: p. 31) concluded that the returns to the CDEP program are only modest.⁷

2.3 General overview of the empirical literature

Much of the available Australian research that has been published is descriptive. A recent publication by Biddle, Taylor and Yap (2008) describes the labour force participation by Indigenous Australians in regional areas between 2001 and 2006 using Census data. Similarly, using a series of Census data, Altman, Biddle and Hunter (2008) document trends in a range of socio-economic outcomes between 1971 and 2006. We discuss a few descriptive studies in the first section to provide a background of the Australian situation, followed by a discussion of the determinants of labour force status as arising from a range of studies in the next section.

2.3.1 Background

The labour force status of Indigenous Australians captures only one dimension of their involvement in the mainstream labour market. Before we turn to the various factors affecting Indigenous labour force status, we consider a few other persistent features that characterise Indigenous Australians' labour market experience.

Indigenous Australians are more likely to be employed in the public sector than other Australians. In addition, Indigenous employment is concentrated in just a few industries such as agriculture, and health and community services (Norris, 2001; Daly, 1995; Taylor, 1993). Movement between labour force states is also frequent among Indigenous Australians. Data from the Indigenous Job Seeker Survey reveal that Indigenous employment can be quite unstable with over 50 percent of currently full-time employed respondents becoming unemployed 15 months later (Gray and Hunter, 2005b: p. 391). They show that the

⁷ Other labour market programs and traineeship programs have also been implemented in different Indigenous communities. However, although some of these programs have been quite successful, the number of participants enrolled in these programs is relatively small. For example, the Workstart Program had 59 Aboriginal trainees in its first year; the National Indigenous Cadetship Project has had 58 students since 2000; the Learning to Earning program had 16 participants in 2008; the Aboriginal Employment Strategy provided 3,000 job placements from 2005 to 2009; the Accor Asia Pacific Corporate Leaders for Indigenous Employment Project has provided 130 job placements in the tourism industry since 2000; the ACT Indigenous Traineeship Program has had 15 participants each year since 2007 (Steering Committee for the Review of Government Service Provision, 2009: pp. 497-501).

probability of Indigenous Australians retaining employment is not related to the search methods or search intensity (the number of job applications), although a higher search intensity makes obtaining employment more likely. They suggest that this is likely to be due to the fact that much of the employment obtained by Indigenous Australians is in the secondary market where the duration of employment is usually short (Gray and Hunter, 2005a).

2.3.2 Determinants of labour force status

In this section we discuss findings regarding the determinants of labour force status among Indigenous Australians with a specific focus on two recent empirical studies. Using data from the 2006 Census, Biddle and Yap (2010) analyse, and compare, the patterns of total employment, part-time employment, and managerial and professional employment of Indigenous and general populations. Using a similar approach but data from the 2002 NATSISS, Stephens (2010) compares the labour force status of Indigenous and non-Indigenous Australians. In addition, we draw on other Australian studies and some international research results.

Before discussing the determinants of labour force status, we would like to make a general observation in relation to the labour market outcomes of Indigenous Australians. It appears that labour force participation and employment are associated with a range of socio-economic factors in the same direction, whereas CDEP employment and unemployment are also associated with the same factors, but in the opposite direction to labour force participation and employment (Stephens, 2010).

Age

One of the demographic variables almost always included in models of labour force status is age. Age captures life cycle effects on a person's labour force status, and also acts as a proxy for work experience (Stephens, 2010: p. 290; Hunter, 2004: p. 66). Including work experience as a determinant of labour force status is consistent with the human capital approach in that on-the-job training will increase a worker's productivity. When work experience is not observed in the available data, in some studies work experience is approximated as the difference between a person's current age and the age at which the person first left school. However, the assumption that Indigenous Australians spend the majority of their time in employment after they leave school is clearly inappropriate (Hunter, 2004: p. 66).

In general, age is found to be positively correlated to employment up to the age of around 45 (see literature review by Stephens, 2010: p. 290). Stephens (2010), using data from the 2002 NATSISS, finds that Indigenous males, who are aged 25-34, have a 12 percentage points higher probability of being in employment than those aged 15-24; whereas for Indigenous females, who are aged 35-44, this probability is 23 percentage points higher compared to those aged 15-24.

Geography

In general, living in remote parts of Australia is associated with having a lower probability of employment (Hunter and Gray, 2001). Factors that contribute to this include limited opportunities in the local labour market, lower education levels, stronger cultural attachment of Indigenous people in remote areas, and weaker ties with non-Indigenous institutions (OEA, 2009; Gray and Chapman, 2006).

The probability of employment (excluding CDEP employment) is 17 percentage points lower for Indigenous males residing in remote Australia, compared to those living in major cities; for Indigenous females, the probability is 11 percentage points lower (Stephens, 2010: pp. 296-297). Not surprisingly, the probability of CDEP employment is higher for Indigenous Australians in remote areas: 38 percentage points and 39 percentage points higher for Indigenous males and females respectively (Stephens, 2010: pp. 296-297). This contrasts with the results in Biddle and Yap (2010: p. 90), in which Indigenous Australians living in major cities have a similar employment probability (when including CDEP employment) to those living in the rest of Australia. Furthermore, Biddle (2010) finds that individual Indigenous Australians who move to urban areas do not appear to do as well in the labour market as those who remain behind.

Stephens (2010) also estimates that the positive association between employment probability and age is stronger in remote areas. This appears most likely due to the disproportionately low employment rate among young Indigenous Australians residing in remote areas.

Education

The association between education and labour market outcomes of the Indigenous people is often found to be positive and significant (see literature review in Stephens, 2010). However, Stephens (2010) finds that, after controlling for other socio-economic variables and relative to those who completed Year 10, completing Year 12 has no effect on the employment probability for Indigenous females and a marginal effect of only 6.1 percentage points for

Indigenous males. Biddle and Yap (2010) find that having left school before Year 10 and not having any qualifications have a stronger association with negative employment outcomes for Indigenous than for non-Indigenous people. Similar results are found in other Australian studies (Altman and McLennan, 1996; Gray and Hunter, 2002) and for New Zealand (Maani, 2002; Winkelmann and Winkelmann, 1997).

Stephens (2010) warns that these results, and results from similar regression analyses in general, should be interpreted with care. Studies that use a low education level, such as for example leaving school between years six and nine, as the reference group risk overstating the association between education variables and labour market outcomes. This is due to the fact that not completing compulsory education is likely to be correlated to other (unobserved) factors that affect employment outcomes (Stephens, 2010, p. 298).

Family characteristics

Family characteristics, such as marital status and the number of dependants, are also included in many models of labour force status. However, in his review of previous studies Stephens (2010) finds that the results on the association between employment probability and marriage among Indigenous Australians are mixed, and it is unclear whether a general relationship exists.

In Stephens' (2010) own analysis, he finds that married Indigenous males are 17 percentage points more likely to be employed, whereas the employment probability for married Indigenous females is the same as for those who are not married. A similar effect is found for Maori women in New Zealand (Winkelmann and Winkelmann, 1997). The presence of dependants is associated with an around 20 percentage point decrease in employment probability for Indigenous males, and the negative association does not change substantially with the number of dependants. On the other hand, for Indigenous females, having one dependant is associated with a decrease of 7 percentage points in the employment probability. The magnitude of decrease is larger, around 20 percentage points, for females with two or more dependants.

Biddle and Yap (2010) find a much smaller effect: an Indigenous person with a marital status other than married is 1 to 5 percentage points less likely to be employed. No separate analysis is undertaken by gender.

Health

Having poor health or the presence of a health condition or disability is generally found to be negatively associated with employment outcomes (Ross, 2006). Health-related variables that are often included in models of labour force status include self-assessed health status, alcohol use, smoker status, and whether the person has a disability.

Male and female Indigenous smokers are respectively 12.1 percentage points and 7.6 percentage points less likely to be in employment than non-smokers. Indigenous males and females who assess themselves as having poor health are 29.4 percentage points and 22.9 percentage points less likely to be in employment, compared to those whose self-assessed health is excellent or very good (Stephens, 2010: pp. 296-298).

The effect of alcohol use on labour force status is less clear. Compared to those whose alcohol consumption is moderate, high-risk alcohol use is associated with a decline in employment probability as expected (1.6 percentage points and 6.4 percentage points for Indigenous males and females). However, those who did not consume any alcohol in the two weeks prior to the day they were surveyed are also less likely to be employed, and to a larger extent than the high-risk alcohol users (10.7 percentage points and 9.1 percentage points for Indigenous males and females). This counterintuitive result might be explained by the observation by Chikritzhs and Brady (2006: p. 245) that the variable alcohol use in the NATSISS 2002, which is publicly available and has been used by previous studies, is thought to understate the incidence of 'at risk' drinking by a factor of three or more. This severe under-reporting may have affected the results in Stephens (2010). The literature on the effect of drinking alcohol on wages also shows positive effects for the general population (Van Ours, 2004; Barrett, 2002), but this is only for moderate drinking levels compared to not drinking.

Other determinants

An advantage of using the NATSISS data is that information is collected on a number of social and cultural aspects of Indigenous Australians' lives that are usually not available. These include the presence of a criminal record, connection to the land or own tribe, participation in cultural activities, ability to speak a native language, etc.

Having an arrest record is correlated with poorer employment outcomes (Hunter, 1997; Borland and Hunter, 2000; Halchuk, 2006). Stephens (2010) finds that Indigenous males and

females who have been arrested are 17 and 18 percentage points, respectively, less likely to be employed.

Cultural attachment and interaction with non-Indigenous society are also correlated with the labour force status of Indigenous Australians. Having a strong attachment to a cultural group could indicate a stronger social preference among those Indigenous Australians towards cultural activities over participation in the mainstream labour market. Stephens (2010) finds that living in a mixed household (that is, Indigenous and non-Indigenous individuals together) is associated with a higher employment probability; 19.8 percentage points and 19.3 percentage points higher for Indigenous males and females respectively. Speaking an Indigenous language is associated with a decrease in employment by 19.1 percentage points and 10.1 percentage points for Indigenous males and females respectively.⁸ The impact of living in a mixed household, as a proxy of interactions with non-Indigenous culture, should be interpreted with caution as mixed families tend to be concentrated in non-remote areas (Stephens, 2010; Ross, 1999). The presence of more and more diverse social capital has a positive effect on employment outcomes (Vurens van Es and Dockery, 2008). Halchuk (2006) also finds that social networks are important determinants of employment outcomes. However, compared to the importance of education, social characteristics are of minor importance, according to the findings of Hunter (1997).

⁸ A study on social network effects among Mexican indigenous people suggests that participation in an economic activity is more likely when participation in that activity is high among the same language group (Lunde, Patrinos and Skoufias, 2010).

3. Data

This project draws on data from three sources. The 2004 NATSIHS and the 2008 NATSISS provide data on Indigenous Australians while the HILDA waves 4 (2004) and 8 (2008) provide data on non-Indigenous Australians. Accessing the ABS data on Indigenous Australians through CURFs provides us with the most detail that is available (that is, individual records) and allows flexibility regarding the use of the available information.

Although the Census provides quite rich information on locational characteristics of individuals, compared to other household data sets, it provides limited information on other individual and family characteristics. Therefore, it is important to examine whether other characteristics, as observed in the three data sets above, can explain the differences in labour market participation of Indigenous Australians with the rest of the population. However, data from the Census of Population and Housing 2006⁹ are used as a benchmark to gauge the reliability and representativeness of the NATSI(H/S)S. We use the 5% sample of the Census, which is a random sample drawn from the full population of Census households known to be representative of the population. Since the project's focus is on labour force status, our analyses only include individuals of working age (15-64).

Table 1 shows sample size by Indigenous status for the four data sources. It is clear from the table that we cannot use the HILDA for analysis of Indigenous Australians, since only a few hundred observations are available for this population. However, the NATSIHS has been complemented with observations from the 2004-05 NHS on non-Indigenous Australians, where the ABS has aimed to make the variables for observations from the two populations comparable. Therefore, in addition to using the HILDA for non-Indigenous Australians, we explore the NATSIHS for this purpose as well.

Table 1: Sample size by Indigenous status

	NATSIHS 2004	NATSISS 2008	Census 2006	HILDA 2004	HILDA 2008
Timing	Aug 04 – Jul 05	Aug 08 – Apr 09	8 August 06	Aug-Dec 04	Aug-Dec 08
Total sample	10,439	13,307	1,002,793	12,408	12,785
<i>Aged 15-64</i>					
Indigenous	5,985	7,342	13,218	227	281
Non-Indigenous	16,686	-	613,868	8,074	8,460
Other/Not stated				2,193	1,978

Notes: Census 2006 sample is based on the 5% expanded CURF. Non-Indigenous respondents in NATSIHS 2004 are taken from NHS 2004-05.

⁹ The Census is carried out every 5 years by the ABS. The 2006 Census is the one closest in time to 2004 and 2008, the years when the NATSI(H/S)S used in this project were conducted. The data are available as a CURF.

3.1 NATSISS and NATSIHS

The two central data sets used in this project are NATSIHS and NATSISS, which are major national surveys run by the ABS that collect information specifically on Indigenous Australians. NATSISS has been carried out three times (in 1994, 2002, 2008) while NATSIHS has been conducted only once (in 2004). While the two surveys have different foci, both collect information on labour market activity. NATSIHS 2004 and NATSISS 2008 are used in this project, as they are the two most recent data sets.

NATSIHS 2004 is the largest health survey of Indigenous Australians conducted by the ABS. The survey covers 10,439 Aboriginal or Torres Strait Islander persons, or about one in 45 of the total Indigenous population.¹⁰ It is designed to provide information on the health circumstances of Indigenous Australians, the survey included questions on demographic characteristics, health-related actions, health risk factors (such as smoking and drinking), general health status and questions specific to women's health.

The survey was conducted in remote and non-remote areas in all States and Territories, and it included only Indigenous persons who were the usual residents of private dwellings¹¹ in Australia. Visitors to private dwellings and Indigenous persons who were usually resident in non-private dwellings¹² were excluded. A random selection of a number of Indigenous communities and outstations was made; and within these selected communities and outstations using the Indigenous Community Frame, a random sample of dwellings was selected. In non-community areas, dwellings were selected using a stratified multistage sample based on Census Collection Districts. Within each household, a random sub-sample of usual residents of one or two adults and one or two children was selected for inclusion in the survey. That is, for households located in community areas up to one adult (aged 18 years and over) and up to one child aged 0–17 years were selected and interviewed, while for households located in non-community areas up to two adults (aged 18 years and over) and up to two children aged 0–17 years were selected and interviewed. Detailed information was collected for these selected persons, while a more limited number of characteristics are observed for the other persons in the households. A sample of Indigenous households was

¹⁰ See ABS (2006) for more detailed information.

¹¹ Defined as “houses, flats, home units and any other structures used as private places or residence at the time of the survey” (ABS, 2006, p. 4)

¹² Such as “hotels, motels, hostels, hospitals, short-stay caravan parks, prisons and other correctional facilities” (ABS, 2006, p. 4)

also selected from the 2004-05 NHS, which included an additional 654 Indigenous persons. The NATSIHS collected information for 9,785 Indigenous persons.

Due to the random selection of individuals within the household to participate in the survey, a number of characteristics are not available and can therefore not be included. For example, it is not known for the individuals in the household whether they have children, since we cannot link specific children to their parents. Similarly, we do not always know whether someone's partner or spouse is employed since this is not asked of all individuals. The only information we have for all enumerated persons in the household is age, sex, indigenous status, marital status, family type and relationship in the household, since this was asked of one usually resident household member aged 18 years and over using a Household Form.

NATSISS 2008 is a multi-faceted social survey, covering 13,307 persons. The survey was also conducted in remote and non-remote areas in all States and Territories. The survey collected information on various topics including language and culture, social networks and support, health (to a limited extent), education, housing, labour force status, and financial stress. Similar to the 2004 NATSIHS, only Indigenous persons who were usual residents of private dwellings were included in the survey, while those usually resident in non-private dwellings were excluded.¹³ Some Collection Districts and Indigenous communities in remote and very remote areas with a small number of Indigenous households were also excluded from the sampling frame.¹⁴

The sample design is mostly the same as that for the 2004 NATSIHS. One important difference, however, is that the 2008 NATSISS distinguished between Indigenous persons (aged 15 years and over) and Indigenous children aged 0-14 years, while the 2004 NATSIHS distinguished between Indigenous adults (aged 18 years and over) and Indigenous children aged 0-17 years (interviewing children of age 15 or over with permission of the parents/carers only, while interviewing a responsible adult regarding the 0-14 year old children). If a dwelling contained one or more Indigenous usual residents, up to two Indigenous persons (aged 15 years or over) and up to two Indigenous children (aged 0-14 years) were randomly selected for participation in the survey. For selected households in discrete remote Indigenous communities and outstations, one Indigenous person aged 15 years and over, and one child aged 0-14 years were selected and interviewed; whereas for selected households in non-remote and remote non-community areas up to two Indigenous persons aged 15 years and

¹³ See ABS (2010) for more detailed information.

¹⁴ As a result, the 2008 NATSISS has a higher level of under-coverage compared to other ABS surveys.

over and up to two children aged 0-14 years were selected and interviewed. The personal interview consisted of a number of separate modules, collecting information on demographics, language and culture, social capital, life experiences, health, education, work, income and finances, housing and mobility, transport, information technology, and safety, crime and justice.

Only a limited amount of information is collected for all members of the selected household. The survey asked one usually resident household member (aged 18 years or over) a number of questions to collect basic demographic information on each person in a selected household. This demographic information includes age; sex; relationship in household; whether anyone aged 15-24 years was a full-time student; and Indigenous status. Therefore, similar to the situation when using NATSIHS 2004, a number of characteristics usually available in labour force status modelling (such as employment status of partner or spouse, or age and number of children are not available in these data).

Chikritzhs and Brady (2006, p. 245) note that information on illicit drug use in NATSISS 2002 was considered to be downwardly biased to such an extent that it has been withheld, and that alcohol use, which is publicly available and has been used by previous studies is thought to understate the incidence of 'at risk' drinking by a factor of three or more. They also note that, as the 2002 NATSISS excludes residents of non-private dwellings (who are less likely to be employed and more likely to abuse alcohol, see p. 243) the association between alcohol abuse and the labour force status of Indigenous Australians may be understated. Comparing low-, medium- and high-risk alcohol use in NATSISS 2008 with those in NATSISS 2002 (see Appendix Table 1), we find very similar proportions. This indicates that the data used in this report may suffer from the same issue of potential under-reporting.

3.2 HILDA

HILDA is a longitudinal survey of Australian households collecting information on all individuals for a number of randomly selected households on a yearly basis. HILDA started in 2001 and has been run annually, with each year corresponding to a 'wave'. It covers approximately 13,000 individual respondents living in more than 7,000 households. We use waves 4 and 8 as they match the timing of NATSIHS 2004 and NATSISS 2008.

HILDA collects information on a large number of individual characteristics, such as education, health, labour force participation and income, and household characteristics, such

as the number and age of children, and the number and a range of characteristics of other adults living in the household.¹⁵ Many of the characteristics collected in the NATSI(H/S)S data are also available in the HILDA. Although the Indigenous population is represented in the HILDA, they have not been oversampled. Therefore, the number of observations for this group is too small to use in separate analyses.

¹⁵ Detailed information on HILDA can be found on the website <http://melbourneinstitute.com/hilda/>. For discussion of the design of the HILDA Survey refer to Wooden and Watson (2007).

4. Descriptive analysis

Before discussing the descriptive statistics from the different data sources, we compare these first with similar descriptive statistics from the Census in Section 4.1 to assess the reliability and representativeness of the NATSIHS, NATSISS and HILDA data. Section 4.2 describes the labour force status by a few important characteristics using graphical representations, while Section 4.3 reports descriptive statistics of a range of variables of interest by labour force status.

4.1 Comparison across data sets

This section compares weighted descriptive statistics based on the data from NATSISS, NATSIHS, HILDA and Census in Tables 2 to 4. The descriptive statistics for the Census data are used as a benchmark for the descriptive statistics for other data sets to assess the representativeness of each data set with regard to the population of interest. Tables 2 to 4 contain two important types of information. First, it allows a comparison between the distributions of characteristics in the three surveys to be used in the analysis with the distribution of the same or comparable characteristics in the Census. Second, it allows a comparison of the characteristics of Indigenous and non-Indigenous Australians.

Table 2 focuses on the demographic characteristics available in the various data sets. Comparing the Census information to the information from the other two data sets for Indigenous Australians, the overall assessment is that it seems a reasonable match, although in most cases the distribution in NATSI(H/S)S is statistically different from the distribution observed in the Census, as indicated by the asterisks.¹⁶ The standard errors turn out to be quite small in most instances and the differences between the NATSI(H/S)S and Census distributions are mostly fairly small. Making the same comparisons between the two waves of HILDA data and the Census for non-Indigenous Australians, we find an even better match of the HILDA information to the Census information. However, a few characteristics exhibit larger differences in one or both surveys. Most of these larger differences occur in the 2004 NATSIHS.

¹⁶ We use the replication weights provided by the ABS to compute standard errors and determine statistical significance.

Table 2: Demographic statistics, by data source

	Indigenous			Non-Indigenous		
	NATSIHS 2004	NATSISS 2008	Census 2006	HILDA 2004	HILDA 2008	Census 2006
Age	281,404	311,122	13,218	13,078,085	14,045,475	613,868
Aged 15-24	32.7*	33.4*	32.1	20.5*	20.8*	20.0
Aged 25-34	24.8*	22.5*	23.8	21.2*	20.3*	20.0
Aged 35-44	21.0*	20.5*	21.5	22.3	21.3*	22.2
Aged 45-54	14.1*	15.1*	14.8	20.5*	20.9	21.0
Aged 55-64	7.4	8.6*	7.9	15.6*	16.7	16.7
Marital status (social)	281,404	311,122	11,585	13,078,085	14,045,475	579,147
Married/de facto	29.0*	44.9*	40.4	57.2*	57.6*	59.8
Not married	71.1*	55.1*	59.6	42.9*	42.5*	40.3
Sex	281,404	311,122	13,218	13,078,085	14,045,475	613,868
Male	47.7*	48.0*	49.0	50.0*	50.1*	49.4
Female	52.3*	52.0*	51.0	50.0*	49.9*	50.7
Household composition	281,404	311,122	12,382	13,078,085	14,045,475	598,956
One family household	73.6*	73.6*	77.7	86.4*	86.6*	82.2
Two and three family household	14.7*	14.2*	8.6	2.1	2.4	2.5
Lone person household	7.9	7.2*	8.8	9.9*	9.7	9.4
Group household	3.8	5.0*	3.9	1.6*	1.3*	4.8
Visitors only	N.A.	N.A.	0.9	N.A.	N.A.	1.1
Highest year of school completed	258,045	311,122	11,638	13,060,122	14,032,534	591,793
Year 12 or equivalent	22.8	21.2*	23.7	48.4*	52.6	51.4
Year 11 or equivalent	12.7	14.3*	12.8	12.8*	13.2*	11.9
Year 10 or equivalent	31.7	31.5*	32.6	26.7*	24.5	25.3
Year 9 or equivalent	14.7	17.2*	15.1	6.9	6.0*	6.7
Year 8 or below	18.1*	15.9	15.7	5.2	3.8*	4.8
Student status	226,386	311,122	12,020	13,078,085	14,045,475	599,465
Not attending	87.7*	80.0*	83.0	89.2*	89.9*	83.7
Full-time	5.2*	13.6*	12.5	10.8	10.2*	11.3
Part-time	7.1*	6.4*	4.6	N.A.	N.A.	5.0
Post-school qualification	82,592	93,218	2,688	7,496,546	8,726,916	279,341
Postgrad degree/grad dip./certificate	5.4	3.7	4.5	13.3*	14.7*	10.6
Bachelor degree level	8.6*	11.4*	14.0	22.7*	23.0*	30.5
Advanced dip. and Diploma level	14.0	13.3	14.0	14.5*	14.1*	17.7
Certificate level	72.0*	71.6*	67.5	49.6*	48.2*	41.2

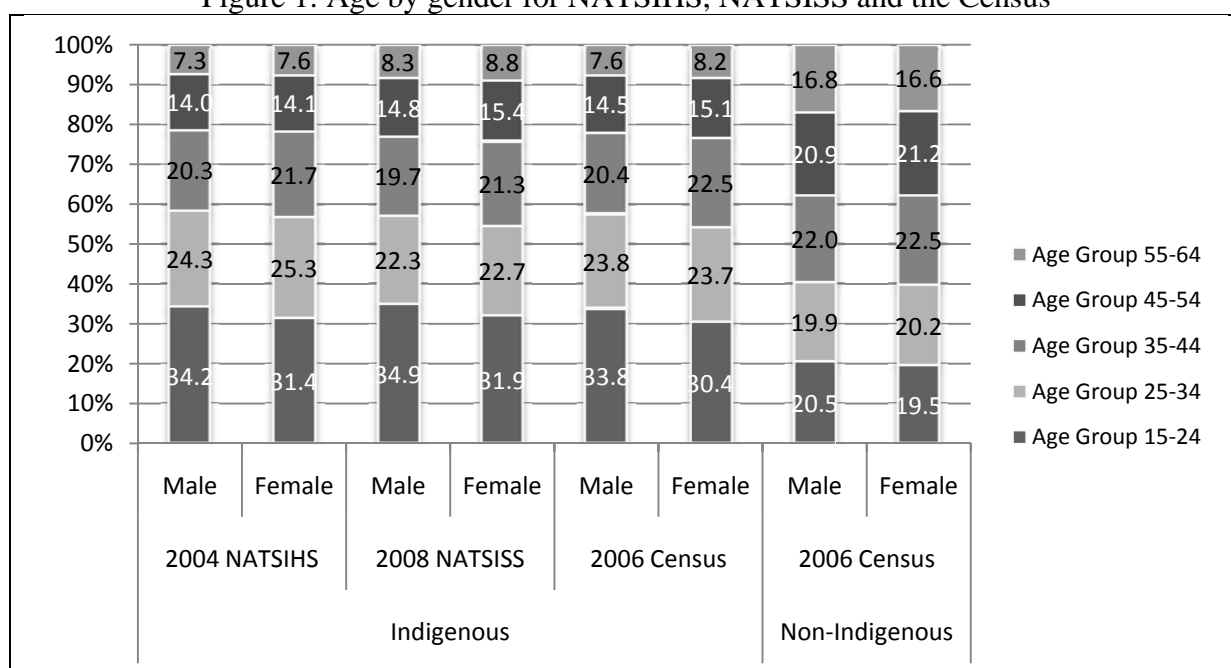
Notes: Entries are percentages in each category. Survey (NATSIHS, NATSISS, HILDA) results are weighted using sampling weights. * indicates that the mean value in the NATSIHS/NATSISS/HILDA is significantly different from the mean value in the Census at the 10% level.

The first major difference in the NATSIHS is the under-representation of full-time students and the under-representation of bachelor's degree holders while those with a certificate are over-represented. Similarly in the HILDA, degree holders are under-represented and those at the certificate level are over-represented compared to what is found in the Census. In both

Indigenous data sets the number of one-family versus two- or three-family household is somewhat under-represented compared to the Census.

Figure 1 presents the age by gender distributions in the different data sets for Indigenous Australians. It shows that this more detailed breakdown is similar across the two Indigenous data sets and the Census. Table 2 (and Figure 1) show clearly that Indigenous Australians have a different age distribution, with a larger proportion of the population in the younger age categories. Comparing Indigenous with non-Indigenous men and women, this younger age distribution for Indigenous men and women, with a larger proportion under 35 and a smaller proportion over 45, is evident.

Figure 1: Age by gender for NATSIHS, NATSISS and the Census



Notes: Entries are percentages in each age group. Survey (NATSIHS, NATSISS, HILDA) results are weighted using sampling weights.

Table 2 can also be used to compare the characteristics of Indigenous Australians with those of non-Indigenous Australians. We base our discussion on the two Census columns but we could have used the other columns as well to draw similar conclusions. Table 2 shows that Indigenous Australians are less likely to be married or in a de facto relationship. Indigenous Australians have much lower educational attainment than other Australians with less than a quarter finishing Year 12 compared to over half of non-Indigenous Australians finishing Year 12. Over 15 percent of Indigenous Australians only finish Year 8 or less. Similarly, a much smaller proportion of the Indigenous population has any post-school qualifications, and those who have post-school qualifications have lower-level qualifications than non-Indigenous Australians with post-school qualifications. Due to the higher proportion of Indigenous

Australians in the younger age groups, the proportion who still are in part-time or full-time study is similar to that of non-Indigenous Australians.

The geographic information presented in Table 3 shows that both NATSISS and NATSIHS over-represent residents of Western Australia, of the Northern Territory, and of Tasmania combined with the Australian Capital Territory compared to the Census. This occurs to a larger extent in the NATSIHS. Home owners, either outright or with a mortgage, are under-represented in NATSIHS compared to the information from the Census. For the HILDA data, we find that outright home owners are under-represented while those who are purchasing their home are over-represented.

Again comparing Indigenous and non-Indigenous Australians, Table 3 shows that Indigenous Australians live in different places compared to other Australians. They are more likely to live in the Northern Territory, Queensland and Western Australia, and are much less likely to live in Victoria. Within those States, they are much more likely to live in remote and very remote areas compared to other Australians. Although Indigenous households are more likely to contain more persons, these households tend to live in homes with fewer bedrooms than non-Indigenous Australians and their homes are much more likely to be rented than owned, whereas the reverse is true for other Australians.

Table 4 presents a number of labour market variables and job characteristics. The income distribution at the individual and household level looks quite reasonable, especially considering the fact that we have not corrected for the difference in year of collection, so one would expect a higher proportion of higher incomes in the later years as is observed in Table 4. The relatively large difference in the proportion receiving \$150 to \$249 per week in individual income in the NATSISS compared to the Census and NATSIHS is likely to be due to an increase of the pension payment rate from just below \$249 to just over \$249 in 2008.

Table 3: Geographic and residency statistics, by data source

	Indigenous			Non-Indigenous		
	NATSIHS 2004	NATSISS 2008	Census 2006	HILDA 2004	HILDA 2008	Census 2006
Place of residence	281,404	311,122	13,218	13,078,085	14,045,475	613,868
New South Wales	29.0*	29.2*	31.9	33.2*	32.6	32.7
Victoria	6.3*	6.6*	6.9	25.2	25.0	25.3
Queensland	26.8*	27.7	27.5	19.4	20.0*	19.4
South Australia	5.6	5.5	5.5	7.6	7.3*	7.7
Western Australia	14.6*	13.5*	13.2	9.8	10.3*	9.8
Northern Territory	12.9*	12.8*	11.9	0.8	0.9	0.7
Tasmania/ ACT	4.8*	4.7*	4.5	4.1	4.0*	4.1
No usual address, other territories	N.A.	N.A.	0.5	N.A.	N.A.	0.2
ASGC Remoteness Area	281,404	311,122	N.A.	13,078,085	14,045,475	N.A.
NSW Major Cities	12.0	12.4		25.1	24.6	
NSW Inner Regional	9.7	9.6		6.1	6.0	
NSW Outer Regional	6.0	5.6		1.9	2.0	
Vic Total	6.3	6.6		25.2	25.0	
Qld Major Cities	7.1	8.2		10.1	10.5	
Qld Inner Regional	4.5	5.4		5.7	5.9	
Qld Outer Regional	8.5	8.2		3.2	3.2	
Qld Remote/Very remote	6.7	5.9		0.4	0.5	
WA Non-Remote	7.8	7.9		9.0	9.6	
WA Remote/Very remote	6.8	5.7		0.8	0.7	
NT Remote/Very remote	10.7	10.3		0.2	0.1	
Balance of Australia - Non-remote	11.2	11.5		12.2	11.9	
Balance of Austr. - (Very) Remote	2.8	2.8		0.1	0.2	
Number of bedrooms	277,226	7,290	11,698	13,066,778	14,032,203	591,386
None (includes bed sitters)	N.A.	N.A.	0.9	0.2*	0.2*	0.5
1 bedroom	3.2	3.2	3.5	2.2*	2.9	2.6
2 bedrooms	14.1	14.3	14.1	13.0*	12.1*	14.4
3 bedrooms	55.8*	56.8*	51.6	42.4*	40.6*	44.4
4 bedrooms	23.1	21.3*	24.4	32.6*	34.3*	30.5
5 or more bedrooms	3.8*	4.4	5.4	9.7*	9.9*	7.7
Tenure type	278,244	309,392	11,701	13,070,327	14,025,057	598,956
Owned without a mortgage	6.7*	7.5*	9.4	11.4*	9.6*	27.6
Owned with a mortgage	18.5*	21.6	21.8	60.3*	62.4*	44.2
Rented	72.6*	69.4	67.8	26.4*	25.8*	27.8
Other	2.2*	1.6*	1.0	1.9*	2.2*	0.5

Note: See Table 2

Table 4: Labour market statistics, by data source

	Indigenous			Non-Indigenous		
	NATSIHS 2004	NATSISS 2008	Census 2006	HILDA 2004	HILDA 2008	Census 2006
Individual income (weekly) ^a	247,319	271,259	10,538	12,417,540	13,351,775	539,879
\$1-\$149	11.4	9.7*	10.9	14.0*	10.3*	8.9
\$150-\$249	31.4*	18.5*	29.3	12.5	8.9*	11.9
\$250-\$399	16.9*	19.5	18.9	12.0	10.9*	12.3
\$400-\$599	17.7	15.3*	16.7	14.1*	12.0*	16.8
\$600-\$799	12.0*	13.9*	9.9	14.5	11.9*	14.3
\$800-\$999	5.0	8.6*	5.8	10.8	11.7*	10.8
\$1,000-\$1,299	3.2*	7.6*	4.4	10.7	13.0*	10.8
\$1,300-\$1,599	1.6*	3.9*	2.2	4.9*	8.7*	6.0
\$1,600-\$1,999	0.3*	1.3	1.1	3.0*	5.6*	3.5
\$2,000 or more	0.6*	1.6*	0.9	3.5*	7.0*	4.8
Household income (weekly) ^a	236,446	247,074	11,416	13,010,188	13,976,964	566,170
\$1-\$149	0.7*	0.7*	2.3	1.0	0.6*	1.3
\$150-\$249	6.4*	2.7*	5.5	2.3	1.1*	2.3
\$250-\$349	4.5*	4.3*	6.8	2.4*	1.6*	3.2
\$350-\$499	14.6*	8.6*	6.7	6.0*	3.1	3.4
\$500-\$649	11.7*	9.3*	16.2	6.0*	4.0*	8.4
\$650-\$799	11.1*	9.1	9.0	7.0	4.3*	6.5
\$800-\$999	12.0*	11.8*	10.2	9.6*	7.5	8.2
\$1,000-\$1,199	10.9	10.9	12.4	8.3*	6.6*	13.0
\$1,200-\$1,399	7.5	8.4	8.2	8.9	7.3	8.1
\$1,400-\$1,699	8.9	10.6*	8.0	13.0*	11.9	11.2
\$1,700-\$1,999	6.4	6.5*	5.5	10.8*	10.9*	9.2
\$2,000-\$2,499	3.1*	8.0*	4.9	11.5*	14.3*	10.4
\$2,500-\$2,999	1.5*	5.3*	3.0	5.8*	9.4*	8.4
\$3,000-\$3,499	0.2*	2.2*	1.0	2.5*	6.9*	3.8
\$3,500 or more	0.7	1.8*	0.4	5.0*	10.8*	2.5
Hh income (weekly): equivalised	N.A.	247,074	10,505	N.A.	N.A.	549,532
\$1-\$149		2.6*	6.2			2.2
\$150-\$249		10.5*	17.9			5.3
\$250-\$399		29.5*	27.2			12.7
\$400-\$599		21.0	19.7			18.7
\$600-\$799		14.6*	12.4			18.4
\$800-\$999		8.7*	6.9			13.2
\$1,000-\$1,299		7.7*	5.3			14.0
\$1,300-\$1,599		2.6	2.4			7.4
\$1,600-\$1,999		1.8	1.4			4.5
\$2,000 or more		1.0	0.7			3.6
Hours worked (weekly)	142,622	166,884	5,283	9,129,798	10,216,469	407,283
1-15 hours	15.3	13.4	14.1	11.6	10.8	11.2
16-24 hours	16.2*	12.6	13.7	8.4*	7.7*	9.3
25-34 hours	11.1	13.0	12.0	10.0	9.2*	10.3

Table 4: Labour market statistics, by data source

	Indigenous			Non-Indigenous		
	NATSIHS 2004	NATSISS 2008	Census 2006	HILDA 2004	HILDA 2008	Census 2006
35-39 hours	21.6	22.7	23.2	17.4	18.7	18.2
40 hours	18.5	17.0	17.5	16.5*	18.1*	19.8
41-49 hours ^b	5.9*	8.8	7.8	14.8*	15.3*	12.3
50 hours or more ^b	11.3	12.6	11.8	21.3*	20.2*	18.9
Labour force status	281,404	311,122	12,473	13,078,085	14,045,475	606,961
Employed	50.7*	53.8*	47.0	72.3*	75.2*	71.6
Unemployed	9.3	10.7*	9.0	3.8*	3.2*	3.9
Not in the labour force	40.0*	35.5*	44.0	23.9*	21.7*	24.5
Employment status ^c	101,821	127,304	5,790	9,454,679	10,558,628	430,967
Employee	92.5	92.9	94.4	83.6	85.7	82.4
Employer	1.4	0.9	5.0	10.2	8.1	16.1
Own account worker/contributing family worker	6.1	6.2	0.7	6.2	6.1	1.5
Sector (public/private)	140,518	N.A.	5,669	9,443,818	10,544,183	429,643
Public sector	35.5*		24.9	19.5*	21.0*	14.7
Private sector	64.5*		75.1	80.5*	79.0*	85.3
CDEP participation	142,622	167,416	898 ^d	N.A.	N.A.	
CDEP participant	21.4*	10.5*	73.4			
Not CDEP participant	78.6*	89.5*	26.6			
Industry of employment ^e	142,622	128,272	5,537	9,453,497	10,530,890	424,208
Agriculture, Forestry and Fishing	3.7	4.0	3.4	3.4	2.6	2.8
Mining and Electricity, Gas and Water Supply	2.1*	3.7	3.3	2.3	2.7	2.2
Manufacturing	8.5	7.5	8.0	11.4	10.1	10.8
Construction	7.8	9.4	7.8	7.2*	8.1	8.1
Wholesale Trade	1.5*	2.1	2.8	3.2*	3.4*	4.4
Retail Trade	10.2*	8.5	7.7	11.3	10.2*	11.8
Accommodation, Cafes and Restaurants	3.0*	8.8*	7.1	6.8	6.1	6.6
Transport and Storage	2.9*	5.3	4.1	4.6	4.2*	4.9
Communication Services and Finance and Insurance	2.3	3.1	2.4	6.8*	6.6	6.1
Property and Business Services	7.8	6.4	7.4	11.3	12.9*	11.8
Government Admin. and Defence	15.7*	11.7*	18.0	6.1*	6.9	6.8
Education	8.1	8.5	8.3	9.0*	9.0*	7.9
Health and Community Services	13.1	13.2	14.5	11.1	11.6	10.7
Cultural and Recreational Services	3.0*	2.7*	1.5	1.9*	1.7*	1.4
Personal and Other Services	10.3*	5.2*	3.8	3.8	3.8	3.8
Occupation (ANZSCO 2006)	N.A.	166,713	5,607	9,453,497	10,557,223	427,569
Managers		5.0	5.3	13	12.8	13.2
Professionals		12.6	11.0	21.5	23.0	20.4
Technicians and Trades Workers		13.4	13.3	14.2	13.9	14.9
Community and Pers. Service Workers		16.8	16.1	9.3	10.0	9.0
Clerical and Admin. Workers		12.0	13.4	15.1	15.1	15.3
Sales Workers		6.6	7.4	9.9	9.2	10.1

Table 4: Labour market statistics, by data source

	Indigenous			Non-Indigenous		
	NATSIHS 2004	NATSISS 2008	Census 2006	HILDA 2004	HILDA 2008	Census 2006
Machinery Operators and Drivers		9.7	8.9	6.2	6.5	6.7
Labourers		23.9	24.7	10.8	9.8	10.4
Occupation (ASCO 1997)	141,480	N.A.	N.A.	9,453,497	N.A.	N.A.
Managers and Administrators	4.2			8.1		
Professionals	12.0			21.2		
Associate Professionals	9.4			13.5		
Tradespersons and Related Workers	14.3			11.4		
Advanced Clerical and Service Workers	1.8			3.6		
Intermediate Clerical, Sales and Service Workers	19.6			16.4		
Intermediate Production and Transport Workers	9.3			7.8		
Elementary Clerical, Sales and Service Workers	9.4			9.8		
Labourers and Related Workers	20.1			8.3		

Notes: See Table 2.

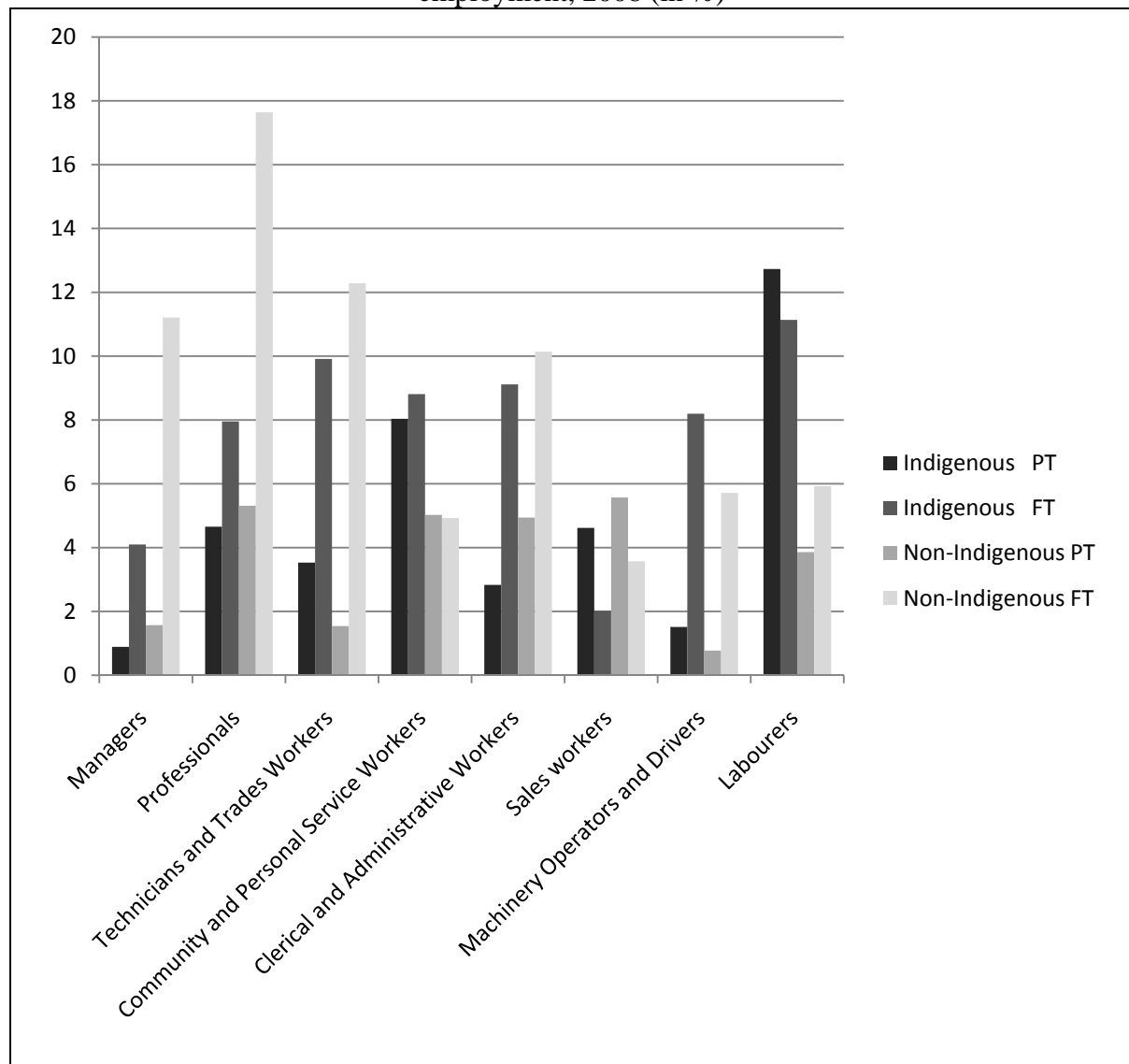
- Weekly income in the HILDA is based on the last financial year income information. This is divided by 52.14 to obtain the weekly amount.
- Hours worked in NATSISS has categories 41 to 48 hours, and 49 hours or more.
- For NATSIHS, only respondents in the non-remote areas were asked regarding their employment status. For the 2006 Census, we combine the two categories 'Owner manager of incorporated enterprises' and 'Owner manager of unincorporated enterprises' into one category 'Employer'. Note that there is not a separate 'Employer' category in the Census. For the 2004 and 2008 HILDA, 'Employee of own business' and 'Unpaid family worker' are combined into one category 'Own account worker/contributing family worker'.
- The question regarding CDEP participation is only asked on the interviewer household form, which is only used in nominated discrete Indigenous communities where language differences or other factors make the use of the standard self-enumeration forms impractical. As a result the number of observations is small and selective.
- For the 2008 NATSISS, 'Industry of main job' is reported for respondents in non-remote areas only.

Public-sector workers and employees are over-represented in the NATSIHS, while CDEP participants are severely under-represented in both data sets. Occupation levels are captured fairly well, although this is somewhat difficult to establish in the NATSIHS since this data set based its occupation categories on a different definition than the Census and NATSISS. Finally, industry of employment is quite comparable across the three data sources, except for an under-representation of Indigenous Australians in NATSIHS working in Accommodation, Cafes and Restaurants and an over-representation working in Personal and Other Services, and an under-representation of Indigenous Australians working in Government Administration and Defence.

The disadvantage with regard to education translates into poorer labour market outcomes for Indigenous Australians. A higher proportion of Indigenous Australians is located at the low end of the individual and household income range. This is at least partly due to the much

lower employment rate among Indigenous Australians (47.0 percent) compared to other Australians (71.6 percent). When employed, Indigenous Australians are more likely to work part time compared to other Australians, to be an employee (rather than self employed or an employer), and to work in a low-skill occupation (such as labourer or machinery operator) than in a high-skill occupation (such as manager or professional), as shown in Figure 2.

Figure 2: Occupation (ANZSCO 2006) by Indigenous status and by part-time versus full-time employment, 2008 (in %)



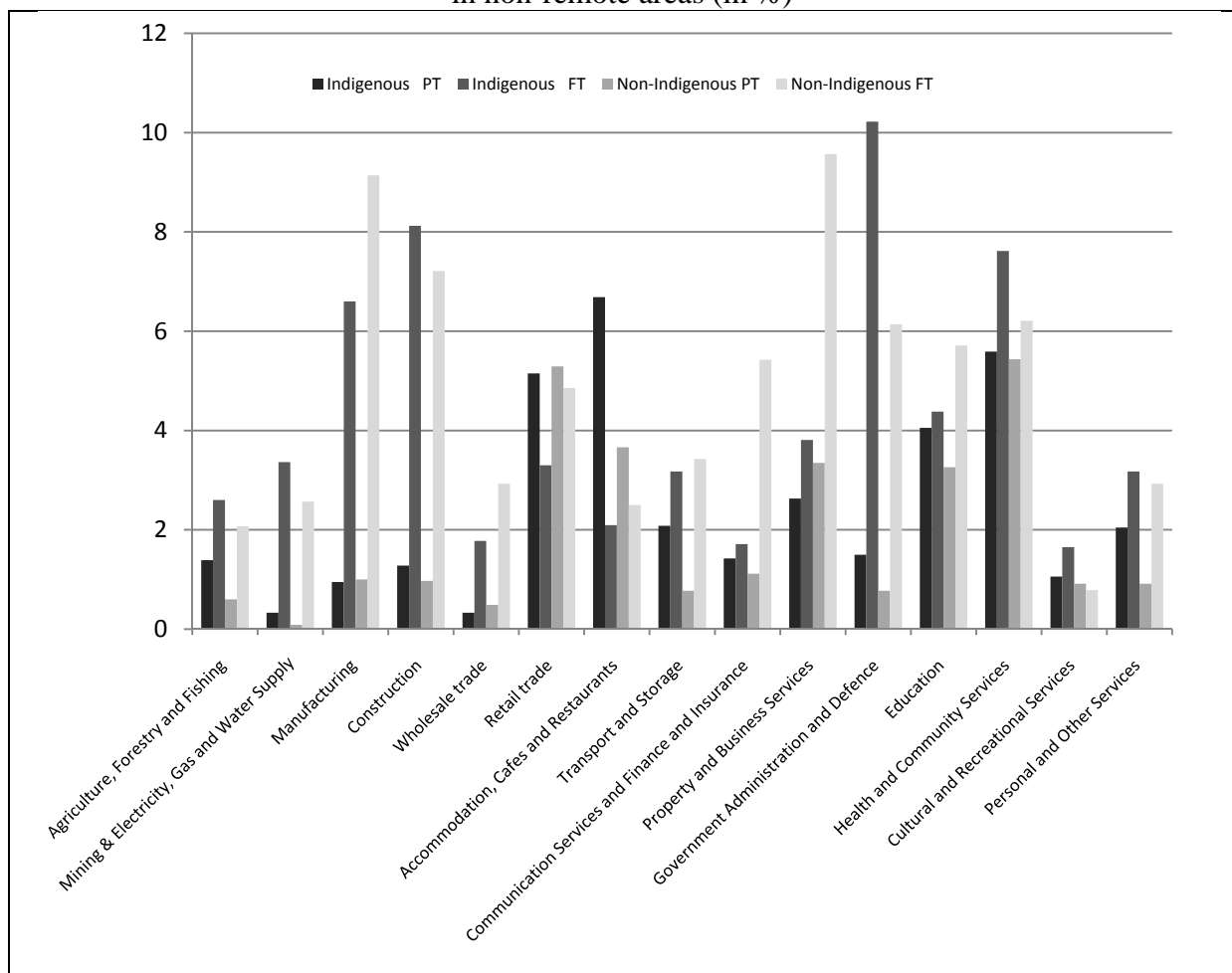
Sources: NATSISS 2008 and HILDA wave 8 (2008)

Figure 2 presents the participation in particular occupations (part-time and full-time) as percentages of the total Indigenous work force and the total non-Indigenous work force respectively. The figure shows a difference in part-time and full-time employment, with Indigenous Australians being relatively more likely to work part-time in nearly all

occupations, except when working as community and personal service workers or as clerical and administrative workers.

Regarding the industry in which Indigenous Australians work, one major difference is apparent in Figure 3. Indigenous Australians are much more likely to work in Government Administration and Defence and are much less likely to work in Property and Business Services than other Australians. In addition, there are some smaller differences, such as, for example, a higher probability of working in Health and Community Services and in Construction by Indigenous Australians.

Figure 3: Industries by Indigenous status and by part-time versus full-time employment, 2008 in non-remote areas (in %)



Sources: NATSISS 2008 and HILDA wave 8 (2008)

Again, comparing part-time and full-time employment in the different industries, some industries clearly have much more part-time employment available than others. For example, the retail trade and accommodation, cafes and restaurants have a higher proportion of part-time workers than full-time workers. Health and community services, and education also have high proportions of part-time workers but full-time workers are just in the majority.

Although Indigenous workers are more likely to work part-time than non-Indigenous workers in most of the industries, this is not true in all industries. For example, Indigenous Australians working in government administration and defence, in health and community services or in cultural and recreational services are probably slightly more likely to work full-time in these industries compared to non-Indigenous Australians.

Overall, the results from Tables 2 to 4 indicate that the NATSI(H/S)S data represent the Indigenous population reasonably adequately, although a number of differences between the Census data and the other data are statistically significant. The differences are, however, mostly small and taking into account that in the multivariate analyses we do not need exact representation of the population but adequate coverage of the different population groups to enable exploration of the relationships of individual and household characteristics with labour force status, the representativeness of the data sets is expected to be sufficient to cover the different subgroups within the Indigenous population.

Tables 5 and 6 present descriptive statistics for a range of other variables that are of interest, and are available in the HILDA and/or NATSI(H/S)S, but not in the Census. Occasionally, there are differences in the way a question is phrased in the NATSI(H/S)S; we have indicated this in the table. We have tried to find comparable variables in the HILDA, but given that these are two completely different data sets, there are going to be larger differences than between the two surveys on Indigenous Australians.

Comparing the principal source of income, Table 5 shows that close to half of all individuals from Indigenous descent are dependent on Government pensions and allowances, compared to around 10 percent for the general population. The total proportions receiving at least some Government pension or allowance are slightly above these figures. Among those who are unemployed, a higher proportion of Indigenous Australians compared to non-Indigenous Australians are found in long-term unemployment. Indigenous households are more likely to include (more) children under 17 and 14 years of age (in 2004 and 2008 respectively) than other Australian households (for whom the number of children under 14 are counted). Given the previous observations regarding income and labour force status of Indigenous Australians, it is not surprising to find that they are much more likely to live in the most disadvantaged areas, as measured by the relevant Socio-Economic Indexes for Areas (SEIFA)

decile.¹⁷ The level of disadvantage is further illustrated by the observation that about half of all Indigenous Australians would have difficulty raising \$2,000 in an emergency situation.

Table 5: Additional labour market variables (not available in Census data)

	NATSIHS 2004	NATSISS 2008	HILDA 2004	HILDA 2008
Principal source of personal income	185,662	271,873	13,078,085	14,045,475
Employee income	40.9	48.0	61.2	64.6
Unincorporated business income	1.9	0.6	3.9	3.5
Government pensions and allowances	49.7	44.1	11.0	9.2
CDEP income	4.2	5.5	N.A.	N.A.
Other income	3.3	1.8	23.9	22.7
Index of Relative Disadvantage (SEIFA deciles)	269,551	311,122	13,074,921	14,044,460
First decile	33.7	34.4	8.9	8.5
Second decile	15.3	18.6	9.5	8.9
Third decile	10.0	9.8	10.7	10.8
Fourth decile	9.7	8.5	7.3	7.3
Fifth decile	8.2	7.7	8.6	9.6
Sixth decile	10.4	6.9	10.5	10.7
Seventh decile	4.1	5.7	12.1	12.4
Eighth decile	5.0	4.5	10.4	10.2
Ninth decile	2.5	3.3	11.5	11.5
Tenth decile	1.2	0.7	10.6	10.0
Whether household members could raise \$2000 in an emergency	264,123	290,568	11,591,483	11,669,858
Could raise \$2,000 within a week	46.5	49.0	N.A.	N.A.
Could not raise \$2,000 within a week	53.5	51.0	N.A.	N.A.
Could easily raise emergency funds (of \$2,000)	N.A.	N.A.	55.0	59.8
Could raise emergency funds, but it would involve some sacrifices	N.A.	N.A.	22.4	21.1
Would have to do something drastic to raise emergency funds	N.A.	N.A.	9.6	8.5
Couldn't raise emergency funds	N.A.	N.A.	13.1	10.7
Duration of unemployment	26,179	33,396	505,491	467,708
Under 4 weeks	11.9	12.4	26.1	31.6
4 weeks and under 13 weeks	23.9	25.4	34.7	33.6
13 weeks and under 26 weeks	19.8	13.2	13.2	14.6
26 weeks and under 52 weeks	12.2	23.1	18.9	12.0
52 weeks and over	32.3	26.0	7.1	8.4
Main difficulty in finding work	N.A.	33,396	505,701	446,887
Have criminal record		2.4	N.A.	N.A.
Don't have driver's licence		6.6	N.A.	N.A.

¹⁷ SEIFA is an index of social advantage and disadvantage, whereby a low SEIFA value indicates lower social and human capital in an area. See Australian Bureau of Statistics (ABS) (2004, 2008) for more information. Given that Indigenous status is also used in the construction of the SEIFA, we do not use it in any of our models.

Table 5: Additional labour market variables (not available in Census data)

	NATSIHS 2004	NATSISS 2008	HILDA 2004	HILDA 2008
No difficulties finding work		11.2	N.A.	N.A.
Own ill health or disability		7.0	9.1	10.4
Employers thought respondent too young		1.7	9.0	13.5
Hours were unsuitable		N.A.	11.4	7.3
Transport problems/ too far to travel		14	10.6	8.7
Did not have the required education		18.6	9.4	8.7
Did not have enough work experience		N.A.	19.8	16.2
Language difficulties		N.A.	3.2	0.8
No jobs in your line of work		14.7	7.0	7.9
Too many applicants for the available jobs		N.A.	8.5	11.3
Just no jobs at all		8.2	7.1	7.3
Difficulties in finding child care		2.9	1.1	1.8
Discrimination against migrant/ ethnic groups		4.4	0.1	0
Other family responsibilities		N.A.	0.2	0
Overqualified		N.A.	0.5	0
Other difficulties		8.3	3.0	6.1
Whether received a Government pension/allowance	281,404	311,122	13,078,085	14,045,475
Received a Government pension or allowance	51.9	50.3	15.9	13.2
Did not receive a Government pension or allowance	48.1	49.8	84.1	86.8

Notes: Entries are percentages in each category. Survey (NATSIHS, NATSISS, HILDA) results are weighted using sampling weights.

Self-assessed health is observed for Indigenous and non-Indigenous Australians, and although it seems to under-represent the big divide in health between the two populations, Table 6 shows higher proportions of Indigenous Australians reporting only fair or poor health (around 6 percentage points more). The difference in unhealthy behaviours is clearer, with a much higher proportion of daily smokers observed in the Indigenous population (a difference of around 30 percentage points) and a high proportion participating in risky alcohol consumption. Furthermore, around half of the Indigenous population indicates to have participated in substance use (such as drugs and petrol sniffing). The latter was only asked of respondents living in non-remote regions.

Table 6: Health and cultural variables (not available in Census data)

	NATSIHS 2004	NATSISS 2008	HILDA 2004	HILDA 2008
Smoker status	246,013	311,122	11,619,777	11,704,285
Current smoker daily	51.4	45.8	20.0	17.4
Current smoker weekly (at least once a week but not daily)	1.7	1.6	2.7	1.8
Current smoker less than weekly	0.5	0.7	1.9	1.9
Ex-smoker	18.8	18.5	24.2	24.2
Never smoked	27.7	33.3	51.2	54.7
Risky alcohol consumption - 1 week avg (2004); 12 months avg (2008)	243,349	307,020	13,078,085	14,045,475
Low risk ^a	33.1	47.6	60.6	61.2
Medium risk	8.5	11.5	13.7	14.0
High risk	8.8	6.6	10.8	10.2
No consumption in the period/ ever	49.7	34.4	14.9	14.6
Whether ever used substances non-remote only	157,210	281,895	N.A.	N.A.
Has used substances	51.2	44.7		
Has not used substances	48.8	55.3		
Self-assessed health status	281,333	311,122	11,625,260	11,758,992
Excellent	14.0	16.8	12.2	12.5
Very good	30.2	28.0	37.7	37.6
Good	34.9	34.4	35.3	35.7
Fair	15.2	14.4	11.9	11.6
Poor	5.7	6.4	2.9	2.7
Health status compared to one year ago	280,482	311,122	11,658,276	11,755,086
Much better now	11.6	10.5	4.9	4.6
A little better now	14.7	16.5	13.5	13.5
About the same	60.0	56.7	70.4	69.6
A bit worse now	11.1	13.2	10.2	11.2
Much worse now	2.6	3.0	1.0	1.1
Whether felt discriminated against in the last 12 months	244,464	311,122	N.A.	N.A.
Felt discriminated against	16.0	28.2		
Did not feel discriminated against	84.1	71.8		
Number of Indigenous persons in household: 0-17 (2004); 0-14 (2008 and in the HILDA)	281,404	311,122	13,078,085	14,045,475
None	31.7	41.9	70.8	72.2
One	20.2	20.5	12.6	12.0
Two	18.7	18.0	11.8	11.0
Three	13.9	9.3	3.7	3.9
Four	6.8	5.1	0.8	0.7
Five or more	8.8	5.2	0.3	0.2
Whether identifies with clan, tribal or language group non-remote only	170,611	311,122	N.A.	N.A.
Identifies with clan, tribal or language group	47.8	62.0		

Table 6: Health and cultural variables (not available in Census data)

	NATSIHS 2004	NATSISS 2008	HILDA 2004	HILDA 2008
Does not identify with clan, tribal or language group	52.2	38.0		
Whether ever removed from natural family	239,396	304,916	N.A.	N.A.
Yes	6.9	8.1		
No	93.1	92.0		

Notes: See Table 5. For the HILDA data, NHMRC guidelines for men and women are used to identify risky alcohol use. For males, this is: low risk = up to 4 standard drinks per day, medium risk = 5 or 6, high risk = 7 or more. For females: low risk = up to 2 standard drinks per day, medium risk = 3 to 4, high risk = 5 or more. The NATSI(H/S)S data use a definition based on the same guidelines but express it in ml of alcohol the individual drinks per day. Note that the reference period to report the average drinking over is different in the various data sets.

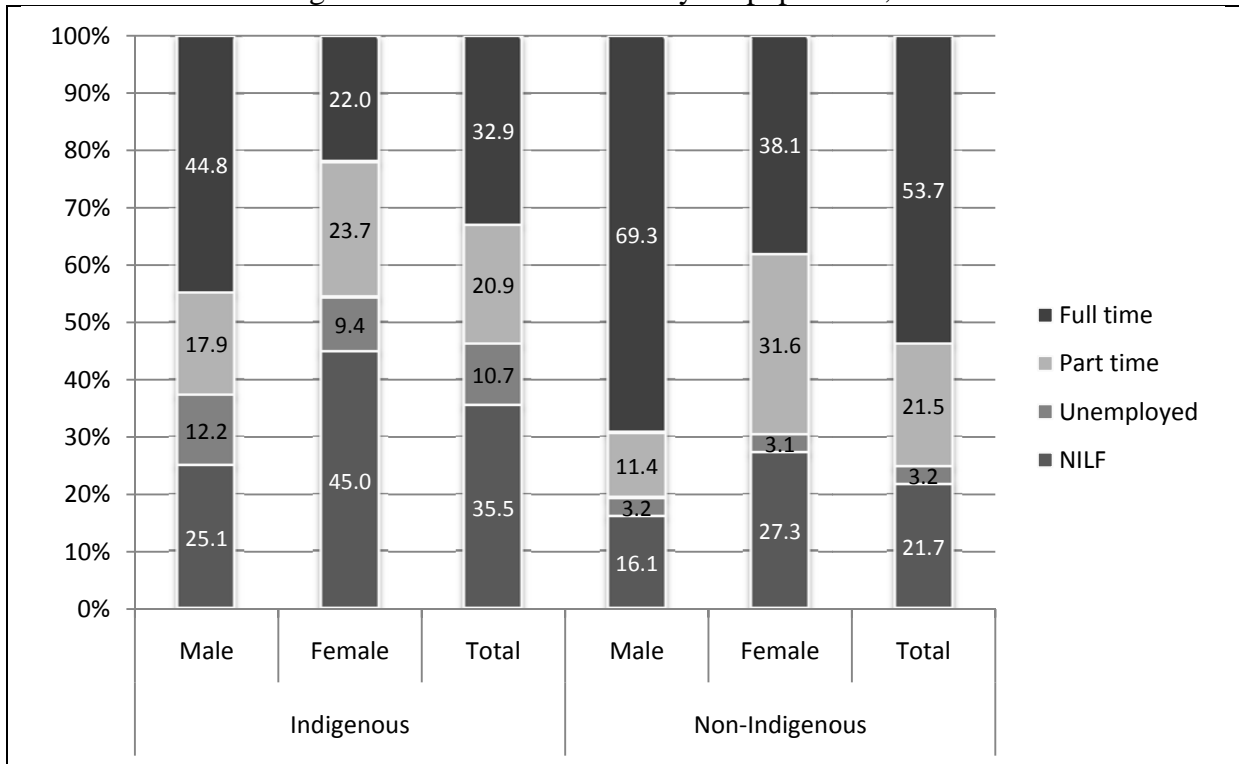
4.2 Labour force status

Using data from NATSISS 2008 and HILDA wave 8 (2008), we provide an overview through a number of graphs of the labour force status of Indigenous and non-Indigenous Australians by a few education and health variables. We distinguish full-time employed, part-time employed, unemployed and out of the labour force.¹⁸

Figure 4 shows the weighted proportions of the different labour force states for both Indigenous and non-Indigenous men and women. For both populations, the proportion of males in full-time employment is higher than that of females, whereas relatively more females are employed part-time. Females are also relatively less likely to be in the labour force, compared to the males in the corresponding populations. Although gender patterns are somewhat similar in the two populations, Indigenous men and women are much less likely to work full time and more likely to be out of the labour force or unemployed than non-Indigenous men and women. Indigenous women are less likely to work part time than other women, whereas Indigenous men are more likely to work part time than other men. For Indigenous men, part-time work is likely to be in place of full-time work, and as such might be seen as a disadvantage, whereas for women part-time work is more common and often by choice.

¹⁸ For the definition of full-time and part-time work, we would have liked to use two alternative definitions: one to allow for comparison with ABS statistics (and DEEWR publications), which uses 35 hours per week as the start of full-time hours and one which uses 30 hours per week as the start of full-time hours. The latter definition is more in line with the international definition of full-time work (as used, for example, by the OECD). Unfortunately, the required information is not available in the NATSI(H/S)S surveys due to the categorisation of hours worked, where all hours between 25 and 34 are grouped together. Therefore, we only use 35 hours as a cut-off point for full-time work.

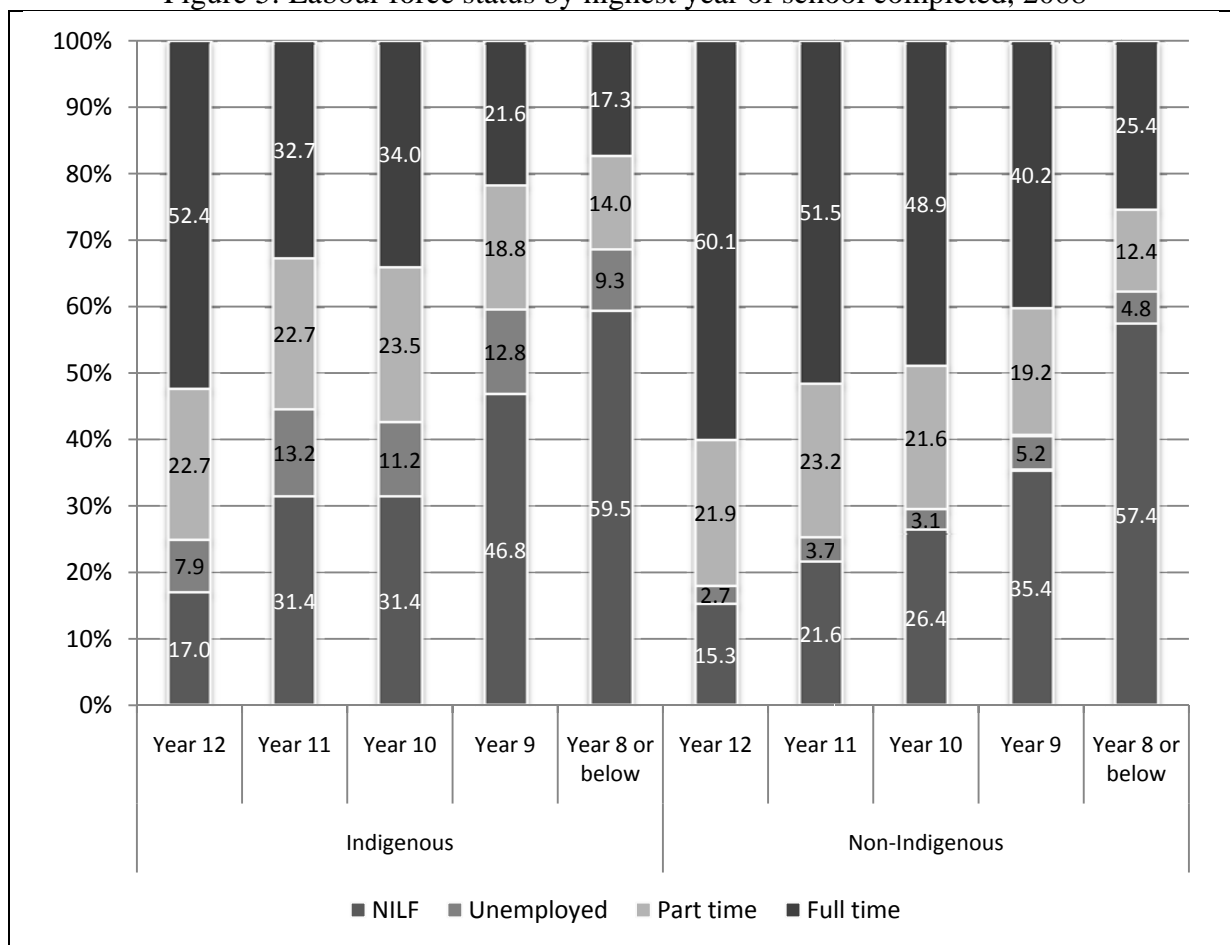
Figure 4: Labour force status by subpopulation, 2008



Sources: NATSISS 2008 and HILDA wave 8 (2008)

Education is an important influencing factor in labour market outcomes. Therefore, we also examine labour force status by the number of years of schooling and the level of post-school qualifications in two graphs. Figure 5 shows that in general those who have completed Year 12 or equivalent are more likely to work full time, more likely to be in the labour force, and less likely to be unemployed, compared to those who completed fewer years of schooling. The proportions working full time or part time generally increase with extra years of schooling, and the proportions not in the labour force decrease with extra years of schooling. Again the patterns are similar between Indigenous and non-Indigenous Australians, but at each education level Indigenous individuals are more likely to be out of the labour force and less likely to be in full-time work than other Australians with the same level of schooling.

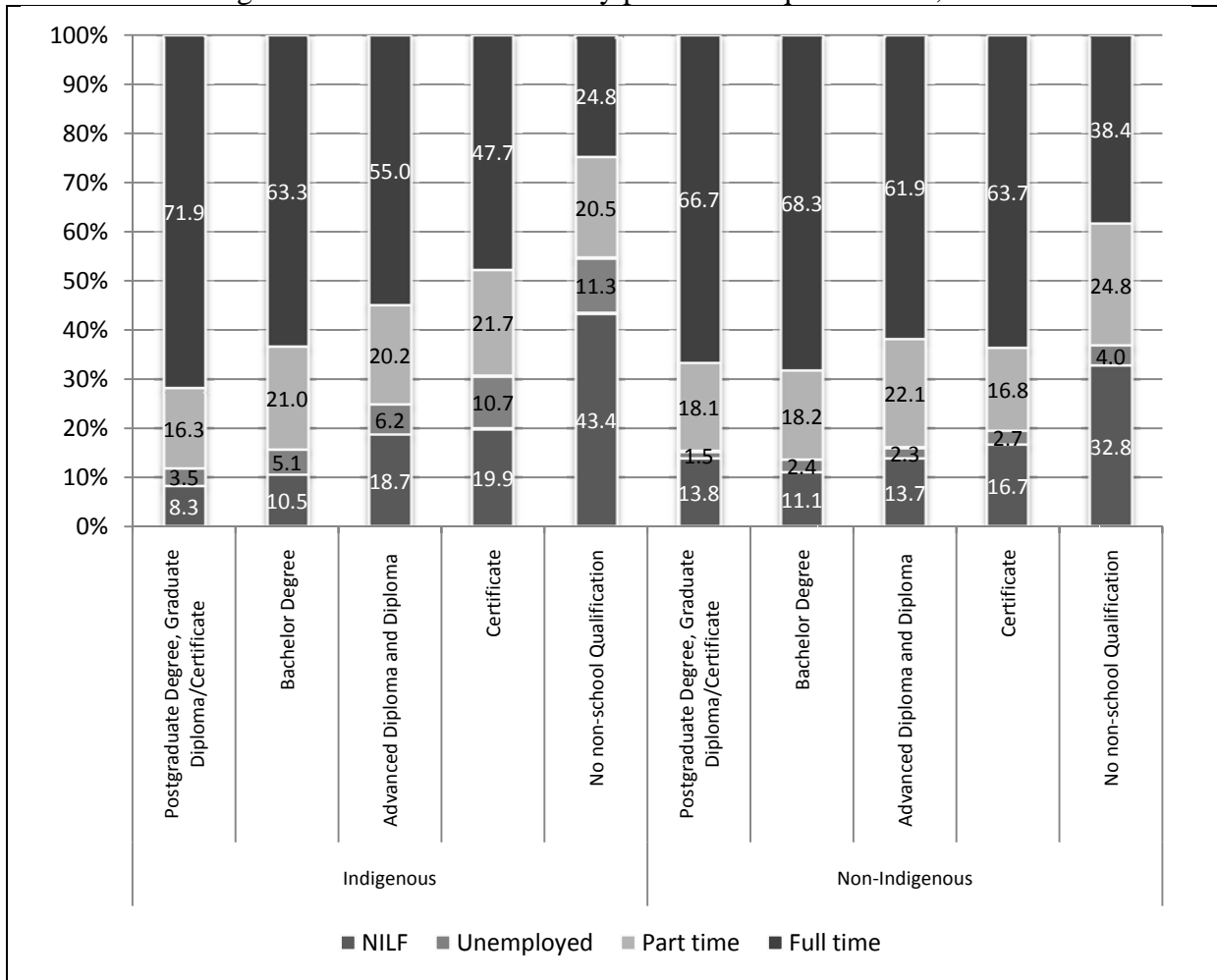
Figure 5: Labour force status by highest year of school completed, 2008



Sources: NATSISS 2008 and HILDA wave 8 (2008)

The distributions by post-school qualifications are shown in Figure 6. For non-Indigenous Australians, the relative proportions in the different labour force states are quite similar for the different types of post-school qualification holders; no clear pattern is visible. However, for Indigenous Australians, the proportion in full-time employment tends to increase with the level of the post-school qualification, and the proportion that is out of the labour force or unemployed tends to decrease with the level of the qualification. Not having any post-school qualifications decreases full-time employment and increases non-participation for Indigenous and non-Indigenous Australians. The gap in labour force participation between Indigenous and other Australians is higher at the lower qualification levels than at the higher qualification levels. Indigenous Australians with a postgraduate degree appear to do even better than non-Indigenous Australians with the same qualifications. However, it should be noted that this is based on the relatively small number of 96 observations for Indigenous Australians. Nevertheless this is an indication of the influence of education.

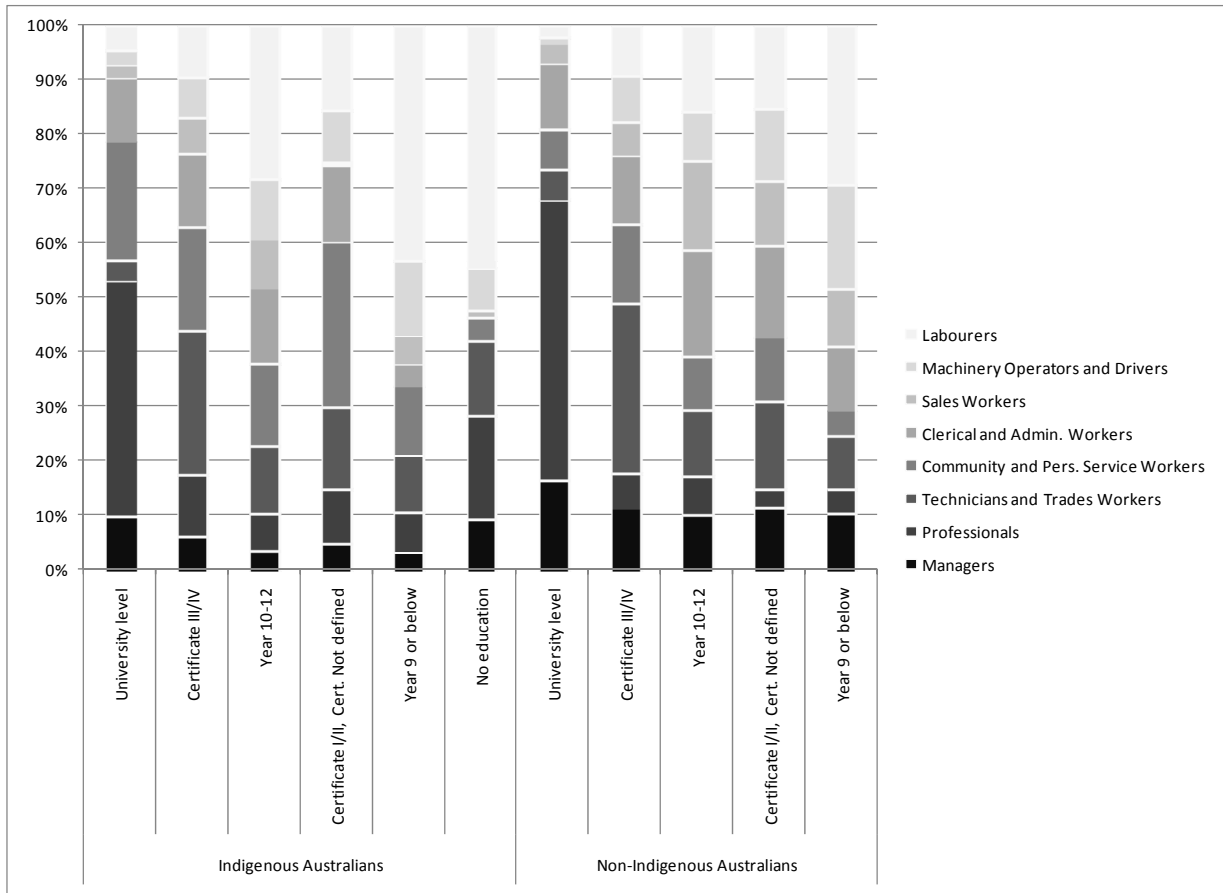
Figure 6: Labour force status by post-school qualification, 2008



Sources: NATSISS 2008 and HILDA wave 8 (2008)

In addition to observing whether someone is employed or not, it is of interest to examine the quality or skill level of employment by highest educational attainment (a measure that combines years of schooling and post-school qualifications). Comparing the most highly educated group of Indigenous and non-Indigenous Australians in Figure 7, we find that given being employed, Indigenous Australians are relatively more likely to be in a low-skilled job and less likely to have a managerial or professional job than other Australians. This is true at all education levels. That is, Indigenous Australians are more likely to work in jobs requiring lower skill levels as similarly educated non-Indigenous Australians.

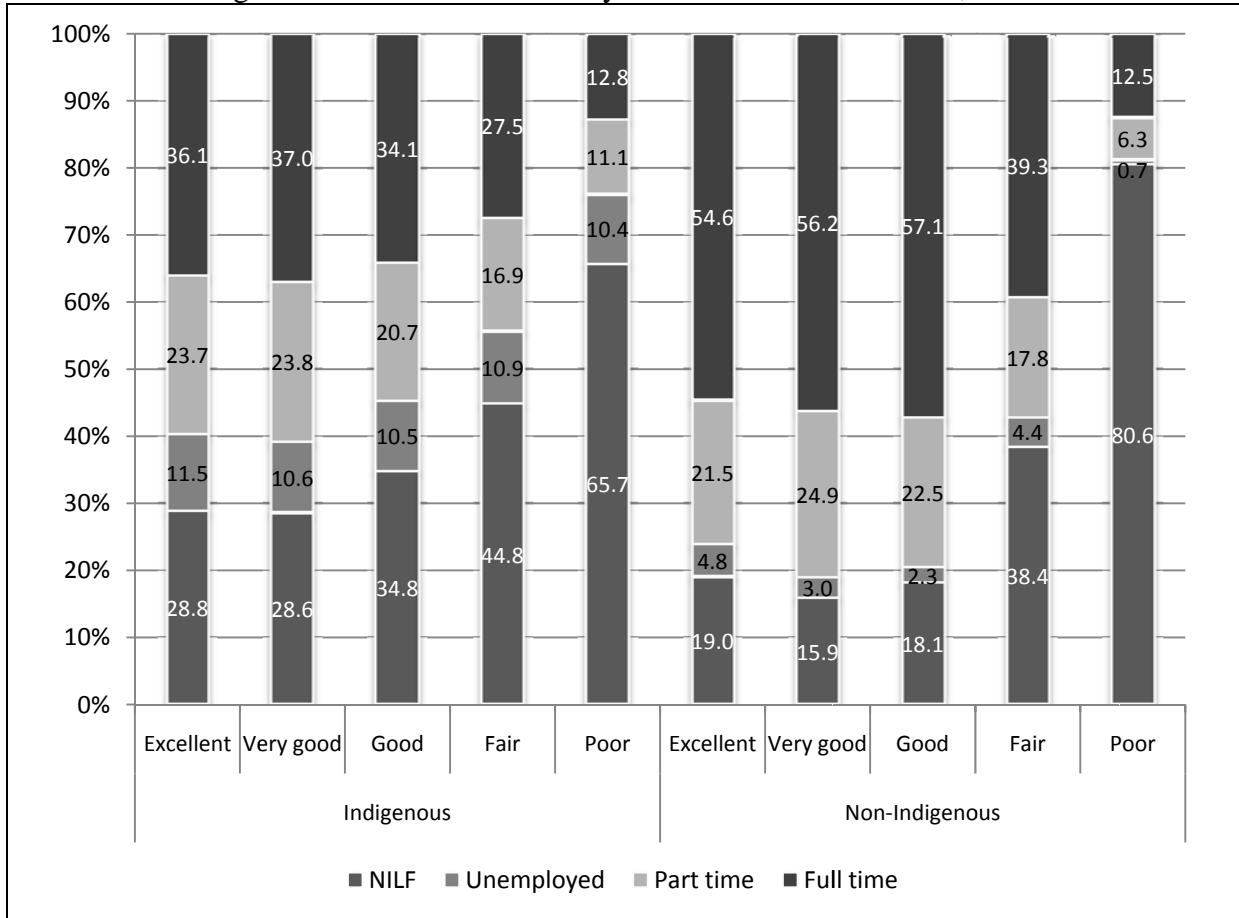
Figure 7: Occupation by highest educational attainment, 2008



Sources: NATSISS 2008 and HILDA wave 8 (2008)

The last breakdown in Figure 8 shows labour force status for Indigenous and non-Indigenous populations by self-assessed health. Among Indigenous Australians whose self-assessed health is ‘Excellent’, ‘Very good’, and ‘Good’, more than one third is employed full-time, whereas for non-Indigenous Australians this proportion is well over 50 percent. Labour force states are fairly similar within the same population for those with ‘Excellent’, ‘Very good’, or ‘Good’ health. Not surprisingly, a very high proportion of those with poor self-assessed health are not in the labour force (65.7 percent for Indigenous; 80.6 percent for non-Indigenous); only 13 percent are in full-time employment (for both). Very few in the non-Indigenous population identify themselves as being unemployed when they have poor health, whereas over 10 percent in the Indigenous population with poor health classify themselves as unemployed.

Figure 8: Labour force status by self-assessed health status, 2008



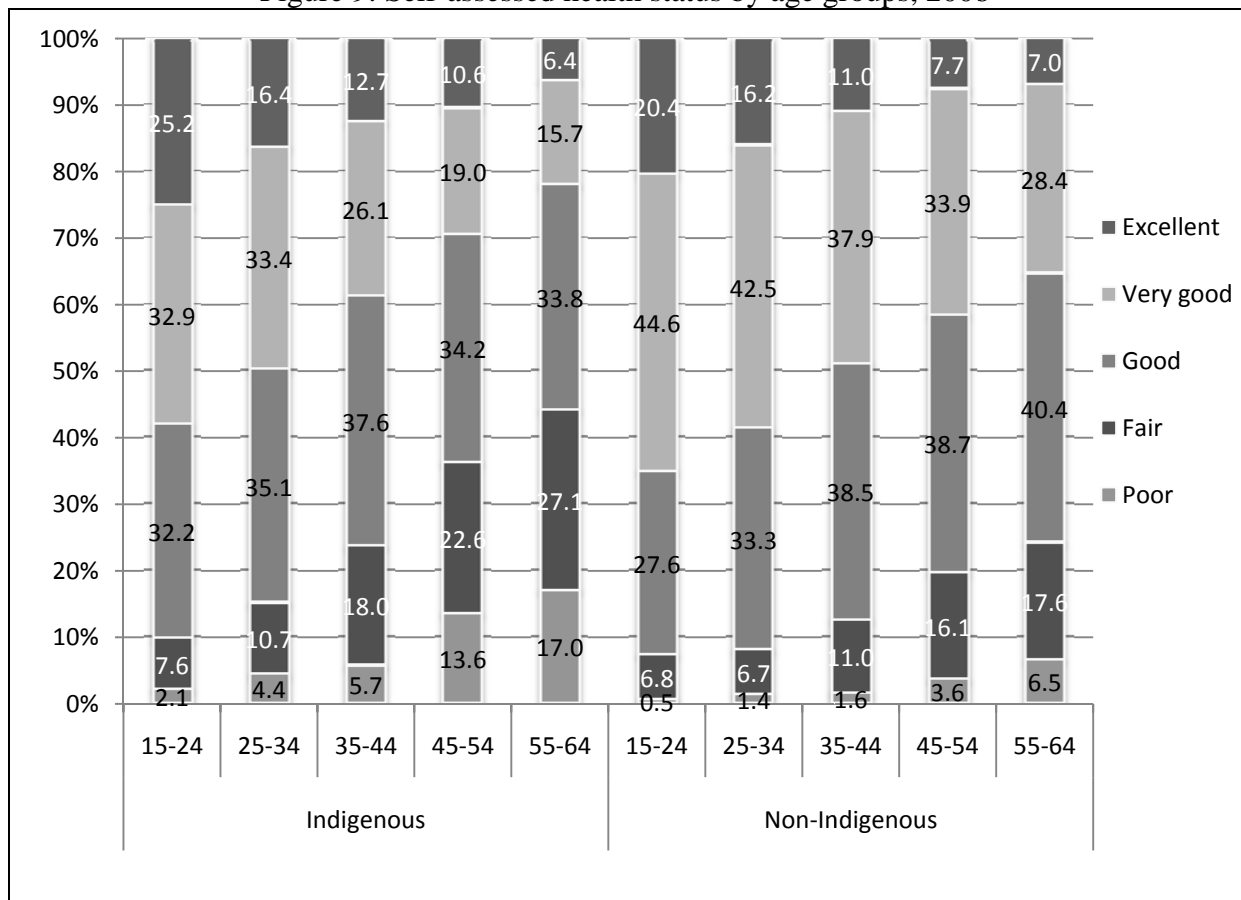
Sources: NATSISS 2008 and HILDA wave 8 (2008)

We have included an additional graph related to health (Figure 9) to show the different distributions of health status by age group for Indigenous and non-Indigenous Australians. Comparing the health status of different age groups in the two populations shows that the health of Indigenous Australians up to 44 years of age is comparable to the health of non-Indigenous Australians who are just over ten years older. However, this health gap seems to suddenly widen, since the 45-54 year old age category in the Indigenous population is much worse off than the 55-64 year old age category in the non-Indigenous population.

The six graphs in this section show that education and health have similar associations with labour force status in the Indigenous and non-Indigenous populations. However, it also shows that for individuals with similar health or education, someone from an Indigenous background generally has poorer labour market outcomes. The only exception appears to be if an Indigenous Australian obtains a postgraduate degree. This (small) group seems to do slightly better than non-Indigenous Australians with a postgraduate degree. In addition it

shows that similar age groups have much poorer health in the Indigenous population, that is it is comparable to non-Indigenous Australians who are at least 10 years older.

Figure 9: Self-assessed health status by age groups, 2008



Sources: NATSISS 2008 and HILDA wave 8 (2008)

4.3 Comparison of characteristics by labour force status

4.3.1 Demographic, geographic and labour market characteristics

Tables 7 to 9 report a descriptive analysis of the demographic, geographic and labour market characteristics of Indigenous and non-Indigenous Australians using the 2008 data by labour force status. Here we discuss only the 2008 results, since the patterns observed in 2004 are very similar (and are reported in Appendix Tables 2 to 5).

Table 7 for Indigenous Australians interviewed in 2008 shows that there are differences in labour force status by the respondent's characteristics. The youngest group of respondents are more likely to be out of the labour force or working part time (and in 2004 to be in unemployment) than others. The oldest group of respondents is also more likely than the other age groups to be out of the labour force, but at the same time, they are much less likely

to be unemployed. Those aged 25 to 54 are more likely to work full time than the other groups, while those aged 35 to 44 are over-represented among those working part time.

Table 7: Demographic statistics for Indigenous Australians by labour force status, 2008

	NILF	Unemployed	Part-time	Full-time	Total
Age	110,310	33,396	64,975	102,442	311,122
Aged 15-24	36.8	48.1	39.0	21.3	33.4
Aged 25-34	19.0	25.9	21.6	25.7	22.5
Aged 35-44	16.0	16.6	20.5	26.8	20.5
Aged 45-54	13.8	8.2	13.7	19.5	15.1
Aged 55-64	14.5	1.3	5.2	6.7	8.6
Marital status (social)	110,310	33,396	64,975	102,442	311,122
Married	37.0	30.1	40.3	61.2	44.9
Not married	63.0	69.9	59.8	38.8	55.1
Sex	110,310	33,396	64,975	102,442	311,122
Male	34.0	54.5	41.0	65.3	48.0
Female	66.0	45.5	59.0	34.7	52.0
Household composition	110,310	33,396	64,975	102,442	311,122
One family household	69.5	75.4	74.2	77.1	73.6
Two and three family households	19.4	14.2	14.4	8.6	14.2
Lone person households	7.0	6.6	6.4	8.0	7.2
Group households	4.2	3.8	5.0	6.3	5.0
Highest year of school completed	110,310	33,396	64,975	102,442	311,122
Year 12 or equivalent	10.2	15.6	23.0	33.7	21.2
Year 11 or equivalent	12.6	17.5	15.5	14.2	14.3
Year 10 or equivalent	27.9	32.7	35.4	32.5	31.5
Year 9 or equivalent	22.7	20.4	15.5	11.3	17.2
Year 8 or below	26.6	13.7	10.6	8.3	15.9
Student status	110,310	33,396	64,975	102,442	311,122
Not attending	78.0	80.4	76.8	84.0	80.0
Full-time	19.2	16.4	17.2	4.5	13.6
Part-time	2.8	3.2	23.2	16.0	6.4
Post-school qualification	16,971	8,600	19,810	47,838	93,218
Postgraduate Degree Level, Graduate Diploma or Certificate	1.7	1.4	2.8	5.1	3.7
Bachelor Degree level	6.6	6.4	11.3	14.1	11.4
Advanced Diploma and Diploma Level	13.7	8.9	12.7	14.3	13.3
Certificate level	78.0	83.3	73.2	66.5	71.6

Source: NATSISS 2008

Notes: Entries are percentages in each category. All results are weighted using sampling weights. Full-time employment is defined as working at least 35 hours a week.

Married individuals are more likely to be working (full time and in 2004 also part time); while men are over-represented among the unemployed and full-time workers, and women among the non-participants and part-time workers. According to expectations, and as already

shown in Section 4.2, education is important: those with less than Year 10 schooling are more likely to be out of the labour force than others, while those with Year 9 to Year 11 schooling are more likely to be unemployed than other groups. Those who finished Year 11 or 12 are more likely to be employed. Similarly, those with a post-school qualification are more likely to be working full time (and also part time in 2004) with this effect being lowest for the lowest level of qualification.

Regarding living circumstances, labour force status is correlated with the tenure type (see Table 8). That is those who are currently purchasing their home are more likely to be working full time. There is no clear pattern with regard to the number of bedrooms available, possibly because that also depends on the household size. Regarding living accommodation, those who live in two- or three-family households are less likely than the other three groups to work full time.

Similarly, there are no clear patterns with regard to the State of residency, since respondents might be more likely to work either more part time or full time in some States, but at the same time, there is also a larger proportion out of the labour force or unemployed. In addition, these latter results for 2008 differ from those for 2004. Those who live in remote areas appear to be less likely to be in full-time employment whereas those who are living in major cities appear more likely to be in full-time employment, but also in unemployment. The distinction between labour force status of those living in remote areas and those living in non-remote areas can be more clearly observed in Figure 10. Part-time employment seems more likely in remote regions, possibly due to the CDEP program. To confirm whether this is indeed the case, we present an alternative classification of labour force status, in which participation in the CDEP program is categorised as unemployment given its ‘workfare’ nature (see Figure 11). Only those whose main job is part of the CDEP program are reclassified as unemployed. The two figures show that CDEP plays an important role in remote Australia and provides mostly part-time employment to its Indigenous participants. Unemployment increases with 19.3 percentage points, with 5 percentage points being from full-time CDEP-related employment, and 14.3 percentage points from part-time CDEP-related employment. After this reclassification, employment opportunities look much poorer in remote regions, as expected.

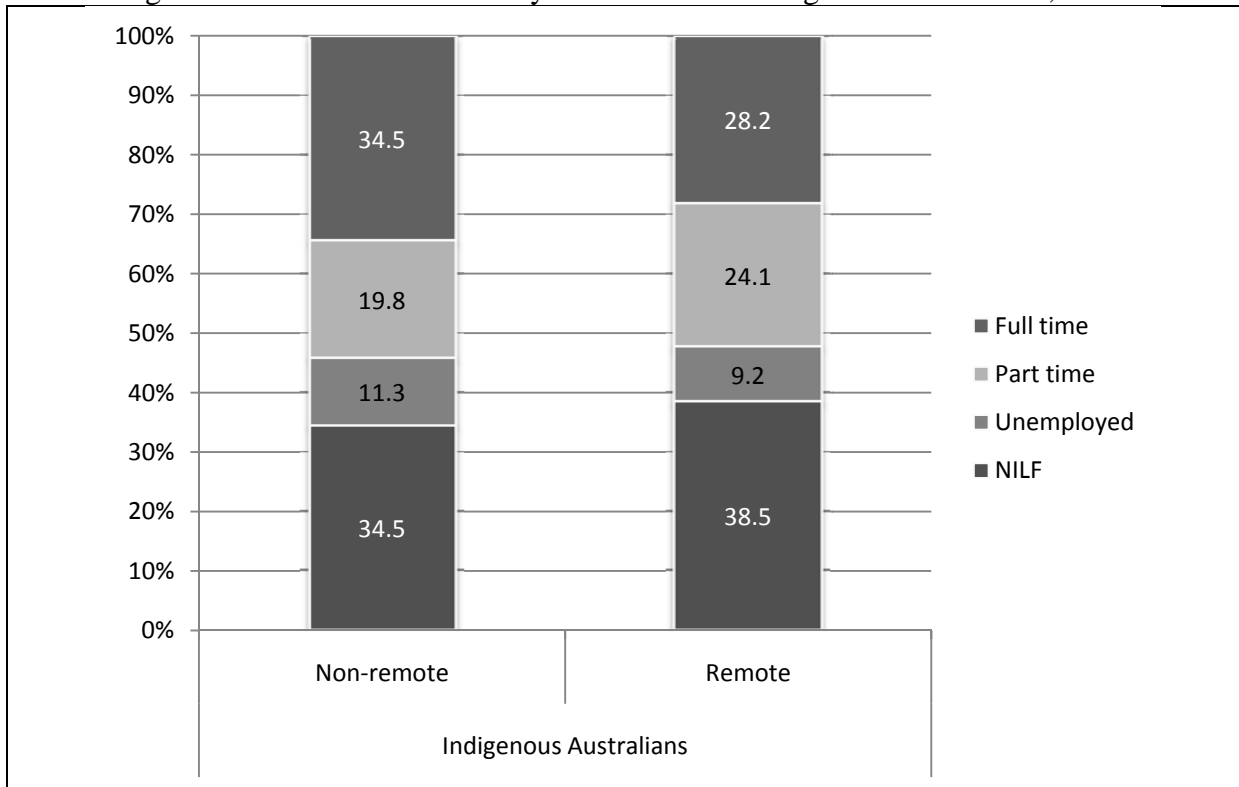
Table 8: Residency statistics for Indigenous Australians by labour force status, 2008

	NILF	Unemployed	Part-time	Full-time	Total
Place of residence	110,310	33,396	64,975	102,442	311,122
New South Wales	32.6	34.1	24.5	26.9	29.2
Victoria	6.3	6.7	6.2	7.3	6.6
Queensland	24.8	23.4	31.3	29.9	27.7
South Australia	5.5	6.3	5.9	5.0	5.5
Western Australia	12.7	14.1	14.4	13.7	13.5
Northern Territory	14.0	12.1	13.2	11.4	12.8
Tasmania/ Australian Capital Territory	4.1	3.4	4.6	5.8	4.7
ASGC remoteness area	110,310	33,396	64,975	102,442	311,122
NSW major cities	11.8	16.0	9.9	13.5	12.4
NSW inner regional	10.4	11.9	9.2	8.1	9.6
NSW outer regional	8.6	4.7	4.1	3.7	5.6
Vic total	6.3	6.7	6.2	7.3	6.6
Qld major cities	4.8	7.6	10.8	10.3	8.2
Qld inner regional	5.8	4.7	6.2	4.7	5.4
Qld outer regional	8.0	6.8	8.1	9.0	8.2
Qld remote/very remote	6.3	4.3	6.3	5.9	5.9
WA non-remote	7.4	10.1	6.6	8.5	7.9
WA remote/very remote	5.3	4.0	7.8	5.2	5.7
NT remote/very remote	12.0	10.2	11.7	7.5	10.3
Balance of Australia - non-remote	10.4	10.5	10.5	13.8	11.5
Balance of Australia - (very) remote	3.1	2.6	2.8	2.5	2.8
Number of bedrooms	109,731	33,086	64,394	102,033	309,245
1 bedroom	2.4	4.0	2.8	2.2	2.6
2 bedrooms	13.2	15.9	12.3	12.9	13.2
3 bedrooms	56.6	45.4	54.9	50.9	53.2
4 bedrooms	22.9	28.2	23.2	27.3	25.0
5 or more bedrooms	5.0	6.5	6.8	6.7	6.1
Tenure type	109,759	33,086	64,394	102,153	309,392
Owned without a mortgage	7.1	4.4	7.3	9.0	7.5
Owned with a mortgage	10.8	14.6	21.9	35.2	21.6
Rented	80.9	79.9	68.7	54.0	69.4
Other	1.2	1.1	2.2	1.9	1.6

Source: NATSISS 2008

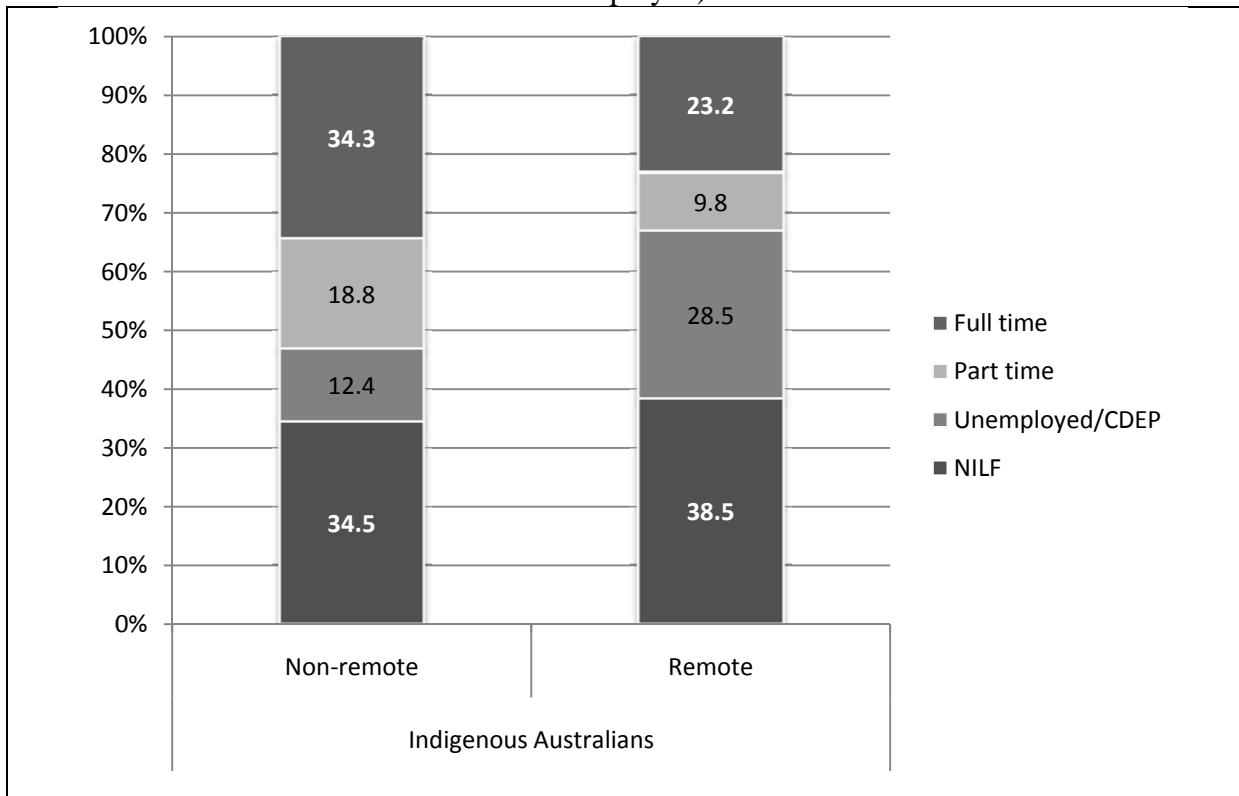
Note: See Table 7

Figure 10: Labour force status by remoteness for Indigenous Australians, 2008



Source: NATSISS 2008

Figure 11: Labour force status by remoteness for Indigenous Australians, 2008 (CDEP as unemployed)



Source: NATSISS 2008

Naturally, those with higher individual and household incomes are more likely to be working full time, while lower household incomes are associated with respondents who were out of the labour force or unemployed (see Table 9). Finally, exploring the type of employment for those who are working part time or full time, we find that the proportion of full-time workers is somewhat higher in the public sector and lower for CDEP participants. Respondents working in Services, Retail Trade, Accommodation, Cafes and Restaurants are more likely to be working part time. The higher skilled occupations are more likely to be in full-time jobs.

Table 9: Labour market statistics for Indigenous Australians by labour force status, 2008

	NILF	Unemployed	Part-time	Full-time	Total
Individual income (weekly)	89,145	25,611	60,765	95,738	271,259
\$1-\$149	14.8	20.9	11.4	0.8	9.7
\$150-\$249	29.3	45.1	18.3	1.6	18.5
\$250-\$399	33.8	20.8	21.9	4.5	19.5
\$400-\$599	15.2	9.6	21.8	12.9	15.3
\$600-\$799	5.8	2.7	15.7	23.4	13.9
\$800-\$999	0.9	0.4	4.9	20.4	8.6
\$1,000-\$1,299	0.1	0.5	3.2	19.3	7.6
\$1,300-\$1,599	0.1	0.0	2.4	9.5	3.9
\$1,600-\$1,999	0.1	0.0	0.4	3.2	1.3
\$2,000 or more	0.0	0.0	0.1	4.4	1.6
Household income (weekly)	88,146	26,768	50,293	81,868	247,074
\$1-\$149	1.4	0.7	0.2	0.1	0.7
\$150-\$249	4.5	6.9	1.4	0.2	2.7
\$250-\$349	7.8	7.3	3.3	0.2	4.3
\$350-\$499	14.8	13.8	7.0	1.4	8.6
\$500-\$649	15.2	14.7	7.4	2.3	9.3
\$650-\$799	11.3	10.9	10.5	5.2	9.1
\$800-\$999	11.7	13.1	12.8	10.9	11.8
\$1,000-\$1,199	9.9	11.6	11.5	11.4	10.9
\$1,200-\$1,399	6.8	4.6	8.1	11.4	8.4
\$1,400-\$1,699	6.4	7.4	13.9	14.0	10.6
\$1,700-\$1,999	3.1	3.9	6.0	11.2	6.5
\$2,000-\$2,499	3.7	3.6	7.8	14.3	8.0
\$2,500-\$2,999	2.4	1.0	5.8	9.5	5.3
\$3,000-\$3,499	0.9	0.2	3.7	3.4	2.2
\$3,500 or more	0.1	0.5	0.8	4.7	1.8
Household income (weekly): equivalised	88,146	26,768	50,293	81,868	247,074
\$1-\$149	4.8	4.2	1.7	0.3	2.6
\$150-\$249	17.8	21.8	6.7	1.3	10.5
\$250-\$399	46.9	42.5	25.5	9.0	29.5
\$400-\$599	18.7	18.0	27.1	20.7	21.0
\$600-\$799	6.8	8.9	18.6	22.3	14.6
\$800-\$999	2.3	2.3	9.7	17.0	8.7

Table 9: Labour market statistics for Indigenous Australians by labour force status, 2008

	NILF	Unemployed	Part-time	Full-time	Total
\$1,000-\$1,299	1.8	1.6	6.1	17.0	7.7
\$1,300-\$1,599	0.5	0.4	2.2	5.8	2.6
\$1,600-\$1,999	0.3	0.2	2.2	3.8	1.8
\$2,000 or more	0.0	0.0	0.4	2.8	1.0
Hours worked (weekly)	N.A.	N.A.	64,975	101,909	166,884
1-15 hours			34.3	N.A.	13.4
16-24 hours			32.2	N.A.	12.6
25-34 hours			33.5	N.A.	13.0
35-39 hours			N.A.	37.2	22.7
40 hours			N.A.	27.8	17.0
41-49 hours			N.A.	14.4	8.8*
50 hours or more			N.A.	20.6	12.58*
CDEP participation	N.A.	N.A.	64,975	102,442	167,416
CDEP participant			20.6	4.1	10.5
Not CDEP participant			79.4	95.9	89.5
Industry of employment	N.A.	N.A.	46,857	81,415	128,272
Agriculture, Forestry and Fishing			3.8	4.1	4.0
Mining and Electricity, Gas and Water Supply			0.9	5.3	3.7
Manufacturing			2.6	10.4	7.5
Construction			3.5	12.8	9.4
Wholesale trade			0.9	2.8	2.1
Retail trade			14.1	5.2	8.5
Accommodation, Cafes and Restaurants			18.3	3.3	8.8
Transport and Storage			5.7	5.0	5.3
Communication Services and Finance and Insurance			3.9	2.7	3.1
Property and Business Services			7.2	6.0	6.4
Government Administration and Defence			4.1	16.1	11.7
Education			11.1	6.9	8.5
Health and Community Services			15.3	12.0	13.2
Cultural and Recreational Services			2.9	2.6	2.7
Personal and Other Services			5.6	5.0	5.2
Occupation (ANZSCO 2006)	N.A.	N.A.	64,715	101,998	166,713
Managers			2.3	6.7	5.0
Professionals			12.0	13.0	12.6
Technicians and Trades Workers			9.1	16.2	13.4
Community and Personal Service Workers			20.7	14.4	16.8
Clerical and Administrative Workers			7.3	14.9	12.0
Sales workers			11.9	3.3	6.6
Machinery Operators and Drivers			3.9	13.4	9.7
Labourers			32.8	18.2	23.9

Source: NATSISS 2008

Notes: See Table 7. Industry of main job is reported in non-remote areas only.

Tables 10 to 12 produce comparable results for non-Indigenous Australians. Again we only discuss the 2008 results. Table 10 shows that the youngest group of respondents are more likely to be in unemployment or in part-time employment (and in 2008 to be out of the labour force) than others. The oldest group of respondents is more likely than the other age groups to be out of the labour force. Those aged 25 to 54 are more likely to work full time than the youngest and oldest age groups. These patterns are very similar to those found for the Indigenous population.

Table 10: Demographic statistics for non-Indigenous Australians by labour force status, 2008

	NILF	Unemployed	Part-time	Full-time	Total
Age	3,043,570	443,276	3,016,459	7,542,169	14,045,475
Aged 15-24	23.1	44.8	30.6	14.6	20.8
Aged 25-34	13.3	18.6	14.9	25.5	20.3
Aged 35-44	14.1	19.7	20.9	24.5	21.3
Aged 45-54	16.7	8.2	19.5	23.8	20.9
Aged 55-64	32.9	8.8	14.1	11.6	16.7
Marital status (social)	3,043,570	443,276	3,016,459	7,542,169	14,045,475
Married	54.7	34.4	52.9	61.9	57.6
Not married	45.3	65.6	47.1	38.1	42.5
Sex	3,043,570	443,276	3,016,459	7,542,169	14,045,475
Male	37.2	51.4	26.5	64.6	50.1
Female	62.8	48.6	73.5	35.4	49.9
Household composition	3,043,570	443,276	3,016,459	7,542,169	14,045,475
One family household	88.7	81.9	91.3	84.2	86.6
Two and three family households	3.0	4.2	1.2	2.5	2.4
Lone person households	7.2	11.7	6.6	11.8	9.7
Group households	1.2	2.2	1.0	1.4	1.3
Highest year of school completed	3,039,046	443,276	3,013,946	7,536,266	14,032,534
Year 12 or equivalent	37.2	44.9	53.6	58.8	52.6
Year 11 or equivalent	13.1	15.4	14.3	12.7	13.2
Year 10 or equivalent	29.9	24.1	24.7	22.3	24.5
Year 9 or equivalent	9.8	9.8	5.3	4.5	6.0
Year 8 or below	10.0	5.8	2.2	1.8	3.8
Student status	3,043,570	443,276	3,016,459	7,542,169	14,045,475
Not attending	81.1	79.6	78.6	98.5	89.9
Full-time	18.9	20.4	21.4	1.5	10.2
Part-time	N.A.	N.A.	N.A.	N.A.	N.A.
Post-school qualification	1,301,922	228,597	1,695,587	5,500,810	8,726,916
Postgrad. Degree, Grad. Dipl. or Cert.	13.6	8.3	13.7	15.5	14.7
Bachelor Degree level	17.1	21.0	21.6	24.9	23.0
Advanced Diploma and Diploma Level	13.0	12.3	16.0	13.8	14.1
Certificate level	56.4	58.4	48.8	45.7	48.2

Source: HILDA wave 8 (2008)

Note: See Table 7

Married individuals are more likely to be working full time than unmarried individuals, while men are over-represented among the unemployed (slightly only) and full-time workers, and women among the non-participants and part-time workers. According to expectations, education is important: those with less than Year 11 schooling are more likely to be out of the labour force or unemployed than other groups (in 2008, those with Year 10 are only more likely to be out of the labour force). Those who finished Year 11 are more likely to be working part time (and in 2008, also to be unemployed) and those who finished Year 12 are more likely to be working part time and full time. Individuals who obtained a post-school qualification are more likely to be working full time with this effect being lowest for the two lowest levels of qualification. And again, these patterns are similar to those found for the Indigenous population.

Regarding living circumstances, we observe similar patterns as for the Indigenous population. Labour force status is correlated with the tenure type (see Table 11), with home mortgage holders more likely to be working full time or part time. There is no clear pattern with regard to the number of bedrooms available, possibly because that also depends on the household size. Similarly, there are no clear patterns with regard to the State of residency, since respondents might be more likely to work either more part time or full time in some States, but at the same time, there is also often a larger proportion out of the labour force or unemployed. In addition the results for 2008 differ from those for 2004. The number of respondents living in remote and very remote areas is too small to compare labour force status with those living in non-remote areas. Those who live in one-family households are less likely than the other three groups to be unemployed.

Finally, exploring the type of employment, we find that the proportion of full-time workers is somewhat higher in the public sector (see Table 12). Respondents working in Retail Trade; Accommodation, Cafes and Restaurants; Education; Health and Community Services and Cultural and Recreational Services are more likely to be working part time. The higher skilled occupations (as well as Machinery Operators and Drivers) are more likely to be in full-time jobs. Naturally, those with higher individual and household incomes are more likely to be working full time, while lower individual incomes are associated with respondents who are out of the labour force, unemployed or working part time. Lower household incomes are associated with respondents who are out of the labour force or unemployed. These observations are similar to those made for the Indigenous population.

Table 11: Residency statistics for non-Indigenous Australians by labour force status, 2008

	NILF	Unemployed	Part-time	Full-time	Total
ASGC remoteness area	3,043,570	443,276	3,016,459	7,542,169	14,045,475
NSW major cities	25.6	28.8	19.3	26.0	24.6
NSW inner regional	7.3	8.4	6.3	5.2	6.0
NSW outer regional	2.6	1.1	2.5	1.6	2.0
Vic total	25.2	27.0	26.8	24.1	25.0
Qld major cities	8.0	7.9	10.4	11.6	10.5
Qld inner regional	6.4	6.0	6.5	5.4	5.9
Qld outer regional	3.9	0.9	2.4	3.4	3.2
Qld remote/very remote	0.4	0.3	0.5	0.5	0.5
WA non-remote	8.3	7.2	11.0	9.7	9.6
WA remote/very remote	0.5	0.0	0.5	0.8	0.7
NT remote/very remote	0.1	0.0	0.1	0.1	0.1
Balance of Australia - Non-remote	11.7	12.4	13.8	11.2	11.9
Balance of Australia - Remote/Very remote	0.1	0.0	0.2	0.3	0.2
Place of residence	3043570.0	443276.3	3016458.9	7542169.0	14,045,475
New South Wales	35.5	38.3	28.1	32.9	32.6
Victoria	25.2	27.0	26.8	24.1	25.0
Queensland	18.7	15.1	19.6	20.9	20.0
South Australia	7.2	8.4	8.2	6.9	7.3
Western Australia	8.8	7.2	11.5	10.6	10.3
Northern territory	0.5	0.1	0.9	1.1	0.9
Tasmania/ Australian Capital Territory	4.2	3.9	4.9	3.5	4.0
Number of bedrooms	3,042,791	434,077	3,014,825	7,540,510	14,032,203
None	0.2	0.5	0.4	0.1	0.2
1 bedroom	2.4	6.7	1.8	3.2	2.9
2 bedrooms	12.6	12.1	9.8	12.9	12.1
3 bedrooms	44.2	41.8	38.6	39.9	40.6
4 bedrooms	32.2	29.1	37.9	34.1	34.3
5 or more bedrooms	8.5	9.8	11.6	9.8	9.9
Tenure type	3,041,010	443,276	3,013,085	7,527,685	14,025,057
Owned without a mortgage	15.5	8.0	10.7	6.9	9.6
Owned with a mortgage	52.5	47.9	65.2	66.1	62.4
Rented	29.8	41.7	21.9	24.8	25.8
Other	2.2	2.4	2.1	2.1	2.2

Source: HILDA wave 8 (2008)

Note: See Table 7

Table 12: Descriptive statistics for non-Indigenous Australians by labour force status, 2008

	NILF	Unemployed	Part-time	Full-time	Total
Individual income (weekly)	2,609,457	371,495	2,928,950	7,441,872	13,351,775
\$1-\$149	24.5	24.2	16.9	2.0	10.3
\$150-\$249	23.1	20.4	11.3	2.4	8.9
\$250-\$399	22.8	19.0	16.4	4.1	10.9
\$400-\$599	12.5	15.5	22.5	7.6	12.0
\$600-\$799	5.2	9.3	13.6	13.7	11.9
\$800-\$999	4.4	3.9	7.5	16.4	11.7
\$1,000-\$1,299	3.3	2.7	5.3	20.0	13.0
\$1,300-\$1,599	1.5	1.3	2.6	13.9	8.7
\$1,600-\$1,999	1.0	1.2	1.8	8.9	5.6
\$2,000 or more	1.7	2.6	2.1	11.0	7.0
Household income (weekly)	3,023,289	439,871	2,995,685	7,518,120	13,976,964
\$1-\$149	1.1	1.8	0.6	0.4	0.6
\$150-\$249	2.5	3.8	0.7	0.5	1.1
\$250-\$349	4.5	2.4	1.2	0.5	1.6
\$350-\$499	7.0	4.7	3.2	1.3	3.1
\$500-\$649	9.0	10.1	4.3	1.5	4.0
\$650-\$799	5.9	7.9	5.1	3.2	4.3
\$800-\$999	10.6	14.0	7.8	5.8	7.5
\$1,000-\$1,199	7.9	8.1	6.3	6.1	6.6
\$1,200-\$1,399	6.9	7.5	8.9	6.7	7.3
\$1,400-\$1,699	11.5	7.4	12.5	12.0	11.9
\$1,700-\$1,999	8.4	7.8	10.9	12.1	10.9
\$2,000-\$2,499	9.4	10.5	15.2	16.1	14.3
\$2,500-\$2,999	5.2	5.0	7.9	11.9	9.4
\$3,000-\$3,499	4.7	3.9	5.3	8.5	6.9
\$3,500 or more	5.5	5.3	10.2	13.4	10.8
Hours worked (weekly)	N.A.	N.A.	2,831,426	7,385,043	10,216,469
1-15 hours			38.8	N.A.	10.8
16-24 hours			27.9	N.A.	7.7
25-34 hours			33.3	N.A.	9.2
35-39 hours			N.A.	25.8	18.7
40 hours			N.A.	25.1	18.1
41-49 hours			N.A.	21.2	15.3
50 hours or more			N.A.	27.9	20.2
Sector (public/private)	N.A.	N.A.	3,006,014	7,538,169	10,544,183
Public sector			19.2	21.7	21.0
Private sector			80.8	78.3	79.0
Industry of employment	N.A.	N.A.	3,012,199	7,518,691	10,530,890
Agriculture, Forestry and Fishing			2.1	2.9	2.6
Mining and Electricity, Gas and Water Supply			0.3	3.6	2.7
Manufacturing			3.5	12.8	10.1
Construction			3.4	10.1	8.1

Table 12: Descriptive statistics for non-Indigenous Australians by labour force status, 2008

	NILF	Unemployed	Part-time	Full-time	Total
Wholesale trade			1.7	4.1	3.4
Retail trade			18.5	6.8	10.2
Accommodation, Cafes and Restaurants			12.8	3.5	6.1
Transport and Storage			2.7	4.8	4.2
Communication Services, Finance and Insurance			3.9	7.6	6.6
Property and Business Services			11.7	13.4	12.9
Government Admin. and Defence			2.7	8.6	6.9
Education			11.4	8.0	9.0
Health and Community Services			19.0	8.7	11.6
Cultural and Recreational Services			3.2	1.1	1.7
Personal and Other Services			3.2	4.1	3.8
Occupation (ANZSCO 2006)			3,016,459	7,540,764	10,557,223
Managers			5.5	15.7	12.8
Professionals			18.6	24.7	23.0
Technicians and Trades Workers			5.4	17.2	13.9
Community and Pers. Service Workers			17.6	6.9	10.0
Clerical and Administrative Workers			17.3	14.2	15.1
Sales Workers			19.5	5.0	9.2
Machinery Operators and Drivers			2.7	8.0	6.5
Labourers			13.5	8.3	9.8

Source: HILDA wave 8 (2008)

Note: See Table 7

The overall conclusion to draw from this section is that the observed associations of characteristics with labour force status are very similar in the Indigenous and non-Indigenous populations. This is despite the fact that the proportion in full-time employment is much lower and the proportion out of the labour force or in unemployment is much higher for Indigenous Australians compared to non-Indigenous Australians. This seems to indicate that similar factors are going to influence labour force status in the two populations.

4.3.2 *Health and social capital*

In addition to the general individual and household characteristics such as education level attained, occupation and household income, we also compare health, the health-related behaviour of risky alcohol consumption and variables aimed at measuring social capital across labour force status for the two population groups for 2008 (information for 2004 is reported in Appendix Table 4 and Appendix Table 5). This information is presented in Table 13 and Table 14.

Table 13: Health and social capital variables by labour force status, NATSISS 2008

	NILF	Unemployed	Part-time	Full-time	Total
Risky alcohol consumption - 12 months avg (2008)	108,855	33,255	64,558	100,353	307,020
Low risk	36.6	48.1	50.4	57.8	47.6
Medium risk	9.1	12.3	11.7	13.8	11.5
High risk	6.8	6.2	6.6	6.4	6.6
Has not consumed in the period/ Never consumed	47.8	33.4	31.4	22.1	34.4
Whether ever used substances	98,056	30,351	59,115	94,374	281,895
Has used substances	38.6	50.4	42.4	50.7	44.7
Has not used substances	61.4	49.6	57.6	49.3	55.3
Whether identifies with clan tribal or language group	110,310	33,396	64,975	102,442	311,122
Identifies with clan, tribal or language group	60.3	61.9	59.9	65.3	62.0
Does not identify with clan, tribal or language group	39.7	38.2	40.1	34.7	38.0
Self-assessed health status	110,310	33,396	64,975	102,442	311,122
Excellent	13.7	18.0	19.1	18.4	16.8
Very good	22.6	27.8	31.9	31.5	28.0
Good	33.8	33.6	34.0	35.6	34.4
Fair	18.2	14.5	11.6	12.0	14.4
Poor	11.8	6.2	3.4	2.5	6.4
Whether participated in sporting social or community activities in last 3 months	110,310	33,396	64,975	102,442	311,122
Participated in sport/social/community	84.4	88.9	91.3	91.9	88.8
Did not participate in sport/social/community	15.6	11.1	8.7	8.2	11.2
Whether participated in sporting social or community activities in last 12 months	110,310	33,396	64,975	102,442	311,122
Participated in sport/social/community	89.7	92.9	93.6	95.7	92.8
Did not participate in sport/social/community	10.3	7.1	6.5	4.4	7.2
Frequency of any contact with family or friends outside household	110,120	33,396	64,954	102,442	310,912
Everyday	65.0	61.6	64.4	55.2	61.3
At least once a week	28.4	33.7	30.0	39.4	32.9
At least once a month	4.2	3.2	4.3	4.1	4.1
At least once in last 3 months	1.5	1.1	0.7	1.0	1.1
No recent contact/no family and no friends	1.0	0.5	0.6	0.3	0.6
Number of family members outside household can confide in	110,120	33,396	64,954	102,442	310,912
1 to 2 family members	36.6	37.0	33.3	36.0	35.7
3 to 4 family members	18.8	18.2	23.2	24.1	21.4
5 or more family members	17.9	18.7	19.3	21.7	19.5
No family members can confide in/No family	26.7	26.1	24.2	18.2	23.3
Whether can confide in any friends	110,120	33,396	64,954	102,442	310,912
Has friends can confide in	68.6	70.5	79.5	83.1	75.9
No friends can confide in/ No friends	31.4	29.5	20.5	16.9	24.2

Table 13: Health and social capital variables by labour force status, NATSISS 2008

	NILF	Unemployed	Part-time	Full-time	Total
Number of friends can confide in	110,120	33,396	64,954	102,442	310,912
1 to 2 friends	36.3	37.0	34.3	34.3	35.3
3 to 4 friends	18.2	15.8	25.1	26.2	22.0
5 or more friends	14.1	17.7	20.1	22.6	18.5
No friends can confide in/ No friends	31.4	29.5	20.5	16.9	24.2
Proportion of Indigenous friends	107,718	33,094	63,605	99,054	303,471
All	26.1	18.3	22.5	10.3	19.3
Most	22.1	24.2	14.2	21.7	20.5
About half	13.6	18.6	16.6	18.3	16.3
Few	21.7	22.1	27.0	32.4	26.4
None/ No friends	16.5	16.8	19.8	17.3	17.5
Whether able to get general support from outside household	110,310	33,396	64,975	102,442	311,122
Able to get general support	85.6	84.8	88.4	94.1	88.9
Not able to get general support	14.5	15.2	11.6	5.9	11.1
Whether able to get support in time of crisis from outside household	110,310	33,396	64,975	102,442	311,122
Able to get support in time of crisis	84.7	85.0	88.7	93.9	88.6
Not able to get support in time of crisis	15.3	15.0	11.3	6.1	11.4

Source: NATSISS 2008

Note: See Table 7

Indigenous Australians in full-time work are more likely to report good to excellent health than those working part time who are again more likely to report good or better health than those who are unemployed (see Table 13). Those who are out of the labour force have the poorest health. However, there is no clear pattern with regard to substance use while alcohol consumption seems to take place at equally risky levels among unemployed, part-time and full-time workers in 2004. In 2008 alcohol consumption of full-time workers seems to be more likely to be at the medium risk level than for other groups and they seemed less likely to consume no alcohol. Respondents who identify with their clan, tribal or language group are most likely to work full time, but least likely to work part time in both years.

Table 13 also reports on a number of other social capital variables in NATSISS 2008. Indigenous Australians who are working full time appear to have better social networks (e.g. more friends and family to confide in, more likely to participate in community events, better support networks), than part-time workers, who again are better off than those who are unemployed or out of the labour force. The contacts with friends and family are perhaps less frequent than for the other groups, which given the time spent in employment is to be expected, but full-time workers are least likely to have no contact at all with family or

friends. Those who are working part time or full time are more likely to have only a few friends from an Indigenous background.

For non-Indigenous Australians we have aimed to construct similar variables as those included in Table 13. Table 14 shows that some of the effects by labour force status are quite similar to the patterns for Indigenous Australians. Those who are working are more likely to have reported good to excellent health compared to those who are unemployed or not in the labour force. However, alcohol consumption shows a different pattern, medium- to high-risk drinking is more prevalent among unemployed individuals than among other individuals in the non-Indigenous community, while no consumption ever (or in the period indicated) is least likely among full-time workers (the latter is similar among Indigenous Australians, although the percentages are substantially higher for this population).

Similar to what is observed for Indigenous Australians, non-Indigenous Australians who are working are also more likely to have good support networks compared to those who are unemployed or out of the labour force and they are more likely to be a member of a sporting/hobby/community based association.

Table 14: Health and social capital variables by labour force status, HILDA 2008

	NILF	Unemployed	Part-time	Full-time	Total
Risky alcohol consumption - number of drinks usually have per day	3,043,570	443,276	3,016,459	7,542,169	14,045,475
Low risk	54.4	48.3	58.3	65.9	61.2
Medium risk	9.8	15.5	15.1	15.1	14.0
High risk	8.3	15.3	11.7	10.1	10.2
Has not consumed in the period/ Never consumed	27.5	20.9	15.0	8.9	14.6
Self-assessed health status	2,516,359	361,505	2,622,255	6,258,872	11,758,992
Excellent	11.1	19.7	12.1	12.8	12.5
Very good	27.9	36.9	42.0	39.7	37.6
Good	30.2	26.3	36.0	38.3	35.7
Fair	20.8	16.6	9.2	8.5	11.6
Poor	10.0	0.6	0.8	0.6	2.7
Currently an active member of a sporting/hobby/community based association	2,460,328	353,691	2,612,183	6,131,214	11,557,416
Yes	35.2	34.4	39.7	37.8	37.5
No	64.8	65.6	60.3	62.3	62.5
How often get together socially with friends/relatives not living with you	2,481,178	362,309	2,605,930	6,211,164	11,660,582
Every day	6.9	8.0	5.6	2.4	4.3
Several times a week	20.9	19.1	27.6	17.7	20.6
About once a week	28.6	26.9	31.6	34.8	32.5

Table 14: Health and social capital variables by labour force status, HILDA 2008

	NILF	Unemployed	Part-time	Full-time	Total
2 or 3 times a month	19.5	17.7	15.3	20.6	19.1
About once a month	10.6	16.7	11.3	12.8	12.1
Once or twice every 3 months	6.8	7.4	5.0	7.3	6.7
Less often than once every 3 months	6.8	4.3	3.7	4.5	4.8
I don't have anyone that I can confide in	2,480,710	361,204	2,612,652	6,232,927	11,687,494
[1] Strongly disagree	41.4	35.0	44.2	40.7	41.5
2	21.7	15.1	27.3	27.7	26.0
3	10.2	10.0	10.4	10.4	10.4
4	10.5	13.5	7.7	8.3	8.8
5	6.9	11.3	4.3	5.9	5.9
6	4.6	6.7	4.1	5.0	4.8
[7] Strongly agree	4.8	8.5	2.0	2.0	2.8
When I need someone to help me out, I can usually find someone	2,495,772	362,086	2,610,673	6,238,406	11,706,938
[1] Strongly disagree	2.7	2.4	1.8	1.2	1.7
2	3.3	8.0	2.4	2.2	2.7
3	5.7	3.7	3.6	4.5	4.5
4	12.3	16.8	9.4	10.3	10.7
5	17.7	13.0	15.2	19.1	17.8
6	27.4	27.9	34.6	34.6	32.8
[7] Strongly agree	31.1	28.2	33.0	28.2	29.9
I have no one to lean on in times of trouble	2,486,655	362,134	2,607,181	6,223,541	11,679,510
[1] Strongly disagree	44.7	39.3	48.4	45.3	45.7
2	22.7	15.7	27.1	27.9	26.2
3	10.1	9.6	9.1	9.6	9.6
4	8.6	13.7	6.4	7.4	7.6
5	5.8	9.8	4.0	4.6	4.9
6	3.6	5.5	3.6	3.8	3.8
[7] Strongly agree	4.5	6.4	1.5	1.4	2.2

Source: HILDA wave 8 (2008)

Note: See Table 7

5. Methodology

This section discusses the methodological approach taken in the multivariate analyses of labour force status. First we discuss the ordered logit approach to estimate the effects of covariates on labour force status in Section 5.1. This section also presents the summary statistics for the main samples of analysis. The following two sections describe the nonlinear decomposition approach and the detailed decomposition approach respectively. These decomposition approaches are used to determine which part of the difference in labour force status can be attributed to differences in characteristics (with the detailed decomposition assigning proportions explained by individual characteristics) and which part can be attributed to differences in the effects of characteristics.

5.1 Ordered logit models and summary statistics of the samples of analysis

Previous studies on labour market participation of Indigenous Australians mostly distinguish two labour force states, namely in versus out of the labour force or in versus out of employment.¹⁹ A few studies distinguish not in the labour force, unemployed and employed, occasionally further disaggregating employed into employed in the mainstream labour market and CDEP participation. This study goes beyond the propensity to enter the labour force and examines the extent of labour market attachment. Thus, we further divide labour force participants into three categories: unemployed, part-time employed and full-time employed. These four categories can be ranked by the extent of labour market attachment as (1) not in the labour force, (2) unemployed, (3) part-time employed and (4) full-time employed. To model labour market attachment, as manifested by those four ranked outcomes, we use the ordered logit method.²⁰ The underlying variable that these four outcomes measure is attachment to the labour market, where not in the labour force represents the lowest attachment and full-time employment represents the strongest attachment.

Two issues are of particular importance in relation to the interpretation of an (ordered) logit model. First, unlike the OLS model where the marginal effect of a change in a control variable on the dependent variable is simply its coefficient, the coefficients in a logit model

¹⁹ Daly et al. (1993) and Daly (1995) are exceptions. Biddle and Yap (2010) separately analyse the probability of working part time among those who are employed using a binomial probit model.

²⁰ In a logit regression, the predicted probability is always equal to the actual probability, whereas in a probit regression the two probabilities may differ. We use the logit model in preference to the probit model so that the actual gaps in labour market attachment, not the predicted gaps, between the two populations are decomposed later.

provide the log odds ratios,²¹ of which the interpretation is not immediately intuitive. As such, it is common practice to only report marginal effects, which are more meaningful. The second issue is that the marginal effects need to be interpreted with respect to a reference case, which can vary from study to study. Therefore, where the reference case is different, the marginal effect of a variable in one model is not directly comparable to the marginal effect of the same variable in another.

We estimate detailed models of labour force status by Indigenous persons (men and women separately) based on the NATSI(H/S)S data. A similar analysis is repeated for non-Indigenous Australians using data from HILDA waves 4 and 8. The analytical samples include all individuals aged 15-64, but exclude full-time students. A list of control variables that are included in the logit models is provided in Appendix C.

Table 15, which contains the means of the regression variables for our 2008 analytical samples, shows that Indigenous people are less likely to participate in the labour force than their non-Indigenous counterparts. The gender gap in labour force status is larger among the former than the latter. While 79 percent of Indigenous men participate in the labour force, only 56 percent of Indigenous women participate. The corresponding figures for non-Indigenous people are 87 percent and 75 percent respectively. Compared with non-Indigenous people, Indigenous people are less likely to have a partner or possess any type of school education or post-school qualifications. Indigenous people are more likely to experience difficulty with spoken English, reside in remote areas, live in households with more children, smoke and report bad health. While men and women in each population are similar in average age, Indigenous people are on average over five years younger than non-Indigenous counterparts.

The next two sections (5.2 and 5.3) can be skipped by those who are not particularly interested in the technical detail of the methodology used. The remainder of the report can be understood without this detailed information.

²¹ The odds ratio is $p/(1-p)$, where p is the probability that the outcome of interest occurs.

Table 15: Descriptive statistics by Indigenous status and gender

	Indigenous		Non-Indigenous	
	Male	Female	Male	Female
Dependent variables				
In labour force	0.788	0.557	0.867	0.752
Not in labour force	0.212	0.443	0.133	0.248
Unemployed	0.121	0.088	0.029	0.026
Part-time employed	0.170	0.227	0.084	0.302
Full-time employed	0.497	0.241	0.754	0.424
Control variables				
Age	35.322	35.933	41.366	41.583
Partnered	0.524	0.486	0.642	0.655
Completed Year 10 or 11	0.451	0.463	0.388	0.357
Completed Year 12	0.216	0.225	0.516	0.547
Has non-degree post-school qualification	0.276	0.273	0.386	0.281
Has degree	0.041	0.058	0.236	0.286
Difficulty with English	0.037	0.029	0.009	0.012
NSW Inner Regional	0.094	0.097	0.063	0.062
NSW Outer Regional	0.053	0.055	0.021	0.020
VIC Major Cities	0.033	0.032	0.191	0.186
VIC Inner/Outer Regional	0.031	0.030	0.057	0.059
QLD Major Cities	0.079	0.072	0.113	0.112
QLD Inner Regional	0.054	0.053	0.061	0.067
QLD Outer Regional	0.081	0.092	0.032	0.033
SA Non-remote	0.041	0.045	0.078	0.073
WA Major Cities	0.049	0.045	0.086	0.076
WA Inner/Outer Regional	0.027	0.031	0.023	0.019
TAS Non-remote	0.035	0.036	0.023	0.023
Balance of Australia - Non-remote	0.035	0.035	0.027	0.025
All of Australia: Remote/Very remote	0.264	0.257	0.014	0.014
Has income from non-labour, non-govt sources	0.086	0.153	0.528	0.528
One family household	0.715	0.732	0.795	0.835
Mixed household	0.186	0.209	0.087	0.092
Number of children aged <=14	1.212	1.513	0.536	0.601
Good health	0.331	0.368	0.375	0.367
Fair health	0.144	0.162	0.127	0.118
Poor health	0.075	0.069	0.027	0.031
Daily smoker	0.512	0.478	0.212	0.165
Moderate drinker	0.510	0.395	0.564	0.486
Infrequent high-risk drinker	0.016	0.006	0.077	0.029
Frequent high-risk drinker	0.118	0.020	0.089	0.019
Number of observations	2,824	3,696	3,733	3,733

Sources: NATSISS 2008 (Indigenous), HILDA wave 8 (non-Indigenous)

Note: Entries are means, weighted by sampling weights.

5.2 Non-linear decomposition

After estimating the factors that affect the labour force status of Indigenous and non-Indigenous people, we use the Blinder (1973)-Oaxaca (1973) method to decompose the gap in labour market attachment between the two populations. For a linear regression, the standard Blinder-Oaxaca decomposition of the Indigenous/non-Indigenous gap in the mean value of labour market outcome Y can be expressed as:

$$\bar{Y}_A - \bar{Y}_B = (\bar{X}_A - \bar{X}_B)\hat{\beta}_A + \bar{X}_B(\hat{\beta}_A - \hat{\beta}_B) \quad (1)$$

where subscript A denotes the non-Indigenous population, subscript B the Indigenous population (the ‘disadvantaged’, or minority, group), \bar{X} is a row of mean values of the control variables and $\hat{\beta}$ is a vector of coefficient estimates. The first term of equation (1) measures the gap due to differences in observed characteristics (the composition, or ‘explained’, gap). The second term measures the unexplained gap due to differences in coefficients, or returns to characteristics (the coefficient, or ‘unexplained’, gap). The unexplained gap can be due to one or more factors, including omitted characteristics, unobservable characteristics, differences in behaviour or preferences, or discrimination.²²

Bauer and Sinning (2008) note that in non-linear models (such as logit), the conditional expectation $E_{\hat{\beta}}(Y|\mathbf{X})$ differs from the linear prediction $\mathbf{X}\hat{\beta}$. They thus re-write equation (1) to accommodate non-linear models:

$$\bar{Y}_A - \bar{Y}_B = [E_{\hat{\beta}_A}(Y_A|\mathbf{X}_A) - E_{\hat{\beta}_A}(Y_B|\mathbf{X}_B)] + [E_{\hat{\beta}_A}(Y_B|\mathbf{X}_B) - E_{\hat{\beta}_B}(Y_B|\mathbf{X}_B)] \quad (2)$$

For an ordered logit model with four categories in the dependent variable (taking values of 0, 1, 2 and 3), the mean conditional expectation is:

$$\begin{aligned} E_{\hat{\beta}_j}(Y_j|\mathbf{X}_j) = & \frac{1}{N_j} \sum_{i=1}^{N_j} \left\{ \left(\frac{e^{(T_{j1}-X_{ij}\hat{\beta}_j)}}{1 + e^{(T_{j1}-X_{ij}\hat{\beta}_j)}} - \frac{e^{-X_{ij}\hat{\beta}_j}}{1 + e^{-X_{ij}\hat{\beta}_j}} \right) \right. \\ & \left. + 2 \left(\frac{e^{(T_{j2}-X_{ij}\hat{\beta}_j)}}{1 + e^{(T_{j2}-X_{ij}\hat{\beta}_j)}} - \frac{e^{(T_{j1}-X_{ij}\hat{\beta}_j)}}{1 + e^{(T_{j1}-X_{ij}\hat{\beta}_j)}} \right) + 3 \left(1 - \frac{e^{(T_{j2}-X_{ij}\hat{\beta}_j)}}{1 + e^{(T_{j2}-X_{ij}\hat{\beta}_j)}} \right) \right\} \end{aligned} \quad (3)$$

²² The unexplained gap is often referred to as discrimination, but it should be kept in mind that discrimination is just one of the possible explanations.

where $j = A, B$; N_j is the size of the group; and the T_{jk} are threshold parameters that are estimated along with the β_j in the ordered logit model. The terms in parentheses are the probability of observing outcome value 1, 2 and 3 respectively.

5.3 Detailed decomposition

After decomposing the gap in labour market attachment between Indigenous and non-Indigenous people into the part due to differences in characteristics and the part due to differences in returns to characteristics, a detailed decomposition can be used to determine how much each characteristic contributes to explaining the gap. A linear detailed decomposition can be written as:

$$E = \sum_{k=1}^K (\bar{X}_{Ak} - \bar{X}_{Bk}) \hat{\beta}_{Ak} \quad (4)$$

$$C = (\hat{\beta}_{A0} - \hat{\beta}_{B0}) + \sum_{k=1}^K \bar{X}_{Bk} (\hat{\beta}_{Ak} - \hat{\beta}_{Bk}) \quad (5)$$

where E is the composition gap (the first term in equation (1)), C is the coefficient gap (the second term in equation (1)), and subscript k denotes the k^{th} covariate.

In the non-linear case, since the conditional expectation differs from the linear prediction, the detailed decomposition of the two components into the contribution of each covariate would not add up to the total. Several alternative detailed non-linear decomposition methods have been proposed, but they are often onerous to execute. For example, Fairlie's (2005) method involves creating a series of counterfactuals, where the coefficient of each covariate is switched to reference group value in sequence. According to Fortin, Lemieux and Firpo (2011), this decomposition approach would be sensitive to the order of decomposition (i.e. be path dependent).

In this study, we adopt the detailed decomposition method proposed by Powers and Pullum (2006). The contribution of each covariate to the composition gap is:

$$E_k = w_{\Delta X_k} E \quad (6)$$

and to the coefficient gap:

$$C_k = w_{\Delta \beta_k} C \quad (7)$$

Powers and Pullum (2006) define the weights w as:

$$w_{\Delta X_k} = \frac{\hat{\beta}_{Ak}(\bar{X}_{Ak} - \bar{X}_{Bk})}{\sum_{k=1}^K \hat{\beta}_{Ak}(\bar{X}_{Ak} - \bar{X}_{Bk})} \quad (8)$$

$$W_{\Delta\beta_k} = \frac{\bar{X}_{Bk}(\hat{\beta}_{Ak} - \hat{\beta}_{Bk})}{\sum_{k=1}^K \bar{X}_{Bk}(\hat{\beta}_{Ak} - \hat{\beta}_{Bk})} \quad (9)$$

That is, the composition weights reflect the relative contribution of each covariate based on the magnitude of the difference in the mean value of the covariate, weighted by the effect of the covariate in group A. The coefficient weights reflect the relative contribution of each covariate based on the magnitude of the difference in the size of the effect, weighted by the mean value of the covariate in group B. As equations (8) and (9) show, this decomposition method is simple and not path dependent.

In this study, we only conduct a detailed decomposition of the composition gap. As discussed in Section 5.2 above, the interpretation of the unexplained gap is complex. Therefore, we cannot learn much more through decomposing the coefficient gap into contributions by each covariate.

6. Estimation results on labour force status

This section reports the estimation results on labour force status of Indigenous people and non-Indigenous people using an ordered logit model. As discussed in Section 5.1, we only report the marginal effects, which give the change in the predicted probability of an outcome resulting from a change in the relevant variable, holding the other continuous variables at their respective means and dummy variables at 0. The ‘before’ and ‘after’ probability is evaluated at the mean value and the mean value plus one unit respectively for continuous control variables, and at zero and at one respectively for dummy variables. There is a set of marginal effects for each outcome of the dependent variable. To keep the number of tables in this section manageable, we only report the marginal effects for the two highest outcomes: part-time employment and full-time employment.²³

6.1 Indigenous population

6.1.1 Basic versus benchmark specifications

Table 16 contains the marginal effects for Indigenous Australians under two specifications. The ‘basic’ specification includes core control variables, similar to Gray and Hunter (1999), corresponding to what variables are available in the Census data, while the more extended (‘benchmark’) specification includes a wider range of variables. The first model combines men and women.

All variables except the geographic dummies in the basic specification are statistically significant at the 1% level. While women are only 1.9 percentage points less likely than men to work part time, their probability of full-time employment is 27 percentage points lower. The coefficients on age and age squared have opposite signs, which means that the probability of the outcome of interest at first increases and then decreases with age. For the person with average sample characteristics, the effect of being 10 years older is to increase the probability of part-time and full-time employment with 0.1 and 1.4 percentage points respectively.²⁴

²³ The marginal effect on the lowest outcome (not in labour force) always has the opposite sign to that of the highest outcome (full-time employment). The marginal effects across the four labour force states add up to zero. Since the outcomes are ordered, the marginal effects of the two middle outcomes (unemployment and part-time employment) fall between those of the lowest and highest outcomes.

²⁴ Age enters the regression in both linear and quadratic terms. The marginal effects of age reported in this paper are computed as $M_1 + 2M_2\overline{Age}$ where M_1 is the marginal effect for the linear term, M_2 is the marginal effect for the quadratic term, and \overline{Age} is mean age of the sample, at which the marginal effect is evaluated. The reported

Table 16: Marginal effects on the probabilities of employment for Indigenous Australians

Control variable	Basic specification		Benchmark specification	
	Part-time	Full-time	Part-time	Full-time
Female	-0.019***	-0.272***	-0.024***	-0.258***
Age (effects of a 10-year increase)	0.001***	0.014***	0.003***	0.024***
Partnered	0.009***	0.103***	0.012***	0.111***
Completed Year 10 or 11	0.012***	0.167***	0.014***	0.143***
Completed Year 12	-0.027***	0.314***	-0.015**	0.266***
Has non-degree post-school qualification	-0.001	0.192***	0.003	0.174***
Has degree	-0.046***	0.293***	-0.031*	0.251***
Difficulty with English	-0.026***	-0.111***	-0.022**	-0.091***
NSW Inner Regional	-0.007	-0.048	-0.008	-0.049
NSW Outer Regional	-0.028*	-0.121***	-0.026*	-0.104***
VIC Major Cities	0.001	0.061	0.003**	0.058
VIC Inner/Outer Regional	-0.018*	-0.091***	-0.018	-0.081**
QLD Major Cities	0.001	0.070	0.002	0.080
QLD Inner Regional	-0.007	-0.047	-0.01	-0.057
QLD Outer Regional	0.000	-0.001	0.002	0.029
SA Non-Remote	-0.009	-0.056	-0.006	-0.039
WA Major Cities	-0.002	-0.016	-0.002	-0.012
WA Inner/Outer Regional	0.000	0.005	0.001	0.008
TAS Non-Remote	0.001	0.010	-0.001	-0.010
Balance of Australia - Non-remote	-0.004	0.123***	-0.004	0.134***
All of Australia: Remote/Very remote	-0.002	-0.016	0.001	0.009
Has income from non-labour, non-govt sources			0.001	0.012
Log equivalised income of other hh. members			0.000	0.000
One family household			0.002	0.014
Mixed household			0.000	-0.001
Number of children aged <=14			-0.005***	-0.048***
Good health			-0.009***	-0.065***
Fair health			-0.035***	-0.138***
Poor health			-0.142***	-0.273***
Daily smoker			-0.008***	-0.069***
Moderate drinker			0.006***	0.060***
Infrequent high-risk drinker			-0.007	-0.042
Frequent high-risk drinker			0.002	0.031
Number of observations	6520		6520	
Pseudo R-squared	0.110		0.142	

Source: Authors' estimation from NATSISS 2008

Notes: Entries are changes in the predicted probability of the associated outcome for an increase by one unit in the continuous variable, or for a change from 0 to 1 in the dummy variable, holding the other continuous variables at their respective means and dummy variables at 0. Standard errors are adjusted to allow for the 'clustering' effect of observations in the same household. *significant at 10%, **significant at 5%, ***significant at 1%. The omitted category for geographic locations is New South Wales major cities.

marginal effects of age are for a change of 10 years, as the effects of 1 year of age are not visible at 3 decimal places.

Partnership and education have positive effects on labour force status. Compared with Indigenous people who are single, those who have a partner are 0.9 percentage points more likely to be in part-time employment while they are 10 percentage points more likely to be in full-time employment. Those who have completed Year 12 are 31 percentage points more likely to be full-time employed than those who left school before Year 10, while a tertiary degree raises the probability of full-time employment by 29 percentage points over those who have no post-school qualifications. By contrast, the likelihood of full-time employment decreases for women (-27 percentage points) and for those who have difficulty speaking English (-11 percentage points).

Only a few of the thirteen geographic dummies are significant. Among those that are, the pattern is that compared with residents of NSW major cities, other residents are more likely to be out of the labour force or unemployed. The only exception is that residents of 'Balance of Australia - Non-remote' are 12 percentage points more likely to be full-time employed than residents of NSW major cities, which is according to expectation given that this category is mostly made up of Australian Capital Territory residents.

We would have liked to include characteristics, such as the presence of employment services or schools, or unemployment rates in the region in which the individual resides. However, since only 13-17 regions (by State and level of remoteness) can at most be distinguished in the NATSI(H/S)S data, the level of disaggregation was too low to observe meaningful differences. It would be interesting to analyse the level of education attained by the availability of schools in the neighbourhood.

When we also control for income of other household members, household structure and personal health, the effects of gender, age, partnering status and language difficulty change only slightly, while the effect of education falls (Table 16, columns 3 and 4). For example, in this benchmark model those who have completed Year 12 are 25 percentage points more likely than those who have left school before Year 10 to be working full time, compared with 31 percentage points in the basic model. These results suggest that in the basic model, the education variables also pick up part of the effects of household income, household structure and personal health.

Whether the individual has income from non-labour, non-government sources has no effect on labour force status and neither does the equivalised income of other household members. This could be because while income from other household members reduces the need for an

individual to participate in the labour market, those who have good earnings capacity are also more likely to live in households with others who have good earnings capacity (i.e. the assortative mating phenomenon), so the ‘net’ effect of income seems to be zero.

Household type also has no effect on the labour force status of Indigenous Australians. The only significant household structure effect is that each child under the age of 15 reduces the adult’s probability of full-time employment by 4.8 percentage points.

Self-assessed health status is an important determinant of labour force status, with those with good to poor health 7 to 27 percentage points less likely to work full time than those with very good or excellent health. A negative effect is also found for daily smoking. Compared with alcohol abstainers, moderate drinkers have 6 percentage points more chance of full-time employment (0.6 percentage points of part-time employment) while the effect of high-risk drinking is statistically insignificant. This result is consistent with previous studies (Barrett, 2002; Van Ours, 2004; Cruise, 2009) which find a significant earnings premium associated with moderate drinking, which may be because moderate drinking improves an individual’s health and hence productivity and earnings, or alternatively because moderate drinking is associated with other unobserved characteristics that may lead to higher productivity and/or earnings.

6.1.2 Male versus female

Given the large difference in labour force states between the two genders observed in Table 15, different factors are likely to affect the labour force status of men and women or the same factors to a different extent. While having a partner is associated with a 24 percentage point increase in full-time employment for men, its effect for women is almost zero and insignificant (Table 17, columns 3 and 4). The strong association between partnering status and employment status for men is because the characteristics that make a man attractive in the labour market, such as age, education, health, as well as unobserved factors like intelligence and drive, are also likely to make him attractive in the marriage market. While partnered women possess strong productivity characteristics, partnered women have greater financial security through an employed partner and usually a higher domestic work burden, because men still tend to be the breadwinner and women take greater responsibility for the homemaking. Thus there are two counteracting effects on the probability of being in paid employment for partnered women, which appear to cancel each other out. As a result, the observed link between partnering status and employment status is weak for women.

Table 17: Marginal effects on the probabilities of employment by gender for Indigenous Australians

Control variable	Male		Female	
	Part-time	Full-time	Part-time	Full-time
Age (effects of a 10-year increase)	-0.002***	0.011***	0.012***	0.019***
Partnered	-0.038***	0.249***	0.005	0.008
Completed Year 10 or 11	-0.028***	0.157***	0.062***	0.105***
Completed Year 12	-0.065***	0.253***	0.070***	0.235***
Has non-degree post-school qualification	-0.030***	0.143***	0.066***	0.155***
Has degree	-0.075**	0.245***	0.044***	0.225***
Difficulty with English	0.008*	-0.148***	-0.022	-0.030
NSW Inner Regional	0.000	0.002	-0.037	-0.049
NSW Outer Regional	0.010***	-0.117	-0.053	-0.065*
VIC Major Cities	-0.018	0.082	0.021	0.040
VIC Inner/Outer Regional	0.010***	-0.114	-0.030	-0.040
QLD Major Cities	-0.022	0.099	0.034**	0.073
QLD Inner Regional	0.010**	-0.095	-0.007	-0.011
QLD Outer Regional	-0.012	0.06	0.013	0.023
SA Non-Remote	0.005	-0.036	-0.012	-0.018
WA Major Cities	0.008	-0.064	0.020	0.038
WA Inner/Outer Regional	0.002	-0.011	0.024	0.048
TAS Non-Remote	0.001	-0.005	0.007	0.011
Balance of Australia - Non-remote	-0.029	0.12	0.044***	0.139**
All of Australia: Remote/Very remote	0.007	-0.047	0.035**	0.065**
Has income from non-labour, non-govt sources	-0.004	0.024	0.008	0.014
Log equivalised income of other hh. members	0.000	-0.002	0.001	0.002
One family household	0.002	-0.012	0.009	0.013
Mixed household	0.007	-0.050	0.006	0.010
Number of children aged <=14	0.005**	-0.027**	-0.037***	-0.059***
Good health	0.013***	-0.087***	-0.028**	-0.043***
Fair health	0.005	-0.239***	-0.052***	-0.068***
Poor health	-0.107***	-0.455***	-0.118***	-0.120***
Daily smoker	0.015***	-0.087***	-0.026**	-0.040***
Moderate drinker	-0.019***	0.116***	0.012	0.019
Infrequent high-risk drinker	0.006	-0.047	-0.058	-0.068
Frequent high-risk drinker	-0.025*	0.109**	-0.065*	-0.074**
Number of observations	2824		3696	
Pseudo R-squared	0.138		0.126	

Source: Authors' estimation from NATSISS 2008

Note: See Table 16

Difficulty with the English language does not appear to affect the probability that a woman works full time, whereas it makes a man 15 percentage points less likely to do so. Health has significant effects on employment for both men and women, but the effects are much larger for men. For example, while poor health reduces the chance of full-time employment by 12

percentage points for women, the corresponding effect is 46 percentage points for men. By contrast, while the presence of each child in the household reduces the probability of full-time employment by 2.7 percentage points for men, its effect on women is more than twice as large.

Education increases the probability of full-time employment and decreases the probability of part-time employment for men. For women, the effect is positive for both types of employment, and slightly smaller for full-time employment. The different effects that education has on the two genders are likely to work through the effects of partnership. While partnered women are more likely to substitute domestic work for market work and therefore tend to have a preference for part-time employment, partnered men have a stronger tendency to increase work effort as the main breadwinner of the family.

The positive effect of moderate drinking on employment, which was observed in the pooled sample, is insignificant in the female sample. Also for women, frequent high-risk drinking lowers the probability of both types of employment by around 7 percentage points. For men, both moderate drinking and frequent high-risk drinking are associated with an over 10 percentage point increase in full-time employment while reducing the likelihood of part-time employment by around 2 percentage points. A possible explanation for this puzzling result could be that frequent drinking may be facilitated by a higher income. However, as noted in Section 3.1, drinking of alcohol seems to be under-reported so we should be cautious to infer too much from this result. In addition, the results when using NATSIHS 2004 data (see Appendix Table 7) in which small negative effects from all levels of alcohol use are estimated (although mostly insignificant) contradict these results.

6.1.3 Remote versus non-remote areas

Over a quarter of Indigenous Australians reside in remote areas (Table 15). Table 18 shows that the control variables have quite different effects on labour force status in remote areas compared to non-remote areas. Surprisingly, post-school education has a stronger effect on employment in remote than in non-remote areas. For example, having a university degree increases the probability that an Indigenous man living in a remote area is full-time employed by 46 percentage points, while for an Indigenous man in a non-remote area, the effect is only 19 percentage points. Perhaps there is a selection effect causing highly educated, unemployed individuals to leave remote areas to find employment.

Table 18: Marginal effects on the probability of full-time employment for Indigenous Australians in remote versus non-remote areas

Control variable	Remote		Non-remote	
	Male	Female	Male	Female
Age (effects of a 10-year increase)	0.051***	0.029***	-0.013***	0.011***
Partnered	0.166***	-0.005	0.306***	0.015
Completed Year 10 or 11	0.139***	0.080***	0.159***	0.101***
Completed Year 12	0.270***	0.214***	0.234***	0.233***
Has non-degree post-school qualification	0.164***	0.266***	0.135***	0.130***
Has degree	0.456***	0.390***	0.194**	0.182***
Difficulty with English	-0.142***	-0.022	0.164	-0.176***
NSW Inner Regional			0.002	-0.045
NSW Outer Regional			-0.115	-0.063*
VIC Major Cities			0.070	0.045
VIC Inner/Outer Regional			-0.114	-0.034
QLD Major Cities			0.088	0.083
QLD Inner Regional			-0.105	-0.009
QLD Outer Regional			0.059	0.044
SA Non-Remote			-0.046	-0.018
WA Major Cities			-0.080	0.047
WA Inner/Outer Regional			-0.006	0.056
TAS Non-Remote			-0.004	0.007
Balance of Australia - Non-remote			0.107	0.166***
Has income from non-labour, non-govt sources	0.031	0.050	0.026	0.010
Log equivalised income of other hh. members	0.002	0.001	-0.004	0.003
One family household	-0.104	-0.075*	0.002	0.035
Mixed household	-0.208***	-0.050	0.031	-0.001
Number of children aged <=14	0.011	-0.025***	-0.053***	-0.079***
Good health	-0.090***	-0.008	-0.080**	-0.055***
Fair health	-0.281***	-0.044*	-0.210***	-0.075***
Poor health	-0.323***	-0.091***	-0.489***	-0.127***
Daily smoker	0.001	-0.014	-0.124***	-0.046**
Moderate drinker	0.091**	0.047**	0.123***	0.010
Infrequent high-risk drinker	-0.007	0.022	-0.053	-0.112
Frequent high-risk drinker	0.106	-0.130***	0.100	-0.042
Number of observations	1009	1275	1815	2421
Pseudo R-squared	0.107	0.112	0.157	0.143

Source: Authors' estimation from NATSISS 2008

Note: See Table 16

In remote areas, difficulty with the English language is an obstacle to employment among Indigenous men but not women, whereas in non-remote areas the language problem hinders women but not men. The presence of each child in the household is associated with a 5.3 percentage point decrease in the probability of full-time employment for an Indigenous man in non-remote areas, yet the link is not statistically significant for men in remote areas.

Children are associated with lower full-time employment for Indigenous women in both remote and non-remote areas, but the effect is three times larger in the latter. While daily smokers are less likely to work full time in non-remote areas, no significant relationship between daily smoking and labour force status is found for Indigenous people in remote areas.

The different effects between remote and non-remote areas could be due not only to differences in local labour markets but also to differences in observed and unobserved characteristics of the two populations. For example, the fact that daily smoking has a negative impact on employment in non-remote areas but not in remote areas could be because the incidence of daily smoking among Indigenous Australians is higher while labour force participation is lower in remote areas.²⁵ In addition, the ‘reference’ person on which the marginal effect is based can be somewhat different, affecting the computed marginal effect.

6.1.4 Extended specification

Past studies have often found a strong link between cultural attachment and labour market participation among Indigenous Australians (e.g. Hunter and Gray, 2001; Stephens, 2010). This section examines how cultural and other factors affect the labour force status among this population.²⁶

As reported in Table 19, neither proficiency in an Indigenous language nor identification with a clan, tribal nor language group has a significant impact on labour force status of Indigenous people. The most significant variable among this ‘extended’ set is police arrest. Having been arrested in the last five years is associated with a decrease by 13 percentage points in full-time employment among men and 6.9 percentage points among women.

Table 19: Marginal effects on the probability of employment for Indigenous Australians in the extended specification

Control variable	Male		Female	
	Part-time	Full-time	Part-time	Full-time
Age (effects of a 10-year increase)	-0.002***	0.011***	0.013***	0.020***
Partnered	-0.044***	0.255***	0.001	0.001
Completed Year 10 or 11	-0.029***	0.144***	0.061***	0.101***
Completed Year 12	-0.061***	0.224***	0.070***	0.217***
Has non-degree post-school qualification	-0.035***	0.147***	0.065***	0.149***

²⁵ Fifty four percent of Indigenous people in our sample are daily smokers and 64 percent participate in the labour force in remote areas. In non-remote areas, the corresponding figures are 48 percent and 68 percent respectively.

²⁶ These cultural variables are unique to NATSI(H/S)S and mostly irrelevant to the non-Indigenous population. Therefore, they cannot be used in the decomposition between Indigenous and non-Indigenous populations.

Table 19: Marginal effects on the probability of employment for Indigenous Australians in the extended specification

Control variable	Male		Female	
	Part-time	Full-time	Part-time	Full-time
Has degree	-0.083**	0.250***	0.045***	0.211***
Difficulty with English	0.012***	-0.131**	-0.005	-0.007
NSW Inner Regional	0.001	-0.003	-0.046	-0.058*
NSW Outer Regional	0.013***	-0.124	-0.062*	-0.073**
VIC Major Cities	-0.016	0.068	0.021	0.040
VIC Inner/Outer Regional	0.011*	-0.080	-0.027	-0.037
QLD Major Cities	-0.021	0.085	0.033*	0.070
QLD Inner Regional	0.013***	-0.124	-0.014	-0.021
QLD Outer Regional	-0.011	0.047	0.011	0.019
SA Non-Remote	0.004	-0.023	-0.016	-0.023
WA Major Cities	0.008	-0.051	0.021	0.039
WA Inner/Outer Regional	-0.001	0.007	0.029	0.061
TAS Non-Remote	0.003	-0.018	0.014	0.025
Balance of Australia - Non-remote	-0.031	0.118	0.041***	0.110**
All of Australia: Remote/Very remote	0.002	-0.008	0.029*	0.052
Has income from non-labour, non-govt sources	-0.006	-0.023	0.001	-0.004
Log equivalised income of other hh. members	0.001	-0.004	-0.002**	0.010**
One family household	-0.001	-0.025	0.045**	-0.131***
Mixed household	0.007	-0.030	0.013***	-0.075
Number of children aged <=14	0.006**	-0.029**	-0.039***	-0.061***
Good health	0.012**	-0.071**	-0.024**	-0.036**
Fair health	0.015**	-0.196***	-0.046***	-0.060***
Poor health	-0.085***	-0.430***	-0.106***	-0.109***
Daily smoker	0.013**	-0.066**	-0.023**	-0.036**
Moderate drinker	-0.022***	0.118***	0.013	0.021
Infrequent high-risk drinker	-0.001	0.007	-0.064	-0.073
Frequent high-risk drinker	-0.034**	0.130**	-0.050	-0.060*
Having a disability	0.019***	-0.098***	-0.012	-0.020
Speaks an Indigenous language well	0.010	-0.058	-0.010	-0.015
Cultural identification	0.009	-0.042	0.013	0.019
Homelands	0.012**	-0.068**	-0.005	-0.007
Attending cultural events	-0.004	0.021	0.031**	0.045***
Lacks contact	0.007	-0.039	-0.041	-0.052*
Removed	0.014***	-0.130***	-0.013	-0.019
Arrest	0.018***	-0.127***	-0.057***	-0.069***
Number of observations	2737		3609	
Pseudo R-squared	0.154		0.131	

Source: Authors' estimation from NATSISS 2008

Note: See Table 16

Compared with the benchmark (Table 17), this further extended specification has better goodness of fit (see the pseudo R-squared) and the coefficients on the 'benchmark' variables

only change slightly, suggesting that the effects that the extra controls have on the dependent variable are additional to those already captured by the standard socio-economic and demographic variables.

Compared with previous studies, this study has found a somewhat weaker relationship between cultural factors and labour force status. However, this could be due partly to the modelling specification. When we use a multinomial logit (i.e. the labour force states are not ranked), which has often been used in previous studies, the effects of the education variables decline, while the opposite is true of cultural variables (see Appendix Table 6). For example, while having a university degree increases the probability of full-time employment by 25 percentage points for men in the ordered logit model (Table 19) the corresponding effect is only 14 percentage points in the multinomial logit model (Appendix Table 6). By contrast, whereas proficiency in an Indigenous language has no significant impact on employment in the ordered logit model, the same variable is associated with a 5.5 percentage point increase in the probability of part-time employment and 10 percentage point decrease in the probability of full-time employment among men when using the multinomial logit model. However, the results are not consistent between men and women, or across the cultural variables. The effect of frequent high-risk drinking on full-time employment among men, which is positive and significant in the ordered logit model, declines and loses its statistical significance in the multinomial logit model. Nevertheless, overall the marginal effects are quite similar between the two specifications.

6.2 Non-Indigenous population

6.2.1 Non-Indigenous versus Indigenous

Table 20 reports the marginal effects on the probabilities of part-time and full-time employment for non-Indigenous Australians under the benchmark specification. The effects of education are weaker for non-Indigenous people than for Indigenous people, whereas English language difficulty, number of children in the household, and poor health show stronger effects for non-Indigenous Australians. For example, a university degree raises the probability of full-time employment by 7.6 percentage points for the reference non-Indigenous man, which is less than a third of the corresponding effect for the reference Indigenous man (24.5 percentage points).²⁷ As discussed in the literature review in Section 2,

²⁷ Caution should be exercised when comparing marginal effects across samples, as they are calculated based on the ‘reference’ person, which varies across samples. For example, the reference person in the Indigenous sample, who has the sample average age, is five year younger than that in the non-Indigenous sample (see Table 15). Their household income and number of household children are also different.

the larger effect of education for the Indigenous population is similar to effects found both in New Zealand and Australia. While poor health reduces the likelihood of full-time employment by 46 percentage points for the reference Indigenous man, its corresponding effect on the average non-Indigenous man is substantially higher at 67 percentage points.

Table 20: Marginal effects on the probability of employment for non-Indigenous Australians

Control variable	Male		Female	
	Part-time	Full-time	Part-time	Full-time
Age (effects of a 10-year increase)	0.028***	-0.071***	0.022***	-0.088***
Partnered	-0.052***	0.142***	0.018**	-0.065**
Completed Year 10 or 11	-0.008	0.021	-0.027**	0.098***
Completed Year 12	-0.016	0.041	-0.041***	0.187***
Has non-degree post-school qualification	-0.023***	0.058***	-0.031***	0.105***
Has degree	-0.030***	0.076***	-0.050***	0.156***
Difficulty with English	0.075**	-0.270	-0.197***	-0.336***
NSW Inner Regional	0.037**	-0.105**	0.011***	-0.065*
NSW Outer Regional	0.003	-0.009	0.011***	-0.079
VIC Major Cities	0.013	-0.033	0.014***	-0.071**
VIC Inner/Outer Regional	0.019	-0.051	0.007	-0.030
QLD Major Cities	-0.003	0.008	0.006	-0.025
QLD Inner Regional	0.014	-0.038	0.012***	-0.072**
QLD Outer Regional	-0.004	0.011	0.009	-0.128**
SA Non-Remote	0.013	-0.035	0.005	-0.023
WA Major Cities	0.010	-0.026	0.011**	-0.057
WA Inner/Outer Regional	0.006	-0.015	0.006	-0.140***
TAS Non-Remote	0.064***	-0.208***	0.011***	-0.079*
Balance of Australia - Non-remote	-0.008	0.020	-0.005	0.018
All of Australia: Remote/Very remote	-0.060***	0.139***	0.003	-0.014
Has income from non-labour, non-govt sources	0.009	-0.023	0.001	-0.004
Log equivalised income of other hh. members	0.002	-0.004	-0.002**	0.010**
One family household	0.010	-0.025	0.045**	-0.131***
Mixed household	0.011	-0.030	0.013***	-0.075
Number of children aged <=14	0.010**	-0.026**	0.043***	-0.173***
Good health	0.014*	-0.036*	0.003	-0.013
Fair health	0.079***	-0.259***	0.007	-0.175***
Poor health	0.023	-0.672***	-0.247***	-0.371***
Daily smoker	0.021**	-0.055**	-0.010	0.035
Moderate drinker	-0.041***	0.108***	-0.031***	0.123***
Infrequent high-risk drinker	-0.019	0.047	-0.061**	0.156***
Frequent high-risk drinker	-0.024**	0.059**	-0.054	0.140*
Number of observations	3733		4163	
Pseudo R-squared	0.176		0.146	

Source: Authors' estimation from HILDA wave 8 (2008)

Note: See Table 16

6.2.2 *Male versus Female*

Large gender differences are also observed among non-Indigenous people. In contrast to the effects for the Indigenous population, education has a larger effect on women's labour force status than on men's. While Year 10 or 11 completion has no effect on non-Indigenous men's employment, it adds 10 percentage points to the full-time employment probability among women. A tertiary degree makes a non-Indigenous woman 16 percentage points more likely to work full time than a woman without a post-school qualification, which is over twice the corresponding effect on men. A potential explanation for this difference in effects is that, in contrast to Indigenous men, non-Indigenous men are participating in the labour force to a very large extent, and mostly full time, independent of the exact level of their education. Labour market attachment is much lower on average for non-Indigenous women, but it increases substantially with investment in human capital through education.

The number of children has a larger negative effect on women than on men, while the opposite is true of health effects. This is a pattern that has been observed among the Indigenous population as well.

Despite some similarities, the patterns of gender differences are quite different between the two populations. Difficulty with the English language has a large negative effect on non-Indigenous women's employment but little effect on men's, while the opposite is true among Indigenous men and women. Non-Indigenous partnered women are 6.5 percentage points less likely than single women to work full time, while no significant effect is seen among Indigenous women.

Although daily smoking has a significant, negative effect on employment of both Indigenous men and women, its effect is insignificant for non-Indigenous women. Moderate or infrequent high-risk drinking has no significant effects on Indigenous women's employment, yet for non-Indigenous people, all types of drinking are associated with higher full-time employment and the effects are stronger among women than among men. While moderate drinking can be associated with socialisation, the positive effect of frequent high-risk drinking among non-Indigenous people, which seems particularly high among women, is counterintuitive. However, when using NHS 2004 data to estimate the same model, we find negative effects as expected, which are larger and more significant for women (see Appendix Table 7).

7. Decomposition analysis

This section decomposes the gap in labour market attachment between Indigenous and non-Indigenous people into an explained and an unexplained component. The section starts with an ‘aggregate’ decomposition using the Blinder-Oaxaca method generalised by Bauer and Sinning (2008), which is followed by a detailed decomposition using the approach outlined by Powers and Pullum (2006).

7.1 Aggregate decomposition

A well-known issue with the Blinder-Oaxaca decomposition technique is the so-called index problem; that is, the decomposition results vary with the choice of reference group. If the Indigenous (non-Indigenous) population is the reference group, the decomposition involves addressing the question ‘What would the labour market attachment of the Indigenous (non-Indigenous) population be if they were to have the same set of coefficients as estimated for the non-Indigenous (Indigenous) population?’

7.1.1 Indigenous population as the reference group

First, we examine the decomposition results when the Indigenous population is the reference group. For men, none of the gap in labour market attachment between Indigenous and non-Indigenous can be attributed to differences in the basic control variables (see Table 21). Indeed, if Indigenous men were to have the same returns to characteristics as non-Indigenous men, their mean labour market attachment would be greater than that of non-Indigenous men.²⁸ However, part of the reason why differences in characteristics fail to explain the gap in labour market attachment is because only a few characteristics are included in the basic model and they are relatively unimportant. In the benchmark specification, which controls for a larger range of variables, differences in characteristics can explain 18 percent of the gap, leaving 82 percent to be attributed to differences in returns to characteristics.

For women, even differences in the ‘basic’ characteristics account for almost half of the gap in labour market attachment between the two populations. All of the gap can be explained by differences in characteristics in the benchmark specification. Indeed, if Indigenous women were to have the same returns to characteristics as non-Indigenous women, their labour market attachment would be lower than their current outcome.²⁹

²⁸ Hence the part of the gap that is attributable to differences in characteristics is negative.

²⁹ Hence the part of the gap that is attributable to differences in coefficients is negative.

Table 21: Decomposition of the gap in labour market attachment between Indigenous and non-Indigenous Australians

	Indigenous population as reference group		Non-Indigenous population as reference group	
	Explained	Unexplained	Explained	Unexplained
Male				
Basic regression	-2.2	102.2	75.2	24.8
Benchmark regression	17.7	82.3	95.4	4.6
Ages 25-59 only	26.8	73.2		
Non-remote only	37.6	62.4		
CDEP categorised as unemployed	13.7	86.3		
NATSIHS/HILDA 2004	23.2	76.8		
NATSIHS/NHS 2004-05	24.0	76.0		
Dependent variable is LF participation	50.9	49.1		
Female				
Basic regression	45.6	54.4	102.6	-2.6
Benchmark regression	106.6	-6.6	100.8	-0.8
Ages 25-59 only	176.4	-76.4		
Non-remote only	96.0	4.0		
CDEP categorised as unemployed	96.2	3.8		
NATSIHS/HILDA 2004	90.9	9.1		
NATSIHS/NHS 2004-05	82.4	17.6		
Dependent variable is LF participation	105.7	-5.7		

Source: Authors' estimation from NATSISS 2008, NATSIHS 2004, NHS 2004-05 and HILDA waves 4 and 8 (2004 and 2008)

Notes: Entries are shares (percentages) of the total gap that are due to each factor. All sensitivity cases depart from the benchmark.

7.1.2 Non-Indigenous people as the reference group

When the reference group is the non-Indigenous population, differences in characteristics are able to explain most of the gap in labour market attachment. For example, 95 percent of the gap between Indigenous and non-Indigenous men is due to differences in characteristics in the benchmark regression (see Table 21). If non-Indigenous men were to have the same returns to characteristics as Indigenous men, their mean labour market attachment would be similar to their current outcome.

As has been seen in the literature, decomposition results can vary markedly with the choice of reference group. Neumark (1988) argues that if men are paid competitive wages while women are underpaid, the coefficients of men should be taken as the non-discriminatory wage structure. Conversely, if women are paid competitive wages but men are overpaid, then the women coefficients should be used as the non-discriminatory wage structure to be applied to both populations. Like Neumark (1988), we argue that if the labour market outcome of non-Indigenous Australians is the fair, desirable outcome that Indigenous Australians should

be able to achieve in a ‘fair’ world, then the coefficients of non-Indigenous individuals should be taken as the non-discriminatory structure. For this reason, the remainder of our decomposition analysis focuses on using the Indigenous population as the reference group (that is, using non-Indigenous people’s coefficients as the non-discriminatory structure).

7.1.3 Robustness checks

This section explores a number of alternative specifications to determine the sensitivity of the results to these changes. This can provide some additional insights in the drivers of the differences in labour market attachment.

It is a well-documented fact that Indigenous people still have considerably shorter life expectancies at birth than non-Indigenous people.³⁰ Accordingly, due to health considerations, Indigenous people may have a tendency to retire early. On the other hand, non-Indigenous people pursue education for a longer period of time and may start working later. When we restrict the age range of our samples of analysis to 25-59, Table 21 shows that differences in characteristics account for 27 percent of the gap in labour market attachment among men (increased somewhat compared with 18 percent for ages 15-64). This is because the inclination to work is stronger for everyone in the prime age range. Thus, the gap between the two populations is less likely to be influenced by unobservable factors like the extent to which the inclination to start working late or retire early differs between the two populations. For women, the results change dramatically in this specification. If Indigenous women were to have the same returns to characteristics as non-Indigenous women, their labour market attachment would be much lower than their current outcome.

While over a quarter of Indigenous Australians reside in remote areas, only under 2 percent of non-Indigenous people do (Table 15). If remote areas are excluded, the explained gap among men doubles to 38 percent. Thus, the unexplained gap in labour market attachment between Indigenous and non-Indigenous men across the entire country is due at least partly to unobserved characteristics which are associated with geographic location. Not much changes for women when using this alternative specification.

Similar results to the benchmark specification are obtained for 2004, using the benchmark specification with alternative data sources. Indigenous individuals are drawn from NATSIHS

³⁰ According to Australian Life Tables 2005-2007, life expectancy at birth was 78.7 years for non-Indigenous males, 11.5 years higher than for Indigenous males. The corresponding gap among females is 9.7 years, see <http://www.abs.gov.au/ausstats/abs@.nsf/0/9F4941454DB3BBFCCA2577D60010A06B?opendocument>

2004 and non-Indigenous individuals from HILDA wave 4 or the 2004-05 NHS.³¹ The explained proportion of the gap is similar to that obtained using the 2008 data combined with the benchmark specification for both men and women.

Many studies on Indigenous employment classify CDEP participation as a separate labour force category from mainstream employment, since CDEP is a government programme in which participation is not driven by typical market forces. Previous studies have found that socio-economic factors affect CDEP employment and unemployment in a similar way (Stephens, 2010), which suggests that CDEP could be more similar to unemployment than to mainstream employment. Hunter (2004) comments on this issue in his paper on a number of occasions but most clearly perhaps in: “The presence of the CDEP scheme has tended to overstate the employment prospects (and understate unemployment rates) of Indigenous Australians, especially in non-urban areas.” (p. 118) He also mentions that “The failure to distinguish CDEP scheme employment from other employment may lead to misleading conclusions in research, and policies based on such research. For example, given that the CDEP scheme is a government-funded program available to many Indigenous unemployed, it is unlikely to be strongly correlated with education. Hence any analysis that conflates the CDEP scheme jobs with other jobs may understate the returns to education...” (pp. 64-65)

In our case, if individuals whose main job is part of CDEP are classified as unemployed, the gap in labour market attachment between Indigenous and non-Indigenous Australians widens.³² As a result, differences in observed characteristics between Indigenous and non-Indigenous populations explain a smaller proportion of this larger gap (14 percent for men and 96 percent for women) than in the benchmark specification. This result could also indicate that CDEP participants are more attached to the labour market than unemployed individuals, and perhaps not as similar as found in previous studies.

Our labour force status variable is quite complex, as it includes a choice element (in versus out of the labour force), a risk element (unemployed versus employed) or both (part-time versus full-time employed).³³ When we simplify the outcome by collapsing it into two categories (in the labour force or out of the labour force), as before, differences in characteristics can explain the entire gap in labour market attachment between Indigenous

³¹ The marginal effects of full-time employment estimated from NATSIHS 2004 (Indigenous) and NHS 2004-05 (non-Indigenous) are reported in Appendix Table 7.

³² The marginal effects on the probabilities of part-time and full-time employment when CDEP employment is classified as unemployment are reported in Appendix Table 8. These show, for example, that living in a remote area now has a significant negative effect on the probability of full-time employment of Indigenous men.

³³ While some people may choose to work part time, others do so because they cannot find a full-time job.

and non-Indigenous women. However, for men, despite a clear increase in the explained proportion, 49 percent of the gap remains unexplained. Even though there are job seekers who, discouraged by the difficulty in finding jobs either due to discrimination or poor local labour market opportunities, have ‘voluntarily’ opted out of the labour force, for most people, to participate or not to participate in the labour force is largely a choice. Thus, the unexplained gap in labour force participation between Indigenous and non-Indigenous men is likely to be due to differences in omitted characteristics or unobservable characteristics, such as motivation and preferences for work versus leisure (which might include participation in cultural activities according to our definition of employment), between the two populations.

7.2 Detailed decomposition

A problem arises with detailed decomposition when the discrete control variables have more than two categories. In such cases one category is omitted, but Fortin, Lemieux and Firpo (2011) note that the choice of the omitted group is arbitrary because there is not a natural zero. In addition, the unexplained part of the decomposition can then not be separated into the part attributed to the group membership (true ‘unexplained’ captured by the difference in intercepts) and the part attributed to differences in the coefficient of the omitted category. Consequently, the results from a detailed decomposition may vary considerably with the choice of omitted category. To avoid these problems, we aggregate all categories of variables with more than two categories into two categories and re-estimate the logit models using these more aggregated control variables.³⁴ Of course, reducing the number of variables reduces the explanatory power of the regressions as well as the ability of the differences in characteristics to explain the gap in outcome. However, this is the best we can achieve given the constraints. In this ‘compact’ specification, differences in characteristics explain 16 percent of the labour market attachment among men and 84 percent among women. These estimates lie in between the basic and benchmark estimates reported in Table 21.

Table 22 reports the contribution of each factor in explaining the gap in labour market attachment between Indigenous and non-Indigenous Australians. A negative contribution

³⁴ Specifically, school education, which previously included Year 9 or less (omitted category), Year 10 or 11 and Year 12 becomes Year 11 or less (omitted) and Year 12. Post-school education goes from No qualifications (omitted), Non-degree qualifications and University degree to University degree and No university degree (omitted). Region of residence changes from 14 categories to Remote/Very remote and Non-remote (omitted). Self-assessed health status now has Poor health and Fair health or better (omitted), instead of Fair health, Good health and Very good or Excellent health (omitted). Alcohol use previously included Abstainer (omitted), Moderate drinker, Infrequent high-risk drinker and Frequent high-risk drinker but is now collapsed to Frequent high-risk drinker and All other drinkers (omitted). The marginal effects on the probabilities of employment in this ‘compact’ specification are reported in Appendix Table 9.

means that the corresponding variable helps to lower the inequality in outcomes. For example, the negative contribution of age in explaining the gap in labour market attachment between the two populations is due to the fact that Indigenous people are younger than non-Indigenous people and the fact that, on average, age has a negative effect on labour market attachment (Appendix Table 10). A younger age structure is an advantage; all else equal, Indigenous people should have higher labour market attachment than non-Indigenous people because they are on average younger. If Indigenous people had the same mean age as non-Indigenous people, their labour market attachment would be lower and the gap between the two populations wider.

Table 22: Contribution of each factor in explaining the gap in labour market attachment between Indigenous and non-Indigenous Australians

	Benchmark		Non-remote only	
	Male	Female	Male	Female
Age (linear and quadratic)	-143.5	-12.4	-37.2	-14.4
Partnered	97.8	-4.2	26.9	-4.7
Completed Year 12	72.7	18.9	18.8	20.8
Has degree	65.9	12.1	17.1	13.3
Difficulty with English	35.8	4.4	-2.5	-3.0
All of Australia: Remote/Very remote	-308.6	-5.4		
Has income fro. non-labour, non-govt sources	16.3	3.5	5.4	3.8
Log equivalised income of other hh. members	-65.4	5.2	-18.0	7.0
Mixed household	-0.6	-2.3	-0.1	-1.3
Number of children aged <=14	104.6	70.7	21.4	66.2
Poor health	125.0	11.0	42.7	13.9
Daily smoker	99.1	-1.8	25.1	-1.4
Frequent high-risk drinker	0.8	0.0	0.3	0.0

Source: Authors' estimation from NATSISS 2008 and HILDA wave 8 (2008)

Notes: Entries are shares (percentages) of the total 'explained' gap that are due to each factor. More details on the benchmark decomposition are reported in Appendix Table 10.

A positive contribution means that Indigenous people have a lower outcome because they compare less favourably to non-Indigenous people with regard to the corresponding factor. For example, over 70 percent of the 'explained' gap in labour market attachment between Indigenous and non-Indigenous women is due to the fact that Indigenous women have more dependent children³⁵ (Appendix Table 10). Likewise, having poor health contributes 11 percent in explaining why Indigenous women participate less in the labour market than their non-Indigenous counterparts. Other positive contributing factors include Year 12 completion, tertiary qualifications and difficulty with English. These latter three factors are also important

³⁵ Or strictly speaking, live in households with more dependent children, since the children in the household are not necessarily the woman's own children.

in explaining the gap in labour market attachment among men. These three factors are also likely to be closely linked with each other.

The large, negative contribution (-309%) of the remoteness indicator to explaining the gap in labour market attachment between Indigenous and non-Indigenous men suggests that there is substantial heterogeneity associated with residency in remote vs. non-remote areas, which may be difficult to capture with just one variable. Restricting the analysis to a more homogenous group who live in non-remote areas (see the last two columns of Table 22), the relative importance of the different factors remains similar but the values are more easily interpretable. The main difference is that in non-remote areas, difficulty with English is not important in explaining the gap, whereas this factor appears important when remote areas are included, particularly for men. Differences in self-assessed health status, partnering status and smoking habit are the most important factors in explaining the gap in labour market attachment between Indigenous and non-Indigenous men. Given the relatively small contribution of the remoteness indicator to explaining the gap in labour market attachment between Indigenous and non-Indigenous women, the contribution of the different factors in explaining the gap between Indigenous and non-Indigenous women are similar whether remote areas are excluded or not. Different factors are important for women compared to men. For example, children are more important for women than men, while self-assessed health is more important for men than women.

The detailed decomposition suggests that the gap in outcome can be narrowed by closing the gaps in characteristics with positive contributions while widening the gaps in characteristics with negative contributions. Some changes that may be conducive to higher labour market attachment among Indigenous people are, for example, raising the education levels, as well as reducing the incidence of poor health, difficulty with the English language, and family size (or alternatively, in the latter case, increasing support to care for children).

However, some effects that the control variables in our models have on the outcome of interest are likely to reflect an association rather than direct causation. For example, partnership is associated with high labour market attachment among men, but it is likely to be due to the unobservable characteristics that are associated with partnered men rather than the partnering status per se. Thus, increasing labour market attachment among Indigenous men could not simply be achieved by inducing them into a relationship. Similarly, remote residency is a large negative contributing factor, because a larger share of Indigenous people live in remote areas compared to the share of non-Indigenous people, and remote residency

has a positive effect on labour market attachment among non-Indigenous people (Appendix Table 10). Thus, encouraging Indigenous people to move into remote areas is unlikely to raise labour market attachment among Indigenous people, and the reverse (encouraging Indigenous men and women to move out of remote areas) appears to be true as well (Biddle, 2010).

7.3 Summary and discussion

Overall, our models are able to explain more of the gap in labour market attachment among women than among men. This could be because the extent to which Indigenous men differ from non-Indigenous men in the propensity to work is greater than that among women. This, in turn, could be because other factors influence men's labour market attachment than women's and these factors may be absent from our models.

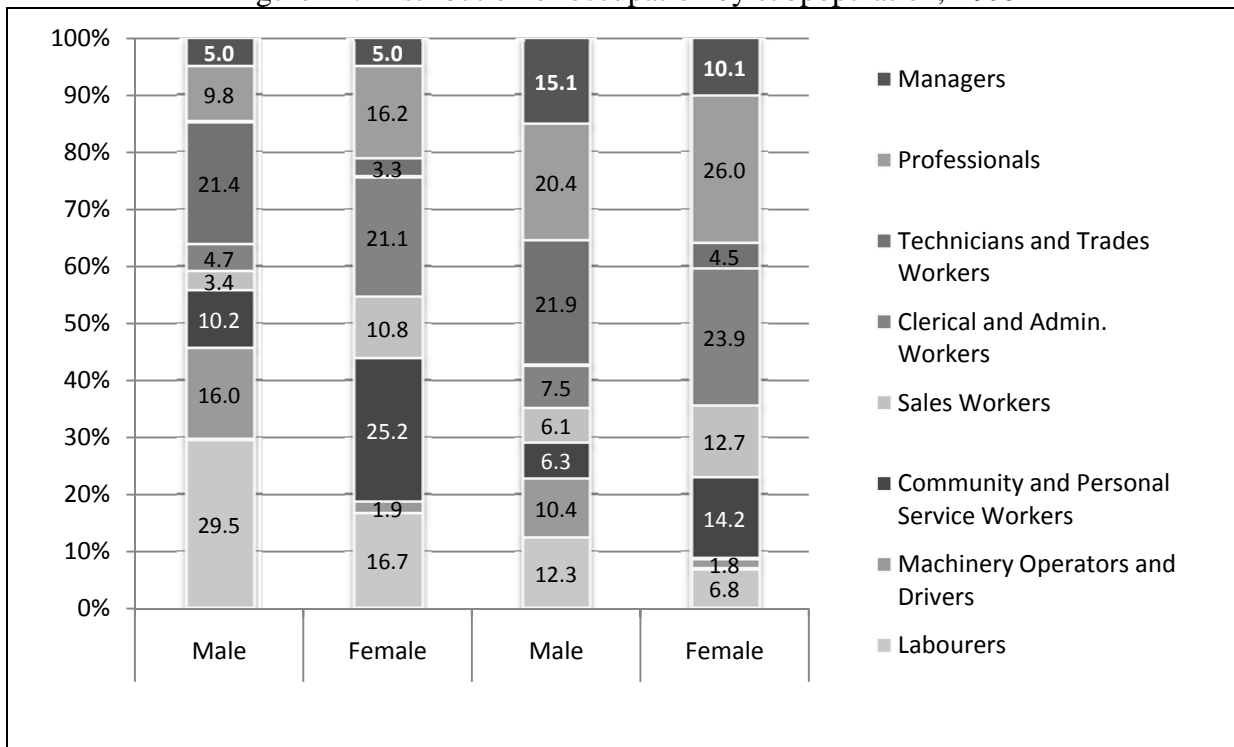
Most of the gap in labour market attachment between Indigenous and non-Indigenous women can be attributed to differences in the characteristics between the two populations. Indeed, if Indigenous women were to have the same returns to characteristics as non-Indigenous women; their labour market attachment would not be much higher, and sometimes even lower, than their current outcome. By contrast, differences in characteristics between Indigenous and non-Indigenous men in the benchmark model can only account for 18 to 51 percent of the gap in labour market attachment.

Some of the remaining unexplained gap could be due to the omission of relevant, but unobserved variables, such as industry and occupation. As Figures 2, 3 (for men and women combined) and 12 (separately for men and women) show, Indigenous and non-Indigenous Australians have different employment patterns across industries and occupations. When explaining the high estimates of potential discrimination, Hunter (2004) states that: "A more plausible explanation is to be found in the following criticism of Nielsen's technique [detailed decomposition in logit model]. Since Indigenous males and females are not employed in the same sorts of jobs (e.g. in the same industries and occupations) as other Australians, it is understandable that they experience different employment prospects. Unfortunately, it is impossible to account for such differences in a regression analysis of employment because having an industry or occupation is only associated with having a job, and hence cannot be used to explain the incidence of employment." (p. 80)

Another unobserved factor that could explain some of the remaining difference in labour market attachment is the potential lack of job-related networks by family members and

friends in the Indigenous population, making this a less likely channel to obtain a job than for people who are part of a community with good job-related networks. Another factor could be motivation, possibly affected by previous experiences in the labour market. For example, the experience or perception of discrimination may lead to discouraged job seekers who leave the labour force. A final unobserved factor is the presence of local job opportunities, as well as the presence of good opportunities to obtain higher education and qualification levels. This is particularly likely to be important when aiming to explain labour force participation in remote areas versus non-remote areas.

Figure 12: Distribution of occupation by subpopulation, 2008



Sources: NATSISS 2008 and HILDA wave 8 (2008)

At least some of the remaining difference in labour market attachment of men is due to characteristics that are observed in the NATSISS data but not in the HILDA data, and therefore cannot be included in the analysis that attributes the difference in attachment to a range of observed factors. Examples of such variables are: having a disability, attending cultural events, connection to homelands, being removed from parents as a child, lacking in social contacts, and having been arrested by the police in the previous five years. Some of these factors are specific to the Indigenous population and could not be included to explain non-Indigenous Australians' labour market attachment. Other factors, such as having been arrested and lacking in social contacts, are likely to influence non-Indigenous outcomes as

well, but these are not observed in the HILDA data in a sufficiently comparable way to be included.

As expected, the distinction between living in remote versus non-remote areas is important but is not well reflected in the decomposition analysis since very few non-Indigenous Australians live in remote regions. Labour force status models should ideally be estimated separately for individuals living in remote and non-remote areas. However, there are usually too few observations on non-Indigenous Australians living in remote or very remote areas in the available datasets to carry out separate analyses for this group. As a result, a decomposition analysis done separately for remote regions is not feasible. What may be potentially of interest, and which could be pursued in future research is a decomposition of the difference in participation between Indigenous Australians living in remote areas versus Indigenous Australians living in non-remote areas. However, good local information on the direct neighbourhood of residency would be required for a meaningful analysis.

A detailed decomposition shows that lower education, worse health, greater difficulty with English (when remote areas are included) and larger families than non-Indigenous people contribute to a substantial extent to the lower attachment to the labour market of Indigenous Australians. Indigenous people are on average five years younger than non-Indigenous people, but that age gap appears to work to the former population's advantage, as labour market attachment is higher among younger individuals. Were the two populations similar in age, the gap in labour market attachment between the two populations would be even larger.

8. Conclusions

This study has analysed data from the 2004 NATSIHS, 2008 NATSISS and HILDA (waves 4 and 8) surveys to examine the factors that affect labour force status of Indigenous and non-Indigenous Australians. We distinguished not in the labour force, unemployed, part-time employed and full-time employed, which represent increasing labour market attachment in the order in which they are listed. It then decomposed the gap between the two populations in labour market attachment.

On average, Indigenous Australians participate less in the labour force than non-Indigenous people while the gender gap in labour force participation is greater among Indigenous people. Data for 2008 show that while 79 percent of Indigenous men aged 15-64 (excluding full-time students) participate in the labour force, only 56 percent of Indigenous women participate. The corresponding figures for non-Indigenous people are 87 percent and 75 percent respectively.

Significant factors that shape labour force status include age, education, health, smoking, drinking habits and number of children in the household. However, the size of the effects varies markedly across genders and the two populations. The effects of the education variables are weaker for non-Indigenous people than for Indigenous people, whereas English language difficulty, number of children in the household, and poor health show stronger effects for non-Indigenous Australians.

Among Indigenous people, education has a larger effect on men's labour force status than on women's, while the opposite is true for non-Indigenous people. Health has significant effects on employment for both men and women, but the effects are much larger for the former in both populations. Having a partner is associated with lower part-time employment and higher full-time employment among men in both populations. No significant impact of partnership is found among Indigenous women, whereas among non-Indigenous women it raises the probability of part-time employment and reduces the probability of full-time employment.

Over a quarter of Indigenous Australians reside in remote areas, and the control variables have quite different effects on labour force status in remote areas compared to the effects in non-remote areas. In an extended specification, we find that connection with Indigenous culture only has a weak impact on labour force status among Indigenous people. By contrast, while some previous studies find Indigenous cultural attachment to have a positive

relationship with labour market outcomes (Dockery, 2009), others find a negative association (Hunter and Gray, 2001; Stephens, 2010).

Our models appear to be able to explain most of the gap in labour market attachment between Indigenous and non-Indigenous women. That is, most of the gap can be attributed to differences in the characteristics between the two populations. Indeed, if Indigenous women were to have the same returns to characteristics as non-Indigenous women (that is, if they were to behave in the same way and were treated in the same way as non-Indigenous women), their labour market attachment would not be much higher, and sometimes even lower, than their current outcome.

However, for men, the models can only account for 18 to 51 percent of the gap. This could be because other factors influence men's labour market attachment than women's and these factors may be absent from our models. In addition, the returns to characteristics between the two populations may be more different for men than for women, causing a larger proportion of the gap.

Compared with previous studies (e.g. Hunter, 2004), our study is able to explain a larger proportion of the gap in labour market participation between Indigenous and non-Indigenous people. This is due to the larger number of variables which are available from NATSISS and HILDA surveys but are not available in the Census (which was used in earlier studies).

A detailed decomposition shows that lower education, worse health, greater difficulty with English (if remote populations are included) and larger families than non-Indigenous people contribute to a substantial extent to the lower attachment to the labour market of Indigenous Australians. This suggests that, as expected, improving health and education would be important for both men and women, although for men it will be far from sufficient to close the gap. The importance of the number of children for women suggests that family-oriented policies (such as, appropriate childcare, flexible work arrangements) may assist in closing the gap. These factors are likely to be closely linked so would need to be addressed jointly rather than in separate policy initiatives.

Indigenous people are on average five years younger than non-Indigenous people, but that age gap appears to work to the former population's advantage, as labour market attachment is higher among younger individuals in the non-Indigenous population. If the two populations were similar in age, the gap in labour market attachment between the two populations would be even larger.

Despite the failure of characteristics to fully explain the gap in labour market attachment for men, there is limited evidence of discrimination for Indigenous women. In many cases, if Indigenous women were to have the same returns to characteristics as non-Indigenous women, their labour market attachment would be lower than their current outcome. For men the unexplained component, which potentially includes the effect of discrimination, is much larger than for women.

At least some of the remaining difference in labour market attachment of men is probably due to unobserved characteristics, but also to characteristics that are observed in the NATSISS data but not in the HILDA data. These latter characteristics could therefore not be included in the analysis that attributes the difference in attachment to a range of observed factors. Some of these are specific to the Indigenous population and could not be included to explain non-Indigenous Australians' labour market attachment. However, factors such as having been arrested and lacking in social contacts are likely to influence non-Indigenous outcomes as well, but these are not observed in the HILDA data in a sufficiently comparable way to be included. Some of these were found to be important in explaining labour market attachment.

One possible unobserved factor that could explain some of the remaining difference in labour market attachment is the potential lack of job-related networks by family members and friends in the Indigenous population, making this a less likely channel to obtain a job than for people who are part of a community with good job-related networks. Another factor could be motivation, possibly affected by previous experiences in the labour market. A final unobserved factor is the presence of local job opportunities, as well as the presence of good opportunities to obtain higher education and qualification levels. This is particularly likely to be important in remote areas.

References

- Access Economics 2008. An overview of the economic impact of Indigenous disadvantage. A report by Access Economics for Reconciliation Australia.
- Alexander, W.R. and M. Genç 2005. Gender and ethnicity in the labour market participation decision. Paper presented at Workshop on Labour Force Participation and Economic Growth, Wellington, New Zealand.
- Alexander, W.R.J., M. Genç and M. Jaforullah 2001. Maori disadvantage in the labour market. Economics Discussion Paper No. 108, University of Otago.
- Alexander, W.R.J. and J.R. Williams 2001. A critique of “Maori socio-economic disparity”. Economics Discussion Paper No. 107, University of Otago.
- Altman, J.C. and W. McLennan 1996. Employment outcomes for Indigenous Australians. Cat. No. 4199.0, Australian Bureau of Statistics, Canberra.
- Altman, J.C., N. Biddle and B.H. Hunter 2008. How realistic are the prospects for ‘Closing the Gaps’ in socioeconomic outcomes for Indigenous Australians? CAEPR Discussion Paper No. 287/2008, Centre for Aboriginal Economic Policy Research, Australian National University.
- Altman, J. C., G. Buchanan and N. Biddle 2006. Measuring the ‘real’ Indigenous economy in remote Australia using NATSISS 2002. *Australian Journal of Labour Economics*, 9(1), 17-31.
- Altonji, J.G. and R.M. Blank 1999. Race and gender in the labor market. In O.C. Ashenfelter and D.E. Card (eds.), *Handbook of Labor Economics: Volume 3C*, 3143-3259. Amsterdam: Elsevier.
- Australian Bureau of Statistics (ABS) 1996. National Aboriginal and Torres Strait Islander Survey 1994: Employment outcomes for Indigenous people. ABS Cat. No. 4199.0, Canberra.
- . 2004. Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA): Australia 2001. Technical Paper, ABS Cat. No. 2039.0.55.001, Australian Bureau of Statistics, Canberra.
- . 2005. Household income and income distribution. ABS Cat. No. 6523.0, Australian Bureau of Statistics, Canberra.

- . 2006. National Aboriginal and Torres Strait Islander Health Survey, 2004-05. ABS Cat. No. 4715.0, Australian Bureau of Statistics, Canberra.
- . 2008. Socio-Economic Indexes for Areas (SEIFA) - Technical Paper 2006. ABS Cat. No. 2039.0.55.001, Australian Bureau of Statistics, Canberra.
- . 2010. National Aboriginal and Torres Strait Islander Social Survey, 2008. ABS Cat. No. 4720.0, Australian Bureau of Statistics, Canberra. Available online at <http://www.abs.gov.au/ausstats/abs@.nsf/PrimaryMainFeatures/4720.0>
- Barrett, G. 2002. The effect of alcohol consumption on earnings. *The Economic Record*, 78(1), 79-96.
- Bauer T. and M. Sinning 2008. An extension of the Blinder–Oaxaca decomposition to nonlinear models, *AStA Advances in Statistical Analysis*, 92(2), 197-206.
- Becker, G.S. 1971. *The economics of discrimination*. Chicago: University of Chicago Press.
- . 1993. *Human capital: A theoretical and empirical analysis, with special reference to education*. Chicago: University of Chicago Press.
- Biddle, N. 2010. Indigenous migration and the labour market: A cautionary tale. *Australian Journal of Labour Economics*, 13(3), 313-330.
- Biddle, N. and M. Yap 2010. Demographic and socioeconomic outcomes across the Indigenous Australian lifecourse: Evidence from 2006 census. CAEPR Research Monograph No. 31, Centre for Aboriginal Economic Policy Research, Australian National University, Canberra.
- Biddle, N., J. Taylor and M. Yap 2008. Indigenous participation in regional labour markets, 2001-06, CAEPR Discussion Paper No. 288/2008, Australian National University.
- Biddle, N., J. Taylor and M. Yap 2009. Are the gaps closing? Regional trends and forecasts of Indigenous employment. *Australian Journal of Labour Economics*, 12(3), 263-280.
- Blinder, A. 1973. Wage discrimination: reduced form and structural estimates. *Journal of Human Resources*, 8, 436-455.
- Booth, A. L., A. Leigh and E. Varganova 2010. Does racial and ethnic discrimination vary across minority groups? Evidence from a field experiment. IZA Discussion Paper No. 4947, Institute for the Study of Labor.

- Borland, J. and B. Hunter 2000. Does crime affect employment status? The case of Indigenous Australians. *Economica*, 67(265), 123-44.
- Buvinic, M. 2004. Introduction: Social inclusion in Latin America. In M. Buvinic, J. Mazza and R. Deutsh (eds.). *Social inclusion and economic development in Latin America*. Washington, D.C.: Inter-American Development Bank.
- Chapple, S. 2000. Maori socio-economic disparity. *Political Science*, 52(2), 101-115.
- Chapple, S. and D. Rea 1998. Time series analysis of disparity between Maori and non-Maori labour market outcomes in the Household Labour Force Survey. *Labour Market Bulletin*, 1-2: 127-144.
- Chikritzhs, T. and M. Brady 2006. Substance use in the 2002 NATSISS. In Hunter, B.H. (ed.) *Assessing Recent Evidence on Indigenous Socioeconomic Outcomes: A focus on the 2002 NATSISS*, CAEPR, Monograph No. 2, Canberra, 231-247. Available online at http://epress.anu.edu.au/c26_citation.html.
- Cruise, G. 2009. The effects of alcohol consumption on earnings in Australia. Honours Thesis Bachelor of Arts/Bachelor of Economics (Honours), Australian School of Business, University of New South Wales.
- Daly, A.E. 1992. The determinants of Aboriginal employment income. Discussion Paper No. 32, Centre for Aboriginal Economic Policy Research, Australian National University, Canberra.
- . 1993. The determinants of employment for Aboriginal people. *Australian Economic Papers*, 32(60), 134-151.
- . 1994. Self-employed Indigenous Australians in the labour market. Discussion Paper No. 67, Centre for Aboriginal Economic Policy Research, Australian National University, Canberra.
- . 1995. Aboriginal and Torres Strait Islander people in the Australian labour market; 1986 and 1991. Occasional Paper, ABS Cat. No. 6253.0, Australian Bureau of Statistics, Canberra.
- Daly, A.E., B. Allen, L. Aufflick, E. Bosworth and M. Caruso 1993. Determining the labour force status of Aboriginal people using a multinomial logit model. Discussion Paper No. 44, Centre for Aboriginal Economic Policy Research, Australian National University, Canberra.

- de Alba, I.G.G. 2010. Poverty in Mexico from an ethnic perspective, *Journal of Human Development and Capabilities*, 11(3), 449-465.
- de Janvry, A. and E. Sadoulet 2001. Income strategies among rural households in Mexico: the role of off-farm activities. *World Development*, 29(3), 467-480.
- Dixon, S. and D.C. Maré 2007. Understanding changes in Maori incomes and income inequality 1997-2003. *Journal of Population Economics*, 20, 571-598.
- Dockery, M. 2009. Cultural dimensions of Indigenous participation in education and training. NCVER research report.
- Doeringer, P.B. and M.J. Piore 1971. *Internal labor markets and manpower analysis*. Lexington, Massachusetts: D.C. Heath and Company.
- FaHCSIA 2011. Indigenous economic development strategy 2011-2018. Available on http://www.indigenous.gov.au/wp-content/uploads/2011/10/ieds_strategy1.pdf.
- Fairlie, R.W. 2005. An extension of the Blinder-Oaxaca decomposition technique to logit and probit models. *Journal of Economic and Social Measurement*, 30, 305-316.
- Fortin, N., T. Lemieux and S. Firpo 2011. Decomposition methods in economics. In Ashenfelter, O. and D. Card (eds.), *Handbook of Labor Economics: Volume 4* (1st ed.), 1-102. Amsterdam: Elsevier.
- Gitter, R.J. and P.B. Reagan 2002. Reservation wages: An analysis of the effects of reservations on employment of American Indian men. *American Economic Review*, 92(4), 1160-1168.
- Gray, M. and B. Chapman 2006. Some labour market measurement issues for Indigenous Australians. *Australian Journal of Labour Economics*, 9(1), 5-16.
- Gray, M.C. and B.H. Hunter 1999. Determinants of employment and labour force participation: a cohort analysis of Indigenous and non-Indigenous Australians, 1986-96, CAEPR Discussion Paper No. 186/1999, Australian National University.
- . 2002. A cohort analysis of the determinants of employment and labour force participation: Indigenous and Non-Indigenous Australians, 1981 to 1996. *Australian Economic Review*, 35(4), 391-404.
- . 2005a. Indigenous job search success. CAEPR Discussion Paper No. 274, Centre for Aboriginal Economic Policy Research, Australian National University.

- . 2005b. The labour market dynamics of Indigenous Australians. *Journal of Sociology* 41(4), 386.
- Halchuk, P. 2006. Measuring employment outcomes for Indigenous Australians. *Australian Journal of Labour Economics*, 9(2), 201-216.
- Hall, G. and H.A. Patrinos 2006. *Indigenous peoples, poverty and human development in Latin America: 1994-2004*. New York, NY: Palgrave Macmillan.
- Hoff, K. and P. Pandey 2006. Discrimination, social identity, and durable inequalities. *American Economic Review*, 96(2), 206-211.
- Hunter, B.H. 1997. The determinants of Indigenous employment outcomes: The importance of education and training. *Australian Bulletin of Labour*, 23(3), 177-192.
- . 2002. The rise of the CDEP scheme and changing factors underlying Indigenous employment. CAEPR Working Paper No. 13, Centre for Aboriginal Economic Policy Research, Australian National University.
- . 2004. Indigenous Australians in the contemporary labour market. Australian Census Analytic Program: ABS Cat. No. 2052.0, Australian Bureau of Statistics, Canberra.
- Hunter B.H. and A.E. Daly 2008. Interactions between crime and fertility in the labour supply of Indigenous Australian women, CAEPR Working Paper No. 40/2008, Australian National University.
- Hunter, B.H. and M.C. Gray 2001. Indigenous labour force status re-visited: Factors associated with the discouraged worker phenomenon. *Australian Journal of Labour Economics*, 4(2), 111-133.
- . 2004. Patterns of Indigenous job search activity. CAEPR Discussion Paper No. 263, Australian National University, Canberra.
- Kelley, J. 1988. Class conflict or ethnic oppression? The cost of being Indian in rural Bolivia. *Rural Sociology*, 53, 339-420.
- Lunde, T., H.A. Patrinos and E. Skoufias 2010. Social networks among Indigenous peoples in Mexico. *Latin American Research Review*, 45(2), 49-67.
- Maani, S.A. 2002. Education and Maori relative income levels over time: The mediating effect of occupation, industry, hours of work and locality. New Zealand Treasury Working Paper 02/17.

- Miller, P.W. 1989. The structure of Aboriginal and non-Aboriginal youth unemployment. *Australian Economic Papers*, 28(52), 39-56.
- Neumark, D. 1988. Employers' discriminatory behavior and the estimation of wage discrimination. *Journal of Human Resources*, 23(3), 279-295.
- Norris, R. 2001. Australian Indigenous employment disadvantage: What, why and where to from here? *Journal of Economic and Social Policy*, 5(2), Article 2.
- Oaxaca, R 1973. Male-female wage differentials in urban labor markets. *International Economic Review*, 14(3), 693-709.
- Office of Evaluation and Audit 2009. Evaluation of the Community Development Employment Projects (CDEP) Program. Indigenous Program Reports.
- Patrinos, H.A. 1994. Methods and data. Chapter 4 in G. Psacharopoulos and H.A. Patrinos (eds.). *Indigenous people and poverty in Latin America: An empirical analysis* (pp. 41-54). Washington, DC: World Bank.
- Pendakur, K.M. and R. Pendakur 2009. *Aboriginal income disparity in Canada*. Metropolis British Columbia.
- Powers, D.A. and T.W. Pullum 2006. Multivariate decomposition for nonlinear models. Mimeo, Department of Sociology, Population Research Center, University of Texas at Austin.
- Ross, K. 1999. Population measurement Issues, Aboriginal and Torres Strait Islander Australians. Occasional Paper, ABS Cat. No. 4708.0, Australian Bureau of Statistics, Canberra.
- Ross, R. 2006. Recent evidence on health and employment status for Indigenous Australians. *Australian Journal of Labour Economics*, 9(1), 65-81.
- Scobie G., J. Gibson and T. Le 2005. *Household wealth in New Zealand*. Institute of Policy Studies, Victoria University Wellington.
- Singley, S.G. and P. Callister 2004. Polarisation of employment, 1986-2002: New Zealand in the international context. Working paper 06/04, Ministry of Social Development, Wellington.
- Steering Committee for the Review of Government Service Provision. 2009. Overcoming Indigenous disadvantage: Key indicators 2009. Productivity Commission, Canberra.

- Stephens, B.J. 2010. The determinants of labour force status among Indigenous Australians. *Australian Journal of Labour Economics*, 13(3), 287-312.
- Taylor, J. 1993. Industry segregation among employed Aborigines and Torres Strait Islanders. *Journal of Sociology*, 29(1), 3-20.
- Van Ours, J.C. 2004. A pint a day raises a man's pay; but smoking blows that gain away. *Journal of Health Economics*, 23, 863-886.
- Vurens van Es, R. and A.M. Dockery 2008. Indigenous Australians in the labour market: Exploring the role of social capital. CLMR Discussion Paper Series 08/03, Centre for Labour Market Research, Curtin Business School, Curtin University of Technology.
- Walters, D., J. White and P. Maxim 2004. Does post-secondary education benefit aboriginal Canadians? An examination of earnings and employment outcomes for recent aboriginal graduates. *Canadian Public Policy*, 30(3), 283-301.
- Winkelmann, L. and R. Winkelmann 1997. Determining the relative labour force status of Maori and non-Maori using a multinomial logit model. *Labour Market Bulletin*, 1997(1), 24-62.
- Wooden, M. and N. Watson 2007. The HILDA Survey and its contributions to economic and social research (so far), *The Economic Record*, 83(261), 208-231.
- Zietsma, D. 2010. Aboriginal people living off-reserve and the labour market: Estimates from the Labour Force Survey, 2008-2009. The Aboriginal Labour Force Analysis Series, Catalogue no. 71-588-X, no. 2, Labour Statistics Division, Statistics Canada.

Appendices

Appendix A: Literature summary

Source	Country, Year	Data source/ Data type	Outcomes examined	Econometric method	Main findings/Notes
Australia					
Miller 1989	Australia, 1985	Australian Longitudinal Survey 1985	Unemployment rate and unemployment rate differential in the youth labour market	Binary and multinomial logit models; an approximation of the Blinder (1973) decomposition also used to decompose the unemployment rate differential	1) Negative relationship between education and the probability of being unemployed among Australian youth; 2) The major part of the Aboriginal/non-Aboriginal unemployment rate differential cannot be explained by differences in observable characteristics that indicate a difference in marketable skills of Indigenous and non-Indigenous Australians.
Altman and McLennan 1996	Australia, 1994	NATSIS 1994	Employment status (Two sets of regressions: one where both CDEP and non-CDEP employed are counted as employed; and one where only non-CDEP employed is included in sample)	Logit model	For both males and females, the probability of being employed increases significantly with having vocational training/tertiary education/other qualifications, and decreases significantly for individuals with no education. For females, the probability decreases with the number of dependent children.
Biddle 2010	Australia, 2006	Census 2006	Employment rate	Probit model	1) Individual Indigenous Australians who move to urban areas do not appear to do as well in the labour market as those who stay behind 2) Inward migration from remote dispersed settlements is associated with a significant and substantial decline in the percentage of the population employed in the destination area

Source	Country, Year	Data source/ Data type	Outcomes examined	Econometric method	Main findings/Notes
Biddle and Yap 2010	Australia, 2006	Census 2006	Employment status (Four types of employment, each modelled as a binary variable, incl. full-time; part-time; managerial and professional; voluntary and unpaid domestic work)	Probit	Lower probability of being employed among Indigenous Australians is attributed to their lower levels of school completion and qualifications; having children is also associated with a lower probability of being employed for female Aborigines
Borland and Hunter 2000	Australia, 1994	NATSIS 1994	Employment status (a probit model is also estimated for whether an individual has been arrested in the previous 5 years)	Probit	A negative correlation between the probability of employment and whether an individual has been arrested, differences in arrest rates between Indigenous and non-Indigenous Australians may explain about 15% of the difference in employment rates between the two populations.
Daly 1992	Australia, 1986	Census 1986	Gross weekly income of full-time workers (35-49 hours/week) (CDEP workers are excluded since they do not work full time); Income differences	OLS (on log of gross weekly income); Oaxaca-Blinder decomposition (income differences)	Most of the difference in income between Aboriginal (29% less) and non-Aboriginal men can be accounted for by differences in their labour market endowments (70%). Endowment differences were less important in accounting for differences in the income of Aboriginal (11% less) and non-Aboriginal women (44%). Indigenous Australians appear to have lower returns to education and experience, but both could be at least partly due to low-quality education and difficulties measuring work experience. Non-Indigenous men received a premium for working in a remote area which was not the case for Indigenous Australians.
Daly 1993	Australia, 1986	Census 1986	Employment status	Probit and Oaxaca-Blinder decomposition	An early empirical study on employment probabilities (using the 1986 census). It finds that only a small proportion of the total difference in employment probability can be explained by observed characteristics: 20% and 17% of the difference in employment can be explained for men and women respectively.

Source	Country, Year	Data source/ Data type	Outcomes examined	Econometric method	Main findings/Notes
Daly 1994	Australia, 1991	Census 1991	Self employment	Descriptive	<p>According to 1991 Census figures, the Indigenous working-age population had a self-employment rate which was one-fifth of that of the rest of the Australian population; 2.2% compared with 11.1%.</p> <p>A possible (part of the) explanation for this result is under-reporting, that is artists and hunter-gatherers may not count themselves/or be recognised as self employed. The question is whether they should be given their dependence on welfare payments. Low self-employment could be due to a preference by government agencies to support community initiatives rather than individual initiatives. Three other possible explanations raised are the lack of a culture of entrepreneurship among Indigenous Australians, poor access to capital, and residency in rural areas which may be a hurdle to self-employment.</p> <p>Self-employed Indigenous Australians are more similar to other Australians than other Indigenous Australians are.</p>
Daly 1995	Australia, 1991	Census 1991	Labour market outcomes (full-time employment, part-time employment, unemployment, out of the labour force) and income (natural logarithm)	Multinomial logit and Ordinary Least Squares (followed by an Oaxaca-Blinder decomposition)	<p>Being of Indigenous descent has a negative effect on the probability of being part-time or full-time employed. Even counting participation in CDEP (which is concentrated in rural areas and was recently expanded) as being employed does not make much difference in the negative effect of being from Indigenous descent. The only exception is for rural areas where the Indigenous population is somewhat more likely to be in part-time employment compared to the non-Indigenous population and compared to Indigenous Australians living in urban areas. This indicates some contribution from CDEP to increased employment.</p> <p>For full-time workers, the determinants of income were analysed, showing income penalties arising from being from Indigenous descent: 9% lower for men, 4% for women. However, the effect was sensitive to the definition of work experience used, and is potentially smaller. Decomposition finds that around 70% (men) and over 80% (women) of the raw income difference (of 29 and 19%) between Indigenous and non-Indigenous Australians can be attributed to differences in characteristics.</p>

Source	Country, Year	Data source/ Data type	Outcomes examined	Econometric method	Main findings/Notes
Daly et al. 1993	Australia, 1971-1991	Census 1971, 1976, 1981, 1986, 1991, cross-sectional	Labour force status (full-time employed, part-time employed, unemployed and NILF)	Multinomial logit only for 1986 (other years used in descriptive analyses only)	1) Aboriginality had a negative effect on the probability of being employed even after controlling for a range of other characteristics. 2) Educated Aboriginal people were more likely to be in full-time employment and less likely to be unemployed or NILF than were the less educated. The effect of tertiary qualifications was particularly marked for Aboriginal females, for whom these qualifications increased the probability of being in full-time employment to an even greater extent than for non-Aboriginal females; 2) Aboriginal people were less likely to be in full-time employment and more likely to be NILF if they lived in a rural area
Gray and Hunter 2002	Australia, 1981-1996	Census, 1981, 1986, 1991, 1996, synthetic panel	Employment status, Labour force participation (due to grouped nature of data, these are proportions within the cohort)	Weighted OLS on logit-transformed dependent variable (Fixed Effects by 10-year age cohorts)	Cohort-specific variables (cohort dummies or fixed effects) pick up unobserved differences between cohorts. Simple OLS results differ from the results accounting for fixed effects by age cohort, but the direction and relative size of effects are similar between the two approaches. The negative and positive effects on employment and labour force participation of low and high education levels respectively are larger for Indigenous men and women than for non-Indigenous men and women, while not speaking English well has a smaller/no effect for Indigenous men and women.
Gray and Hunter 2005a	Australia, 1996-1997	Indigenous Job Seeker Survey, 1996- 1997 (waves 1 to 3); Panel	Job finding success and job retention (i.e. whether respondent found and retained employment for three or more consecutive months)	Logit	High rates of movements between labour force states by Indigenous Australians were found. Of respondents who were employed at the time of the first wave of the IJSS, half were not employed 15 months on. The most stable Indigenous labour force states were unemployment and NILF. A higher search intensity leads to a higher job finding rate but does not make it more likely to retain the job. Searching jobs through answering newspaper advertisements make it more likely to find and retain a job.
Halchuk 2006	Australia, 2002	NATSISS 2002	Employment status (separate models by gender and remoteness)	Logit	1) Similar to previous research, negative impacts for previous incarceration, positive returns for education, training and technology are found. Mobility has a negative impact on employment outcomes indicating that Indigenous people do not relocate for employment opportunities.

Source	Country, Year	Data source/ Data type	Outcomes examined	Econometric method	Main findings/Notes
					<p>2) Social networks are an important determinant in employment outcomes, particularly for Indigenous women located in urban and inner regional locations, but it also plays a role in improving employment outcomes for urban males.</p> <p>3) Women residing in urban and inner regional locations with higher educational qualifications and other employment-related skills do well employment-wise, but women without these characteristics do not.</p> <p>4) The fact that males and females in these locations tend to hold higher levels of education and training suggests that individuals relocate to areas where their skills will provide high marginal returns to employability.</p>
Hunter 1997	Australia, 1994	NATSIS 1994	Employment status (all employment and employment excluding CDEP employment)	Logistic regression	Provides a detailed review of the regression results in ABS (1996) <i>Employment Outcomes for Indigenous People</i> . The most important finding is that education is the most important factor associated with the low employment rates of Indigenous Australians. In comparison, most demographic, geographic and social characteristics are minor influences only. However, recent arrest and poor health have been found to be very important as well, but are complex issues which require separate in-depth investigation.
Hunter 2002	Australia, 1981-1996	NATSIS 1994, Census, 1981, 1986, 1991, 1996 (repeated cross-sectional data)	Proportion of group employed	Weighted OLS on logit transformed dependent variable	Census-based estimates of the measured factors underlying employment prospects are reasonably stable over time despite a substantial expansion of the CDEP scheme in various parts of the country. In rural and remote areas, CDEP provides around half of all employment. Although this institutional development does not excessively distort the underlying determinants of Indigenous employment, it is still advisable that the measures of statistical discrimination are estimated at a regionally disaggregated level in order to minimise this potential distortion.
Hunter 2004	Australia, 2001	Census 2001, cross-sectional	Total employed, Labour force participation, Full-time employed, Employed in the private sector	Weighted OLS on logit transformed dependent variable, and a decomposition analysis	Main findings on self employment and labour force status from Daly (1995) were confirmed in this study. The formal statistical analysis confirms that the lower educational attainment is the major factor underlying Indigenous labour

Source	Country, Year	Data source/ Data type	Outcomes examined	Econometric method	Main findings/Notes
					<p>force status. Other important factors include basic demographic factors, especially the disproportionately youthful nature of the Indigenous workforce, regional factors, family variables and marital status.</p> <p>The results indicate that the potential for racial discrimination of Indigenous Australians is high in all analyses. Potential proportion attributable to discrimination is between 65.4 and 83.1% for total employment, between 85.5 and 101.2% for private sector employment and between 60.1 and 86.8% for full-time employment. However, these high proportions could also be caused by differences in preferences rather than differences in constraints such as those caused by discrimination. There is also a high potential for sexual discrimination, and in fact Indigenous men are more similar to non-Indigenous men than Indigenous women with regard to the processes determining employment outcomes.</p>
Hunter and Gray 2001	Australia, 1994	NATSIS 1994	Labour market outcomes (non-CDEP employment, CDEP employment, unemployment, discouraged worker and other NILF)	Multinomial logit	<p>Indigenous people are more likely (4 times for men and 3 times for women) to be discouraged from looking for work than other Australians. Labour supply factors (including family, cultural and social environmental factors) are found to be important in discouraging Indigenous jobseekers, but the interaction between the supply and demand side of the labour market also seems important. The study finds that Indigenous people want to work as much as other Australians. Policies aimed at increasing the demand for their services are therefore crucial. E.g. through education and regional development policies.</p> <p>The usual effects are found on other labour market outcomes.</p>
Hunter and Gray 2004	Australia, 1996-1997	Indigenous Job Seeker Survey (IJSS) 1996-1997 3-wave panel	Job search methods and intensity	Descriptive summary statistics	<p>The study finds that non-Indigenous job seekers are more likely to use more pro-active search methods such as answering newspaper job advertisements and directly contacting employers. Indigenous job seekers are more likely to report having asked friends or relatives about jobs. This stressed the importance of Indigenous social networks and</p>

Source	Country, Year	Data source/ Data type	Outcomes examined	Econometric method	Main findings/Notes
					location to the success of Indigenous job search
Ross 2006	Australia, 2002	NATSISS 2002	Employment status	Probit	The focus is on self-assessed health and the presence of a disability. Both have significant and considerable impacts on a person's employment status. No marginal effects are computed but the effect of poor health relative to excellent health seems of a similar magnitude as having a degree versus having less than Year 10.
Stephens 2010	Australia, 2002	NATSISS 2002	Labour force status (employed ,CDEP participant, unemployed or NILF)	Multinomial logit	The analysis confirms the importance of a range of geographic, demographic, cultural and human capital related factors as determinants of labour supply among Indigenous Australians. One notable difference from prior research is that education generally has a weaker effect on employment prospects in this study. This may be driven by the use of very low education levels as the omitted category in prior studies. Compared to non-remote areas, there are significantly lower returns to education and health in remote areas. The author also notes an apparent tension between mainstream employment and cultural attachment which points to the possibility that acquiring mainstream employment may be associated with some trade-off with traditional culture and obligations for some people. The welfare effects of higher rates of mainstream employment may, therefore, not be unambiguously positive.
Taylor 1993	Australia, 1986	Census 1971, 1976, 1981, 1986	Industry composition	Indexation (Duncan Index of industrial segregation)	The study documents the industry composition of the Aboriginal and Torres Strait Islander workforce and measures the extent to which it differs from the general workforce. It finds evident patterns of relative employment concentration and exclusion in particular industry classes. In 1986 ATSI were predominantly employed in the public sector. It also examines changes in industry segregation among ATSI since 1971, and finds that segregation declined steadily from 1971 to 1986.

Source	Country, Year	Data source/ Data type	Outcomes examined	Econometric method	Main findings/Notes
Vurens van Es and Dockery 2008	Australia, 2002	NATSISS 2002	Labour force participation, and non-CDEP employment	Logit	This study incorporated a social capital index (using social variables such as access to cultural networks, sports, volunteering and support networks in times of crisis) in the estimation of participation and employment. As the authors note it is an exploratory study using this relatively new concept. They find 1) The quantity of social capital which an individual may utilise is positively related to labour market outcomes; 2) The diversity of the social capital which an individual may utilise is positively related to labour market outcomes; 3) The relationship between social capital and labour market outcomes varies by geographic location and by gender.
New Zealand					
Alexander and Genç 2005	New Zealand, 2002	Income Survey 2002	Labour force participation and labour force status (NILF, unemployed, part-time employed, full-time employed)	Probit (for labour force participation) and Multinomial logit (for labour force status)	The study is for the overall New Zealand population but includes a separate coefficient for four ethnic groups, one of which is the group of Maori. It is found that Maori individuals are more likely to be unemployed or out of the labour force. They present results from Statistics New Zealand that show that the raw difference in labour force participation is fairly modest at 2 to 3.5 percentage points lower for Maori compared to New Zealanders from European descent.
Alexander, Genç and Jaforullah 2001	New Zealand, 1997-1999	Income Survey 1997 – 1999	Employment status; Wage	Probit (employment status); OLS (log hourly wage)	Again, estimating a model for all New Zealanders, significant ethnic and gender wage differentials are found. Specifically, Maori, Pacific Island and other non-European ethnic groups suffer labour market discrimination compared to those from European ethnicity which is unexplained by observable characteristics. The magnitude of the coefficient on being from Maori background is twice that on being from a Maori-mixed background, and it is comparable with that on being from a Pacific Island background. Other non-European ethnic groups show the largest negative effects on employment. Maori receive 13% lower actual hourly wages than those from European ethnicity, even when they have the same

Source	Country, Year	Data source/ Data type	Outcomes examined	Econometric method	Main findings/Notes
					productivity characteristics. This is even lower for Pacific Island people and other non-European ethnicities who receive 17% and 20% lower hourly rates respectively. The 'mixed' group of Maori earn about 6% less.
Chapple 2000	New Zealand, 1985-1997	Household Labour Force Survey 1997, and Census 1986, 1991, 1996	A number of outcomes: employment, wages	Descriptive analysis, simple <i>univariate</i> regressions	The author assigns the variation in disparity between non-Maori and Maori mostly to worsening relative performance of the sole Maori sub-ethnic group, who have low education levels and live outside major urban centres. They experience the largest disadvantage. Alexander and Williams (2001) criticised this study on three grounds: 1) poorly documented evidence; 2) invalid statistical inferences; and 3) a different conclusion could be drawn based on the same information presented in the paper. Therefore, we do not report the results using these approaches
Chapple and Rea 1998	New Zealand, 1985-1998	Household Labour Force Survey, 1985-1998, quarterly panel data with a duration of 2 years for each household	Four measures of disparity: percentage disparity, disparity ratio, Duncan Index (authors' preferred choice) and Karmel and Maclachlan Index. Indexes are calculated for labour force status (i.e. employed, unemployed and NILF). Comparing non-Maori/Maori, non-Maori/mixed Maori, non-Maori/sole Maori, mixed Maori/sole Maori	Indexation: Duncan Index (Duncan and Duncan 1955); Karmel and Maclachlan Index (Karmel and Maclachlan 1988)	A gap in outcomes between sole Maori and mixed Maori groups is emerging. The authors try to explain this phenomenon. Characteristics of the two groups differ. It is sole Maori with low literacy, poor education and living in geographical concentrations that have socio-economic problems, not the Maori ethnic group as a whole, suggesting that intra-ethnic group variation can be far greater than inter-ethnic group variation. Relative labour market performance for the Maori ethnic group was considerably worse in 1998 than in 1985. The deterioration occurred between 1985 and 1992 since, relative Maori labour market performance improved between 1992 and 1996. This variation was mostly due to the time series variation in disparity for the sole Maori subset of the Maori ethnic group. There is no widening or narrowing gap for the mixed Maori group while there is both rising and falling disparity for the sole Maori group. The authors assign some of the difference in outcomes to the fact that the two groups are in different geographical labour markets.

Source	Country, Year	Data source/ Data type	Outcomes examined	Econometric method	Main findings/Notes
Dixon and Maré 2007	New Zealand, 1997-2003	Income Survey, 1997-2003, cross-sectional	Income distribution	Kernel density estimation methods	<p>In the 1980s and early 1990s, Maori were more vulnerable to job loss than people of other ethnic groups, since they were over-represented in lower skilled jobs and in the primary sector and manufacturing industries, which were hardest hit.</p> <p>The authors show that transition of many Maori who were previously not working into employment had a large impact on the aggregate income distribution between 1997 and 2003 (a period of economic growth), making it more equal and decreasing the Maori - European income gap.</p> <p>The authors also conclude that “changes in the distribution of other income-related attributes, particularly education, and changes in the occupational structure of Maori employment may also have made a significant contribution” (p.598).</p>
Maani 2002	New Zealand, 1986 and 1996	Census 1986, 1996; Cross-sectional	Log annual income, income differential	OLS (income); Oaxaca-Blinder decomposition (income differential)	<p>Separate models for income are estimated by gender, ethnicity (Maori, part-Maori, European) and year. The decomposition results highlight the importance of differences in ‘characteristics’, such as education, hours of work and occupation, rather than differential returns to higher skills by ethnicity in explaining the income gap. It is also clear the income gap has widened. Returns to educational investments for Maori were higher at every level of education. Maori without school qualifications were most disadvantaged compared to Europeans. Maori participation in higher education has increased from 1986 to 1996 (although it is still not at the same rate as that of Europeans). Controlling for a wide range of characteristics Maori living in rural areas are most disadvantaged.</p> <p>The observed gap in occupational status mostly disappears – particularly in 1996, once educational attainment is controlled for. This has caused the income gap at the higher education levels to narrow over the period.</p>

Source	Country, Year	Data source/ Data type	Outcomes examined	Econometric method	Main findings/Notes
Singley and Callister 2004	New Zealand, UK, US, 1986-2002	Household Labour Force Survey, 1986-2002; British Labour Force Survey, 1986-2002; US Current Population Survey, 1986-2000; Panel	Household joblessness	Measure polarisation: difference between the actual household joblessness rate and the predicted household joblessness rate when individual joblessness is randomly distributed across individuals, regardless of household type	The study analyses joblessness among the general population, while distinguishing differences by groups. New Zealand households in which all working-aged members were Maori saw especially large increases in joblessness. These rates did not recover to 1986 levels as they did for the population as a whole. The authors suggest “that the economic shocks of the late 1980s and early 1990s, which [...] had a disproportionately negative effect on Maori employment, had longer-lasting effects on the Maori population that are still being felt in 2002” (p.45).
Winkelmann and Winkelmann 1997	New Zealand, 1981-1991	Census 1981, 1986, 1991	Labour market outcomes	Multinomial logit	The difference between Maori and non-Maori cannot be explained by observed characteristics alone, and the same characteristics affect the two groups differently. Disparities increased between 1986 and 1991. The beneficial effect of education is substantially larger for Maori than for non-Maori: “having no qualifications imposes an exceptionally high penalty on Maori”. Marriage increases the probability of non-participation and decreases the probability of employment for non-Maori women, but not for Maori women. The latter show a relatively strong labour market attachment.
Canada					
Pendakur and Pendakur 2009	Canada, 2001	Census 2001	Earnings, and total income	OLS	Aboriginal men and women, even those with high levels of education, face severe earnings and income disparity relative to persons from majority groups in Canada. Disparity is greatest at the bottom quintile of the conditional distribution and smallest at the top quintile and decile of the conditional distribution. That is, the distribution of earnings for the Aboriginal group is stretched and with more probability mass at low earnings compared with the distribution of earnings in the majority population. Different from observations for other ethnic groups, it seems that the greater the size of an urban Aboriginal community, the worse the economic outcomes for its members. With the exception of Inuit women, income is between 11

Source	Country, Year	Data source/ Data type	Outcomes examined	Econometric method	Main findings/Notes
					and 50% lower for the different Aboriginal groups. This is much larger than for non-Aboriginal ethnic minorities.
Walters, White and Maxim 2004	Canada, 1995	1995 National Graduates Survey	Labour market outcomes and Earnings	Multinomial logit and OLS	Aboriginal postsecondary graduates in Canada earn more than both non-minorities and visible minorities, when socio-demographic characteristics and type of postsecondary attainment are controlled for. They have better employment prospects if they have graduated from a trades or college program than from a university program. So although Aboriginals with university degrees report the highest earnings, they also report the lowest levels of full-time employment and highest levels of unemployment, when compared with non-Aboriginal university graduates.
US					
Gitter and Reagan 2002	US, 1979-1990	National Longitudinal Surveys of Youth 1979, 1979-1990 waves	Employment	Random effects probit model	American Indians are almost 10 percentage points less likely to be employed; those who reside in a county with a reservation are 11-14 percentage points less likely to be employed. Very few demographic and geographic variables are included in the model. Only men are included in the sample. They are aged between 15 and 21 in 1979.
Mexico					
de Janvry and Sadoulet 2001	Mexico, 1997	Survey of the peasant communities in rural Mexico	Off-farm employment and income from off-farm employment	Multinomial regression and OLS/Tobit	Indigenous populations are less likely to work in more profitable off-farm activities, such as non-agricultural employment and seasonal migration, and more likely to be self-employed. This contributes to their poverty.
De Alba 2010	Mexico	National Household Survey of Income and Expenditure, 2008	Poverty, income distribution, inequality	Calculation of a range of measures, such as poverty headcount, Foster, Greer and Thorbecke poverty measures, Lorenz curve, Gini coefficient	These data allow for the first time comparison at the individual level of Indigenous versus non-Indigenous populations. Indigenous populations are clearly poorer than non-Indigenous populations, and it is strongest in rural areas. There is less inequality within the Indigenous population compared to the non-Indigenous population.

Appendix B: Supplementary tables and figures

Appendix Table 1: Alcohol consumption comparison: NATSISS 2002 and 2008

Share (%) of population with consumption level	NATSISS 2002	NATSISS 2008
Risky alcohol consumption (12 months average)		
Low risk	75.2	72.5
Medium risk	15.7	17.6
High risk	9.0	10.0
Number of weighted observations	168,667	201,527
Risky alcohol consumption (2 weeks average)		
Low risk	23.9	25.1
Medium risk	25.7	22.2
High risk	50.5	52.7
Number of weighted observations	127,301	157,306

Notes: The NATSISS data use a definition based on NHMRC guidelines for men and women to identify risky alcohol use, but express it in ml of alcohol the individual drinks per day instead of standard drinks. For males: low risk = up to 4 standard drinks per day, medium risk = 5 or 6, high risk = 7 or more. For females: low risk = up to 2 standard drinks per day, medium risk = 3 to 4, high risk = 5 or more.

Appendix Table 2: Descriptive statistics for Indigenous Australians by labour force status, 2004

	NILF	Unemployed	Part-time	Full-time	Total
Age	110,310	33,396	64,975	102,442	311,122
Aged 15-24	36.8	48.1	39.0	21.3	33.4
Aged 25-34	19.0	25.9	21.6	25.7	22.5
Aged 35-44	16.0	16.6	20.5	26.8	20.5
Aged 45-54	13.8	8.2	13.7	19.5	15.1
Aged 55-64	14.5	1.3	5.2	6.7	8.6
Marital status (social)	110,310	33,396	64,975	102,442	311,122
Married	37.0	30.1	40.3	61.2	44.9
Not married	63.0	69.9	59.8	38.8	55.1
Sex	110,310	33,396	64,975	102,442	311,122
Male	34.0	54.5	41.0	65.3	48.0
Female	66.0	45.5	59.0	34.7	52.0
Highest year of school completed	110,310	33,396	64,975	102,442	311,122
Year 12 or equivalent	10.2	15.6	23.0	33.7	21.2
Year 11 or equivalent	12.6	17.5	15.5	14.2	14.3
Year 10 or equivalent	27.9	32.7	35.4	32.5	31.5
Year 9 or equivalent	22.7	20.4	15.5	11.3	17.2
Year 8 or below	26.6	13.7	10.6	8.3	15.9
Student status	110,310	33,396	64,975	102,442	311,122
Not attending	78.0	80.4	76.8	84.0	80.0
Full-time	19.2	16.4	17.2	4.5	13.6
Part-time	2.8	3.2	23.2	16.0	6.4
Post-school qualification	16,971	8,600	19,810	47,838	93,218
Postgraduate Degree Level, Graduate Diploma or Certificate	1.7	1.4	2.8	5.1	3.7
Bachelor Degree level	6.6	6.4	11.3	14.1	11.4
Advanced Diploma and Diploma Level	13.7	8.9	12.7	14.3	13.3
Certificate Level	78.0	83.3	73.2	66.5	71.6
Place of residence	110,310	33,396	64,975	102,442	311,122
New South Wales	32.6	34.1	24.5	26.9	29.2
Victoria	6.3	6.7	6.2	7.3	6.6
Queensland	24.8	23.4	31.3	29.9	27.7
South Australia	5.5	6.3	5.9	5.0	5.5
Western Australia	12.7	14.1	14.4	13.7	13.5
Northern Territory	14.0	12.1	13.2	11.4	12.8
Tasmania/ Australian Capital Territory	4.1	3.4	4.6	5.8	4.7
ASGC remoteness area	110,310	33,396	64,975	102,442	311,122
NSW Major Cities	11.8	16.0	9.9	13.5	12.4
NSW Inner Regional	10.4	11.9	9.2	8.1	9.6
NSW Outer Regional	8.6	4.7	4.1	3.7	5.6
Vic Total	6.3	6.7	6.2	7.3	6.6
Qld Major Cities	4.8	7.6	10.8	10.3	8.2

Appendix Table 2: Descriptive statistics for Indigenous Australians by labour force status, 2004

	NILF	Unemployed	Part-time	Full-time	Total
Qld Inner Regional	5.8	4.7	6.2	4.7	5.4
Qld Outer Regional	8.0	6.8	8.1	9.0	8.2
Qld Remote/Very remote	6.3	4.3	6.3	5.9	5.9
WA Non-Remote	7.4	10.1	6.6	8.5	7.9
WA Remote/Very remote	5.3	4.0	7.8	5.2	5.7
NT Remote/Very remote	12.0	10.2	11.7	7.5	10.3
Balance of Australia - Non-remote	10.4	10.5	10.5	13.8	11.5
Balance of Australia - Remote/Very remote	3.1	2.6	2.8	2.5	2.8
Number of bedrooms	109,731	33,086	64,394	102,033	7,290
1 bedroom	2.4	4.0	2.8	2.2	3.2
2 bedrooms	13.2	15.9	12.3	12.9	14.3
3 bedrooms	56.6	45.4	54.9	50.9	56.8
4 bedrooms	22.9	28.2	23.2	27.3	21.3
5 or more bedrooms	5.0	6.5	6.8	6.7	4.4
Tenure type	109,759	33,086	64,394	102,153	309,392
Owned without a mortgage	7.1	4.4	7.3	9.0	7.5
Owned with a mortgage	10.8	14.6	21.9	35.2	21.6
Rented	80.9	79.9	68.7	54.0	69.4
Other	1.2	1.1	2.2	1.9	1.6
Household composition	110,310	33,396	64,975	102,442	311,122
One family household	69.5	75.4	74.2	77.1	73.6
Two and three family households	19.4	14.2	14.4	8.6	14.2
Lone person households	7.0	6.6	6.4	8.0	7.2
Group households	4.2	3.8	5.0	6.3	5.0
Individual income (weekly)	89,145	25,611	60,765	95,738	271,259
\$1-\$149	14.8	20.9	11.4	0.8	9.7
\$150-\$249	29.3	45.1	18.3	1.6	18.5
\$250-\$399	33.8	20.8	21.9	4.5	19.5
\$400-\$599	15.2	9.6	21.8	12.9	15.3
\$600-\$799	5.8	2.7	15.7	23.4	13.9
\$800-\$999	0.9	0.4	4.9	20.4	8.6
\$1,000-\$1,299	0.1	0.5	3.2	19.3	7.6
\$1,300-\$1,599	0.1	0.0	2.4	9.5	3.9
\$1,600-\$1,999	0.1	0.0	0.4	3.2	1.3
\$2,000 or more	0.0	0.0	0.1	4.4	1.6
Household income (weekly)	88,146	26,768	50,293	81,868	247,074
\$1-\$149	1.4	0.7	0.2	0.1	0.7
\$150-\$249	4.5	6.9	1.4	0.2	2.7
\$250-\$349	7.8	7.3	3.3	0.2	4.3
\$350-\$499	14.8	13.8	7.0	1.4	8.6
\$500-\$649	15.2	14.7	7.4	2.3	9.3
\$650-\$799	11.3	10.9	10.5	5.2	9.1
\$800-\$999	11.7	13.1	12.8	10.9	11.8

Appendix Table 2: Descriptive statistics for Indigenous Australians by labour force status, 2004

	NILF	Unemployed	Part-time	Full-time	Total
\$1,000-\$1,199	9.9	11.6	11.5	11.4	10.9
\$1,200-\$1,399	6.8	4.6	8.1	11.4	8.4
\$1,400-\$1,699	6.4	7.4	13.9	14.0	10.6
\$1,700-\$1,999	3.1	3.9	6.0	11.2	6.5
\$2,000-\$2,499	3.7	3.6	7.8	14.3	8.0
\$2,500-\$2,999	2.4	1.0	5.8	9.5	5.3
\$3,000-\$3,499	0.9	0.2	3.7	3.4	2.2
\$3,500 or more	0.1	0.5	0.8	4.7	1.8
Household income (weekly): equivalised	88,146	26,768	50,293	81,868	247,074
\$1-\$149	4.8	4.2	1.7	0.3	2.6
\$150-\$249	17.8	21.8	6.7	1.3	10.5
\$250-\$399	46.9	42.5	25.5	9.0	29.5
\$400-\$599	18.7	18.0	27.1	20.7	21.0
\$600-\$799	6.8	8.9	18.6	22.3	14.6
\$800-\$999	2.3	2.3	9.7	17.0	8.7
\$1,000-\$1,299	1.8	1.6	6.1	17.0	7.7
\$1,300-\$1,599	0.5	0.4	2.2	5.8	2.6
\$1,600-\$1,999	0.3	0.2	2.2	3.8	1.8
\$2,000 or more	0.0	0.0	0.4	2.8	1.0
Hours worked (weekly)	N.A.	N.A.	64,975	101,909	166,884
1-15 hours			34.3	N.A.	13.4
16-24 hours			32.2	N.A.	12.6
25-34 hours			33.5	N.A.	13.0
35-39 hours			N.A.	37.2	22.7
40 hours			N.A.	27.8	17.0
41-49 hours			N.A.	14.4	8.8*
50 hours or more			N.A.	20.6	12.58*
CDEP participation	N.A.	N.A.	64,975	102,442	167,416
CDEP participant			20.6	4.1	10.5
Not CDEP participant			79.4	95.9	89.5
Industry of employment	N.A.	N.A.	46,857	81,415	128,272
Agriculture, Forestry and Fishing			3.8	4.1	4.0
Mining and Electricity, Gas and Water Supply			0.9	5.3	3.7
Manufacturing			2.6	10.4	7.5
Construction			3.5	12.8	9.4
Wholesale Trade			0.9	2.8	2.1
Retail Trade			14.1	5.2	8.5
Accommodation, Cafes and Restaurants			18.3	3.3	8.8
Transport and Storage			5.7	5.0	5.3
Communication Services and Finance and Insurance			3.9	2.7	3.1
Property and Business Services			7.2	6.0	6.4
Government Administration and Defence			4.1	16.1	11.7

Appendix Table 2: Descriptive statistics for Indigenous Australians by labour force status, 2004

	NILF	Unemployed	Part-time	Full-time	Total
Education			11.1	6.9	8.5
Health and Community Services			15.3	12.0	13.2
Cultural and Recreational Services			2.9	2.6	2.7
Personal and Other Services			5.6	5.0	5.2
Occupation (ANZSCO 2006)	N.A.	N.A.	64,715	101,998	166,713
Managers			2.3	6.7	5.0
Professionals			12.0	13.0	12.6
Technicians and Trades Workers			9.1	16.2	13.4
Community and Personal Service Workers			20.7	14.4	16.8
Clerical and Administrative Workers			7.3	14.9	12.0
Sales Workers			11.9	3.3	6.6
Machinery Operators and Drivers			3.9	13.4	9.7
Labourers			32.8	18.2	23.9

Source: NATSIHS 2004

Note: See Table 7

Appendix Table 3: Descriptive statistics for non-Indigenous Australians by labour force status, 2004

	NILF	Unemployed	Part-time	Full-time	Total
Age	3,043,570	443,276	3,016,459	7,542,169	14,045,475
Aged 15-24	23.1	44.8	30.6	14.6	20.8
Aged 25-34	13.3	18.6	14.9	25.5	20.3
Aged 35-44	14.1	19.7	20.9	24.5	21.3
Aged 45-54	16.7	8.2	19.5	23.8	20.9
Aged 55-64	32.9	8.8	14.1	11.6	16.7
Marital status (social)	3,043,570	443,276	3,016,459	7,542,169	14,045,475
Married	54.7	34.4	52.9	61.9	57.6
Not married	45.3	65.6	47.1	38.1	42.5
Sex	3,043,570	443,276	3,016,459	7,542,169	14,045,475
Male	37.2	51.4	26.5	64.6	50.1
Female	62.8	48.6	73.5	35.4	49.9
Highest year of school completed	3,039,046	443,276	3,013,946	7,536,266	14,032,534
Year 12 or equivalent	37.2	44.9	53.6	58.8	52.6
Year 11 or equivalent	13.1	15.4	14.3	12.7	13.2
Year 10 or equivalent	29.9	24.1	24.7	22.3	24.5
Year 9 or equivalent	9.8	9.8	5.3	4.5	6.0
Year 8 or below	10.0	5.8	2.2	1.8	3.8
Student status	3,043,570	443,276	3,016,459	7,542,169	14,045,475
Not attending	81.1	79.6	78.6	98.5	89.9
Full-time	18.9	20.4	21.4	1.5	10.2
Part-time	N.A.	N.A.	N.A.	N.A.	N.A.
Post-school qualification	1,301,922	228,597	1,695,587	5,500,810	8,726,916
Postgrad. Degree, Grad. Diploma or Certificate	13.6	8.3	13.7	15.5	14.7
Bachelor Degree level	17.1	21.0	21.6	24.9	23.0
Advanced Diploma and Diploma Level	13.0	12.3	16.0	13.8	14.1
Certificate Level	56.4	58.4	48.8	45.7	48.2
ASGC remoteness area	3,043,570	443,276	3,016,459	7,542,169	14,045,475
NSW Major Cities	25.6	28.8	19.3	26.0	24.6
NSW Inner Regional	7.3	8.4	6.3	5.2	6.0
NSW Outer Regional	2.6	1.1	2.5	1.6	2.0
Vic Total	25.2	27.0	26.8	24.1	25.0
Qld Major Cities	8.0	7.9	10.4	11.6	10.5
Qld Inner Regional	6.4	6.0	6.5	5.4	5.9
Qld Outer Regional	3.9	0.9	2.4	3.4	3.2
Qld Remote/Very remote	0.4	0.3	0.5	0.5	0.5
WA Non-Remote	8.3	7.2	11.0	9.7	9.6
WA Remote/Very remote	0.5	0.0	0.5	0.8	0.7
NT Remote/Very remote	0.1	0.0	0.1	0.1	0.1
Balance of Australia - Non-remote	11.7	12.4	13.8	11.2	11.9
Balance of Australia - Remote/Very remote	0.1	0.0	0.2	0.3	0.2

Appendix Table 3: Descriptive statistics for non-Indigenous Australians by labour force status, 2004

	NILF	Unemployed	Part-time	Full-time	Total
Place of residence	3,043,570	443,276	3,016,459	7,542,169	14,045,475
New South Wales	35.5	38.3	28.1	32.9	32.6
Victoria	25.2	27.0	26.8	24.1	25.0
Queensland	18.7	15.1	19.6	20.9	20.0
South Australia	7.2	8.4	8.2	6.9	7.3
Western Australia	8.8	7.2	11.5	10.6	10.3
Northern Territory	0.5	0.1	0.9	1.1	0.9
Tasmania/ Australian Capital Territory	4.2	3.9	4.9	3.5	4.0
Number of bedrooms	3,042,791	434,077	3,014,825	7,540,510	14,032,203
None	0.2	0.5	0.4	0.1	0.2
1 bedroom	2.4	6.7	1.8	3.2	2.9
2 bedrooms	12.6	12.1	9.8	12.9	12.1
3 bedrooms	44.2	41.8	38.6	39.9	40.6
4 bedrooms	32.2	29.1	37.9	34.1	34.3
5 or more bedrooms	8.5	9.8	11.6	9.8	9.9
Tenure type	3,041,010	443,276	3,013,085	7,527,685	14,025,057
Owned without a mortgage	15.5	8.0	10.7	6.9	9.6
Owned with a mortgage	52.5	47.9	65.2	66.1	62.4
Rented	29.8	41.7	21.9	24.8	25.8
Other	2.2	2.4	2.1	2.1	2.2
Household composition	3,043,570	443,276	3,016,459	7,542,169	14,045,475
One family household	88.7	81.9	91.3	84.2	86.6
Two and three family households	3.0	4.2	1.2	2.5	2.4
Lone person households	7.2	11.7	6.6	11.8	9.7
Group households	1.2	2.2	1.0	1.4	1.3
Individual income (weekly)	2,609,457	371,495	2,928,950	7,441,872	13,351,775
\$1-\$149	24.5	24.2	16.9	2.0	10.3
\$150-\$249	23.1	20.4	11.3	2.4	8.9
\$250-\$399	22.8	19.0	16.4	4.1	10.9
\$400-\$599	12.5	15.5	22.5	7.6	12.0
\$600-\$799	5.2	9.3	13.6	13.7	11.9
\$800-\$999	4.4	3.9	7.5	16.4	11.7
\$1,000-\$1,299	3.3	2.7	5.3	20.0	13.0
\$1,300-\$1,599	1.5	1.3	2.6	13.9	8.7
\$1,600-\$1,999	1.0	1.2	1.8	8.9	5.6
\$2,000 or more	1.7	2.6	2.1	11.0	7.0
Household income (weekly)	3,023,289	439,871	2,995,685	7,518,120	13,976,964
\$1-\$149	1.1	1.8	0.6	0.4	0.6
\$150-\$249	2.5	3.8	0.7	0.5	1.1
\$250-\$349	4.5	2.4	1.2	0.5	1.6
\$350-\$499	7.0	4.7	3.2	1.3	3.1
\$500-\$649	9.0	10.1	4.3	1.5	4.0
\$650-\$799	5.9	7.9	5.1	3.2	4.3

Appendix Table 3: Descriptive statistics for non-Indigenous Australians by labour force status, 2004

	NILF	Unemployed	Part-time	Full-time	Total
\$800-\$999	10.6	14.0	7.8	5.8	7.5
\$1,000-\$1,199	7.9	8.1	6.3	6.1	6.6
\$1,200-\$1,399	6.9	7.5	8.9	6.7	7.3
\$1,400-\$1,699	11.5	7.4	12.5	12.0	11.9
\$1,700-\$1,999	8.4	7.8	10.9	12.1	10.9
\$2,000-\$2,499	9.4	10.5	15.2	16.1	14.3
\$2,500-\$2,999	5.2	5.0	7.9	11.9	9.4
\$3,000-\$3,499	4.7	3.9	5.3	8.5	6.9
\$3,500 or more	5.5	5.3	10.2	13.4	10.8
Hours worked (weekly)	N.A.	N.A.	2,831,426	7,385,043	10,216,469
1-15 hours			38.8	N.A.	10.8
16-24 hours			27.9	N.A.	7.7
25-34 hours			33.3	N.A.	9.2
35-39 hours			N.A.	25.8	18.7
40 hours			N.A.	25.1	18.1
41-49 hours			N.A.	21.2	15.3
50 hours or more			N.A.	27.9	20.2
Sector (public/private)	N.A.	N.A.	3,006,014	7,538,169	10,544,183
Public sector			19.2	21.7	21.0
Private sector			80.8	78.3	79.0
Industry of employment	N.A.	N.A.	3,012,199	7,518,691	10,530,890
Agriculture, Forestry and Fishing			2.1	2.9	2.6
Mining and Electricity, Gas and Water Supply			0.3	3.6	2.7
Manufacturing			3.5	12.8	10.1
Construction			3.4	10.1	8.1
Wholesale Trade			1.7	4.1	3.4
Retail Trade			18.5	6.8	10.2
Accommodation, Cafes and Restaurants			12.8	3.5	6.1
Transport and Storage			2.7	4.8	4.2
Communication Services and Finance and Insurance			3.9	7.6	6.6
Property and Business Services			11.7	13.4	12.9
Government Administration and Defence			2.7	8.6	6.9
Education			11.4	8.0	9.0
Health and Community Services			19.0	8.7	11.6
Cultural and Recreational Services			3.2	1.1	1.7
Personal and Other Services			3.2	4.1	3.8
Occupation (ANZSCO 2006)			3,016,459	7,540,764	10,557,223
Managers			5.5	15.7	12.8
Professionals			18.6	24.7	23.0
Technicians and Trades Workers			5.4	17.2	13.9
Community and Personal Service Workers			17.6	6.9	10.0
Clerical and Administrative Workers			17.3	14.2	15.1

Appendix Table 3: Descriptive statistics for non-Indigenous Australians by labour force status, 2004

	NILF	Unemployed	Part-time	Full-time	Total
Sales Workers			19.5	5.0	9.2
Machinery Operators and Drivers			2.7	8.0	6.5
Labourers			13.5	8.3	9.8

Source: HILDA wave 4 (2004)

Note: See Table 7

Appendix Table 4: Descriptive statistics of additional variables by labour force status for Indigenous Australians, 2004

	NILF	Unemployed	Part-time	Full-time	Total
Risky alcohol consumption - 1 week avg (2004)	90,510	19,744	53,386	79,710	243,349
Low risk	26.1	28.3	33.2	42.0	33.1
Medium risk	5.9	12.4	10.5	9.1	8.5
High risk	7.5	8.1	9.4	10.0	8.8
Has not consumed in the period/ Never consumed	60.5	51.2	46.8	38.9	49.7
Whether ever used substances	59,663	14,646	30,467	52,435	157,210
Has used substances	48.8	52.7	54.7	51.6	51.2
Has not used substances	51.2	47.3	45.3	48.4	48.8
Whether identifies with clan tribal or language group	62,976	14,614	32,325	60,696	170,611
Identifies with clan, tribal or language group	47.1	45.8	42.8	51.7	47.8
Does not identify with clan, tribal or language group	52.9	54.2	57.2	48.3	52.2
Self-assessed health status	112,533	26,179	60,784	81,838	281,333
Excellent	14.1	17.0	15.4	12.0	14.0
Very good	23.6	28.8	33.9	37.0	30.2
Good	32.5	36.1	34.4	38.3	34.9
Fair	19.6	15.0	13.2	10.5	15.2
Poor	10.2	3.1	3.2	2.3	5.7

Source: NATSIHS 2004

Note: See Table 7

Appendix Table 5: Descriptive statistics of additional variables by labour force status for non-Indigenous Australians, 2004

	NILF	Unemployed	Part-time	Full-time	Total
Risky alcohol consumption - number of drinks usually have per day	3,131,417	491,989	2,919,591	6,535,088	13,078,085
Low risk	54.6	43.8	56.5	66.6	60.6
Medium risk	11.9	14.8	15.5	13.6	13.7
High risk	7.4	21.7	12.2	11.0	10.8
Has not consumed in the period/ Never consumed	26.1	19.6	15.8	8.8	14.9
Self-assessed health status	2,774,609	419,031	2,663,610	5,768,010	11,625,260
Excellent	9.4	13.2	14.8	12.3	12.2
Very good	28.8	33.9	41.0	40.8	37.7
Good	31.4	37.4	34.3	37.4	35.3
Fair	22.0	13.5	8.5	8.5	11.9
Poor	8.4	2.0	1.5	1.0	2.9
Currently an active member of a sporting/hobby/community based association	2,766,139	423,936	2,668,475	5,784,867	11,643,417
Yes	36.7	31.7	41.6	37.7	38.1
No	63.3	68.3	58.5	62.3	61.9
How often get together socially with friends/relatives not living with you	2,780,273	423,241	2,666,676	5,788,911	11,659,101
Every day	8.0	12.4	7.8	2.5	5.4
Several times a week	29.3	26.5	29.1	22.1	25.6
About once a week	27.1	26.2	31.9	34.4	31.8
2 or 3 times a month	14.3	12.7	15.7	18.1	16.4
About once a month	9.6	9.1	8.1	12.5	10.7
Once or twice every 3 months	4.5	6.6	4.2	6.1	5.3
Less often than once every 3 months	7.1	6.6	3.2	4.4	4.9
I don't have anyone that I can confide in	2,757,050	424,516	2,659,162	5,778,994	11,619,722
[1] Strongly disagree	41.4	36.0	45.4	40.8	41.8
2	21.7	19.3	24.7	27.0	24.9
3	10.4	14.7	10.0	9.9	10.2
4	8.7	11.8	7.0	8.3	8.2
5	6.4	6.0	5.8	5.9	6.0
6	6.3	6.2	5.0	5.5	5.6
[7] Strongly agree	5.1	6.2	2.2	2.5	3.2
When I need someone to help me out, I can usually find someone	2,779,966	424,631	2,667,730	5,791,022	11,663,350
[1] Strongly disagree	4.4	2.6	2.1	2.0	2.6
2	4.8	3.1	3.0	3.6	3.7
3	5.1	10.2	4.4	4.2	4.7
4	10.8	15.7	9.6	10.4	10.5
5	15.0	15.9	16.4	17.6	16.6
6	28.2	25.8	30.9	34.1	31.7
[7] Strongly agree	31.7	26.6	33.6	28.2	30.2

Appendix Table 5: Descriptive statistics of additional variables by labour force status for non-Indigenous Australians, 2004

	NILF	Unemployed	Part-time	Full-time	Total
I have no one to lean on in times of trouble	2,761,698	422,674	2,656,063	5,779,264	11,619,700
[1] Strongly disagree	45.8	41.7	48.8	43.8	45.3
2	21.2	20.5	25.4	27.7	25.3
3	8.3	11.1	8.9	10.1	9.4
4	8.1	9.5	5.5	7.2	7.1
5	5.5	7.9	4.0	4.8	4.9
6	6.8	4.4	5.3	4.2	5.1
[7] Strongly agree	4.3	4.9	2.1	2.2	2.8

Source: HILDA wave 4 (2004)

Note: See Table 7

Appendix Table 6: Marginal effects on the probability of employment for Indigenous Australians in the extended specification using multinomial logit

Control variable	Male		Female	
	Part-time	Full-time	Part-time	Full-time
Age (effects of a 10-year increase)	-0.036***	0.063***	0.023***	0.035***
Partnered	-0.073***	0.282***	-0.015	0.021
Completed Year 10 or 11	0.029	0.081**	0.070**	0.105***
Completed Year 12	-0.022	0.194***	0.051	0.258***
Has non-degree post-school qualification	0.000	0.108***	0.059**	0.165***
Has degree	-0.056	0.141*	0.041	0.215***
Difficulty with English	0.167**	-0.293***	0.004	-0.044
NSW Inner Regional	0.190*	-0.119	-0.034	-0.069
NSW Outer Regional	0.294***	-0.271***	-0.058	-0.076
VIC Major Cities	0.075	0.006	0.077	0.027
VIC Inner/Outer Regional	0.055	-0.089	0.005	-0.070*
QLD Major Cities	-0.012	0.065	0.115	0.045
QLD Inner Regional	0.162	-0.207*	0.007	-0.025
QLD Outer Regional	0.081	0.025	0.036	0.020
SA Non-Remote	0.093	-0.053	-0.024	-0.031
WA Major Cities	0.13	-0.125	-0.090*	0.080
WA Inner/Outer Regional	0.048	-0.024	-0.056	0.113
TAS Non-Remote	0.122	-0.082	0.048	0.039
Balance of Australia - Non-remote	-0.004	0.093	-0.098**	0.174**
All of Australia: Remote/Very remote	0.181***	-0.094	0.038	0.061
Has income from non-labour, non-govt sources	0.033	0.024	0.049	-0.007
Log equivalised income of other hh. members	-0.003	-0.002	0.007***	0.001
One family household	0.020	-0.017	-0.035	0.020
Mixed household	0.025	-0.065	-0.025	0.013
Number of children aged <=14	0.000	-0.032**	-0.029***	-0.074***
Good health	0.016	-0.097***	-0.081***	-0.013
Fair health	-0.069**	-0.174***	-0.064*	-0.059**
Poor health	-0.018	-0.465***	-0.164***	-0.105**
Daily smoker	-0.001	-0.067**	-0.047**	-0.043*
Moderate drinker	0.004	0.112***	-0.021	0.040*
Infrequent high-risk drinker	-0.119***	0.076	-0.092	-0.132*
Frequent high-risk drinker	0.066	0.062	-0.151***	-0.005
Having a disability	0.011	-0.092***	-0.026	-0.024
Speaks an Indigenous language well	0.055*	-0.100**	0.038	-0.044
Cultural identification	0.016	-0.05	-0.098***	0.084***
Homelands	0.028	-0.083**	0.024	-0.039

Appendix Table 6: Marginal effects on the probability of employment for Indigenous Australians in the extended specification using multinomial logit

Control variable	Male		Female	
	Part-time	Full-time	Part-time	Full-time
Attending cultural events	0.062**	-0.013	0.050*	0.051**
Lacks contact	0.068	-0.087	0.011	-0.094***
Removed	-0.014	-0.145***	-0.038	-0.034
Arrest	0.047*	-0.164***	-0.071**	-0.078**
Number of observations	2737		3609	
Pseudo R-squared	0.229		0.169	

Source: Authors' estimation from NATSISS 2008

Note: See Table 16

Appendix Table 7: Marginal effects on the probabilities of full-time employment for 2004

Control variable	Indigenous		Non-Indigenous	
	Male	Female	Male	Female
Age (effects of a 10-year increase)	0.035***	0.001***	-0.062***	-0.086***
Partnered	0.178***	0.017	0.133***	-0.106***
Completed Year 10 or 11	0.122***	0.109***	0.062***	0.131***
Completed Year 12	0.280***	0.220***	0.045**	0.164***
Has non-degree post-school qualification	0.149***	0.119***	0.051***	0.066***
Has degree	0.274***	0.382***	0.069***	0.150***
NSW Inner Regional	-0.053	0.003	-0.108***	-0.035
NSW Outer Regional	-0.146*	0.004	-0.071	-0.030
Vic Total	-0.103	0.011	-0.028	-0.014
Qld Major Cities	0.036	-0.001	-0.006	0.037
Qld Inner Regional	-0.094	-0.021	-0.045	0.033
Qld Outer Regional	-0.040	0.011	-0.013	-0.052*
WA Non-Remote	-0.080	0.018	-0.017	0.001
Balance of Australia - Non-remote	-0.088	0.002	-0.048**	0.002
All of Australia: Remote/Very remote	-0.199***	0.046	0.044	0.054
Has income from non-labour, non-govt sources	0.089	-0.022	0.011	0.013
Log equivalised income of other hh. members	0.009**	0.006***	0.002	0.004**
One family household	-0.088	-0.063*	-0.004	-0.056**
Mixed household	-0.077	-0.059**	0.008	-0.028
Number of children aged <=17	-0.021*	-0.024***	-0.005	-0.143***
Good health	-0.025	-0.014	-0.051***	-0.060***
Fair health	-0.290***	-0.040**	-0.256***	-0.157***
Poor health	-0.379***	-0.131***	-0.583***	-0.293***
Daily smoker	-0.106***	-0.022	-0.033**	-0.025
Medium-risk drinker	0.119**	0.019	0.026	0.092***
High-risk drinker	0.093*	0.035	0.023	0.081**
Fair health	0.089	-0.022	0.011	0.013
Poor health	0.009**	0.006***	0.002	0.004**
Daily smoker	-0.088	-0.063*	-0.004	-0.056**
Moderate drinker	-0.077	-0.059**	0.008	-0.028
Infrequent high-risk drinker	-0.021*	-0.024***	-0.005	-0.143***
Frequent high-risk drinker	-0.025	-0.014	-0.051***	-0.060***
Number of observations	2326	2925	7002	7707
Pseudo R-squared	0.144	0.113	0.15	0.121

Source: Authors' estimation from NATSIHS 2004 (Indigenous) and NHS 2004-05 (non-Indigenous)

Notes: See Table 16. Geographic categories, Number of children and Alcohol use are defined differently from NATSIS 2008. Difficulty with spoken English is not available.

Appendix Table 8: Marginal effects on the probabilities of employment by gender for Indigenous Australians, with CDEP categorised as unemployed

Control variable	Male		Female	
	Part-time	Full-time	Part-time	Full-time
Age (effects of a 10-year increase)	-0.000***	0.008***	0.011***	0.017***
Partnered	-0.008*	0.240***	0.004	0.006
Completed Year 10 or 11	-0.008**	0.158***	0.061***	0.098***
Completed Year 12	-0.028***	0.249***	0.081***	0.224***
Has non-degree post-school qualification	-0.013***	0.161***	0.072***	0.151***
Has degree	-0.045*	0.273***	0.058***	0.225***
Difficulty with English	-0.008	-0.158***	-0.028	-0.037
NSW Inner Regional	0.000	0.005	-0.037	-0.049*
NSW Outer Regional	-0.005	-0.135*	-0.067**	-0.079***
VIC Major Cities	-0.006	0.075	0.023	0.040
VIC Inner/Outer Regional	-0.004	-0.123*	-0.029	-0.039
QLD Major Cities	-0.008	0.099	0.037*	0.074
QLD Inner Regional	0.000	-0.078	-0.008	-0.012
QLD Outer Regional	-0.003	0.052	0.013	0.021
SA Non-Remote	0.001	-0.043	-0.013	-0.019
WA Major Cities	0.001	-0.056	0.021	0.037
WA Inner/Outer Regional	0.000	-0.005	0.026	0.047
TAS Non-Remote	0.000	-0.006	0.007	0.011
Balance of Australia - Non-remote	-0.011	0.111	0.051***	0.134**
Remote/Very remote	0.000	-0.147**	0.018	0.029
Has income from non-labour, non-govt sources	-0.002	0.034	0.010	0.016
Log equivalised income of other hh members	0.000	-0.001	0.001	0.002
One family household	0.001	-0.013	0.008	0.011
Mixed household	0.001	-0.080	0.002	0.003
Number of children aged <=14	0.001*	-0.027**	-0.037***	-0.057***
Good health	0.002	-0.073**	-0.029***	-0.042***
Fair health	-0.013*	-0.222***	-0.050***	-0.064***
Poor health	-0.094***	-0.440***	-0.108***	-0.115***
Daily smoker	0.004*	-0.097***	-0.028***	-0.042***
Moderate drinker	-0.004*	0.109***	0.009	0.014
Infrequent high-risk drinker	0.001	-0.053	-0.070	-0.079
Frequent high-risk drinker	-0.008	0.099*	-0.064*	-0.075**
Number of observations	2824		3696	
Pseudo R-squared	0.151		0.129	

Source: Authors' estimation from NATSISS 2008

Notes: See Table 16. Individuals whose main job is part of CDEP are categorised as unemployed.

Appendix Table 9: Marginal effects on the probabilities of employment in the ‘compact’ specification

Control variable	Male		Female	
	Part-time	Full-time	Part-time	Full-time
Indigenous people				
Age (effects of a 10-year increase)	0.001***	-0.005***	0.005***	0.010***
Partnered	-0.034***	0.241***	0.010	0.018
Completed Year 12	-0.043***	0.194***	0.054***	0.173***
Has degree	-0.053*	0.199**	0.038***	0.193***
Difficulty with English	0.002	-0.195***	-0.039	-0.058*
All of Australia: Remote/Very remote	0.008**	-0.058**	0.019**	0.039**
Has income from non-labour, non-govt sources	-0.008	0.046	0.010	0.020
Log equivalised income of other hh. members	0.000	-0.001	0.001	0.002
Mixed household	0.004	-0.029	-0.004	-0.008
Number of children aged <=14	0.005***	-0.031***	-0.033***	-0.063***
Poor health	-0.082***	-0.429***	-0.091***	-0.114***
Daily smoker	0.018***	-0.117***	-0.034***	-0.064***
Frequent high-risk drinker	-0.007	0.038	-0.069*	-0.090***
Number of observations	2824		3696	
Pseudo R-squared	0.101		0.089	
Non-Indigenous people				
Age (effects of a 10-year increase)	0.030***	-0.083***	0.023***	-0.096***
Partnered	-0.057***	0.171***	0.015*	-0.057*
Completed Year 12	-0.017**	0.047**	-0.029***	0.133***
Has degree	-0.022***	0.061***	-0.037***	0.124***
Difficulty with English	0.072***	-0.321*	-0.210***	-0.352***
All of Australia: Remote/Very remote	-0.062***	0.153***	-0.015	0.052
Has income from non-labour, non-govt sources	-0.003	0.007	-0.005	0.022
Log equivalised income of other hh. members	0.002**	-0.006**	-0.001	0.004
Mixed household	0.000	0.001	-0.013	0.045
Number of children aged <=14	0.011**	-0.030**	0.043***	-0.178***
Poor health	0.028	-0.634***	-0.224***	-0.372***
Daily smoker	0.023***	-0.068**	-0.003	0.013
Frequent high-risk drinker	0.002	-0.005	-0.008	0.030
Number of observations	3733		4163	
Pseudo R-squared	0.139		0.121	

Source: Authors’ estimation from NATSISS 2008 (Indigenous) and HILDA wave 8 (non-Indigenous)

Notes: Entries are changes in the predicted probability of the associated outcome for an increase by one unit in the continuous variable, or for a change from 0 to 1 in the dummy variable, holding the other continuous variables at their respective means and dummy variables at 0. Standard errors are adjusted to allow for the ‘clustering’ effect of observations in the same household. *significant at 10%, **significant at 5%, ***significant at 1%.

Appendix Table 10: Contribution of each factor in explaining the gap in labour market attachment between Indigenous and non-Indigenous Australians

	Mean of non-Indigenous	Mean of Indigenous	Coef. of non-Indigenous	Contribution
Male				
Age	41.366	35.322	0.282	1474.2
Age squared (/100)	18.793	14.129	-0.401	-1617.7
Partnered	0.642	0.524	0.957	97.8
Completed Year 12	0.516	0.216	0.280	72.7
Has degree	0.236	0.041	0.389	65.9
Difficulty with English	0.009	0.037	-1.449	35.8
All of Australia: Remote/Very remote	0.014	0.264	1.426	-308.6
Has income from non-labour, non-govt sources	0.528	0.086	0.042	16.3
Log equivalised income of other hh. members	8.443	6.424	-0.037	-65.4
Mixed household	0.087	0.186	0.006	-0.6
Number of children aged <=14	0.536	1.212	-0.179	104.6
Poor health	0.027	0.075	-2.996	125.0
Daily smoker	0.212	0.512	-0.381	99.1
Frequent high-risk drinker	0.089	0.118	-0.032	0.8
Female				
Age	41.583	35.933	0.250	147.0
Age squared(/100)	18.935	14.544	-0.349	-159.4
Partnered	0.655	0.486	-0.237	-4.2
Completed Year 12	0.547	0.225	0.564	18.9
Has degree	0.286	0.058	0.512	12.1
Difficulty with English	0.012	0.029	-2.545	4.4
All of Australia: Remote/Very remote	0.014	0.257	0.212	-5.4
Has income from non-labour, non-govt sources	0.528	0.153	0.090	3.5
Log equivalised income of other hh. members	8.976	5.707	0.015	5.2
Mixed household	0.092	0.209	0.187	-2.3
Number of children aged <=14	0.601	1.513	-0.745	70.7
Poor health	0.031	0.069	-2.761	11.0
Daily smoker	0.165	0.478	0.054	-1.8
Frequent high-risk drinker	0.019	0.020	0.124	0.0

Source: Authors' estimation from NATSISS 2008 and HILDA wave 8 (2008)

Note: Entries in the last column are shares (percentages) of the 'explained' gap that are due to each factor.

Appendix C: Control variables

Below is a list of control variables that are included in the logit models.

- Personal characteristics
 - Gender: Male (omitted), Female
 - Age and Age squared
 - Partnering status: Single (omitted), Partnered
 - School education: Year 9 or less (omitted), Year 10 or 11, Year 12
 - Post-school qualification: No qualifications (omitted), Non-degree qualifications, University degree
 - Difficulty with spoken English: No difficulty (omitted), Having difficulty
 - Whether the respondent receives income from non-labour, non-government sources
 - Self-assessed health status: Excellent or very good health (omitted), Good health, Fair health, Poor health
 - Smoking: Daily smoker, Other (omitted)
 - Alcohol use: Abstainer (omitted), Moderate drinker, Infrequent high-risk drinker, Frequent high-risk drinker
- Household characteristics
 - Log equivalised income of all household members except respondent³⁶
 - Household composition: Single occupant (omitted) household, One family household, Mixed household
 - Number of dependent children aged 0-14
- Region of residence: New South Wales (NSW) Major Cities (omitted), NSW Inner Regional, NSW Outer Regional, Victoria (VIC) Major Cities, VIC Inner/Outer Regional, Queensland (QLD) Major Cities, QLD Inner Regional, QLD Outer Regional, South Australia Non-Remote, Western Australia (WA) Major Cities, WA Inner/Outer Regional, Tasmania Non-Remote, Balance of Australia - Non-remote, All of Australia: Remote/Very remote.
- Extended variables (for Section 6.1.4)
 - Having a disability
 - Speaks an Indigenous language well

³⁶ Since the log of negative numbers or zero does not exist, we assign a value of 0 to cases with non-positive 'other household income'.

- Cultural identification: whether identifies with clan, tribal or language group
- Homelands: whether recognises an area as homelands and presently lives there
- Attending cultural events: whether involved in cultural events, ceremonies or organisations in last 12 months
- Lacks contact: has face to face contact with family or friends outside household less frequently than once a month
- Removed: whether ever removed from natural family
- Arrest: whether arrested by police in last 5 years

For alcohol use, we follow a careful study by Cruise (2009), who classifies drinkers based on both the intensity and frequency of their drinking habits. Cruise defines abstainers as those who do not drink, or drink rarely (frequency) and consume up to 6 standard drinks each sitting (intensity). Moderate drinkers consume up to 6 standard drinks each time, from 2-3 days a month to 3-4 days a week. Heavy drinkers consume at least 7 drinks per sitting, regardless of frequency, or at least 5 drinks per sitting and drink at least 5-6 days a week. We further divide the last category into infrequent high-risk drinker (drinking less than 2 days a week) and frequent high-risk drinker (at least 3 days a week).

The 'household income of all household members except respondent' variable is equivalised to account for the fact that household of different compositions and sizes require different levels of resources to achieve similar standards of living. We adopt the modified OECD equivalisation scale, which is a commonly used scale in Australian studies (see, ABS, 2005, for example). This scale gives a weight of 1 to the first adult in the household, 0.5 to each additional adult, and 0.3 to each child. Accordingly, a household with two adults and one child is assumed to require 1.8 times the resources required by a single occupant household to achieve a similar standard of living.