

## **Cover Letter**

### **Modelling the Labour Force Status of Aboriginal and Torres Strait Islander Australians**

#### **Australian Labour Market Research Workshop, University of Melbourne, 8-9 February, 2007**

The following is a draft version of a paper that models the individual and area level factors associated with the employment outcomes of Aboriginal and Torres Strait Islander (Indigenous) Australians. There are four employment outcomes analysed:

- Whether or not a person is in the labour force;
- For those in the labour force whether they are employed or unemployed;
- For those employed whether they are employed as part of the Community Development and Employment Projects (CDEP) scheme; and
- For those not in the labour force whether or not they would like a job.

To analyse labour market outcomes, the 2002 National Aboriginal and Torres Strait Islander Social Survey (NATSISS) is used. This is the second national social survey that the Australian Bureau of Statistics (ABS) has carried out that focuses on the Indigenous Australian population. In addition to labour market outcomes, the 2002 NATSISS collected information on a range of demographic, social and economic aspects.

In addition to comments on the methodology and presentation of results in this paper, it is also hoped that our presentation will motivate a broader discussion on the collection of labour market data on Indigenous Australians. The 2002 NATSISS is part of a larger collection strategy on Indigenous Australians that includes:

- The five yearly Census of Population and Housing (most recently collected in 2006);
- The National Aboriginal and Torres Strait Islander Health Survey (most recently collected in 2004-05); and
- Future National Aboriginal and Torres Strait Islander Social Surveys (next collected in 2008).

The results presented in this paper as well as the presentation and discussion at the Australian Labour Market Research Workshop will be useful in developing future surveys so any comments on collection methodology, survey content and dissemination strategy are particularly welcome.

Any published version of this paper will include relative standard errors for Tables 2.1 and 2.2, as well as confidence intervals around the results presented in Figures 2.1, 2.2 and 2.3. Any suggestions for other additions to this paper that would add to the robustness of the results would of course also be considered.

The authors and the ABS would like to thank attendees of the workshop and in particular the discussant of this paper for their time and attention.

Kind regards

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**MODELLING THE LABOUR FORCE STATUS OF ABORIGINAL AND  
TORRES STRAIT ISLANDER AUSTRALIANS**

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## EXECUTIVE SUMMARY

This paper looks at the individual and area level factors associated with the employment outcomes of Aboriginal and Torres Strait Islander (Indigenous) Australians. There are four employment outcomes analysed:

- Whether or not a person is in the labour force;
- For those in the labour force whether they are employed or unemployed;
- For those employed whether they are employed as part of the Community Development and Employment Projects (CDEP) scheme; and
- For those not in the labour force whether or not they would like a job.

The factors associated with the above outcomes are estimated assuming separate binary probit models. The robustness of assuming the decisions are made independently is then tested by also estimating a multinomial probit model with the dependent variable consisting of four labour market categories: not in the labour force; unemployed; employed in the CDEP scheme; and employed in non-CDEP employment. Such methods allow the associations between the dependent and a particular independent variable to be estimated whilst holding all other independent variables constant.

A number of the results are useful in confirming and quantifying previous work. In particular human capital characteristics (education and health) are important factors in explaining the probability of the above employment outcomes. That is, those with higher levels of education (especially non-school qualifications) are more likely to be employed rather than unemployed or not in the labour. For those who are employed, those with high levels of education are more likely to be employed in non-CDEP scheme employment, which as this paper shows is much better remunerated.

Other individual factors are also found to be important explanatory variables, many of which have not been available on previous data sets. For both males and females, those who were married had a lower probability of not being in the labour force. However those who had main caring responsibility for someone 12 years and under had a much higher probability. Those who were arrested in the 5 years preceding the survey were found to be much more likely to be unemployed, however for the first time results from this paper show that those who had also been incarcerated had an even higher probability of being unemployed.

The paper also presents new findings on how the characteristics of the area in which a person lives are associated with an individual's own probability of employment. Area level characteristics were found to have a statistically significant association with several of the individual outcomes of a person in the area. Importantly, these variables were found to be significant even after controlling for a large range of individual characteristics, giving initial evidence that employment is associated with more than just a person's own attributes.

# 1. INTRODUCTION

According to both survey and Census data (ABS 2004a and Altman, Biddle and Hunter 2005 respectively) Aboriginal and Torres Strait Islander (Indigenous) Australians are less likely to be employed and more likely to be unemployed than the rest of the population. Of those who are employed, that employment is more likely to be part-time and in the public sector.

There are a number of aspects related to the employment of Indigenous Australians that are unique. First, Indigenous Australians are much more likely to live in areas with poor or non-existent labour markets. Related to this, the Community Development and Employment Projects (CDEP) scheme (used predominantly by Indigenous Australians) provides an alternate employment path to typical 'mainstream' employment. While there have been changes to the scheme since the survey was enumerated (as outlined in the following section) a large proportion of Indigenous Australians will continue to be employed in the scheme. Lower levels of human capital, including education outcomes and health, may also make it difficult for Indigenous Australians to access the jobs that are available. Finally, Indigenous Australians are more mobile with the associated migration less likely to be motivated by life cycle or employment factors (Biddle and Hunter 2006a).

To understand Indigenous employment, it is important to quantify the extent to which some of the above factors (among other things) are related to employment outcomes. This will inform the decision making of Indigenous stakeholders and assist in the development of an evidence based policy for improving employment outcomes that takes into account the particular characteristics of Indigenous Australians.

This paper reports on analysis of the 2002 National Aboriginal and Torres Strait Islander Social Survey (NATSISS) conducted by the Australian Bureau of Statistics (ABS). The NATSISS collected information on 9,359 Indigenous Australians aged 15 years and over across a number of topics including:

- Demographic information
- Culture and language
- Family and community
- Health
- Housing
- Education
- Employment
- Income
- Financial stress
- Information technology
- Crime and justice

In 2004, the ABS released the first results from the NATSISS (ABS 2004a). In this publication, the ABS presented summary statistics across a number of topics covered in the survey. Given the breadth of information in the NATSISS, it was only possible in the initial publication to summarise the main results.

Given this potentially rich yet so far not fully tapped data source, the ABS has undertaken a more detailed analysis of the data.<sup>1</sup> This paper represents the major output from one of these projects within the ABS. This paper will report on three main questions:

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<sup>1</sup>The ABS has also provided a Confidentialised Unit Record File (CURF) for users outside the ABS to perform their own analysis.

- how are selected socio-economic outcomes associated with selected labour market outcomes (including being unemployed and not in the labour force)?
- within those not in the labour force, what are the characteristics of those who would still like a job but are not actively seeking employment?
- within those who are employed, what are the characteristics of CDEP and non-CDEP Indigenous employees in Australia?

Two broad methodological approaches are used to answer these questions:

- descriptive statistics and graphical analysis; and
- modelling the relationships between one or more dependent variables and a set of independent variables.

The remainder of the paper is structured as follows. Section 2 will give an overview of Indigenous Australian's employment patterns. It will begin with a discussion of the structural factors likely to be associated with employment, especially the CDEP scheme. Some descriptive statistics for a number of variables from the NATSISS likely to be related to employment will then be presented. These will be presented separately by a set of employment outcomes. The final part of the section looks in more detail at how a few characteristics vary across CDEP and non-CDEP employment.

Section 3 presents the statistical model and the estimation methodology that will be used to analyse the factors associated with employment outcomes. Section 4 presents the results from this analysis and Section 5 concludes the paper with discussion of the main points from the analysis.

## 2. INDIGENOUS EMPLOYMENT

Indigenous Australians live across quite varied geographies and therefore vary quite substantially in their proximity to what might be referred to as "mainstream" labour markets. A large number of Indigenous Australians live in urban or regional areas where the ranges of job opportunities are similar to what non-Indigenous Australians might be accustomed to. However, because of a number of reasons including low levels of formal education, different language skills, exposure to the criminal justice system and poor health, Indigenous Australians are not always able to fully make use of these labour markets. For these reasons, unemployment rates for Indigenous Australians range from 25.2% in major cities to 30.0% for inner regional areas (Altman, Gray and Levitus 2005).

Because of geographical isolation, in remote areas there are fewer jobs available of the type expected to be seen in conventional labour markets. In part to compensate for this lack of other labour market activities, in a number of these areas the CDEP scheme provides an alternate form of employment. The CDEP scheme began as a small pilot scheme under the Federal Fraser Coalition Government in 1977 in 12 remote Aboriginal communities. The scheme began as a response to the perceived spread of Unemployment Benefit Payments into areas without developed labour markets (Sanders 2001). Since then the scheme expanded so that as of December 2002 it was estimated to have 34 000 participants (ABS 2005).

In essence, the CDEP scheme operates by funding community organisations an amount roughly equal to the social security benefits individuals would have received, along with a small amount of additional funding to cover on-costs and additional capital requirements. This money is then paid to the individual as wages for work on projects within the community, generally run by Aboriginal and Torres Strait Islander organisations. Importantly, the type of work is not necessarily targeted towards market based activity. Rather, projects have historically been geared towards schemes that lead to development within the community, although many of the projects within the scheme are run on a reasonably commercial basis.

In the time between enumeration of the 2002 NATSISS and the analysis for this paper was carried out, there has been a number of changes to the way in which the CDEP scheme operates. From an individual participant's perspective, the changes were designed to increase the role of CDEP employment as a 'stepping stone' to non-CDEP employment rather than as an employment destination itself (DEWR 2005). The two changes that took effect from the 1st July 2006 with perhaps the biggest impacts for the analysis of individual outcomes were that:

- In urban and regional centres, new participants on the CDEP scheme are now limited to 52 weeks (total) participation; and
- New CDEP participants aged 20 or under are now paid a youth rate consistent with the Independent rate of Youth Allowance.

Additional changes proposed for the 1st July 2007 will mean that in most urban and regional centres, the CDEP programme will be replaced by Structured Training and Employment Projects (STEP) brokerage services (DEWR 2006).

The implications of these changes are that, compared to when the survey took place, those in non-remote Australia and aged under 20 are more likely to be either unemployed or employed in non-CDEP employment as opposed to employed in the CDEP scheme. On the one hand, these changes will to a certain extent reduce the timeliness of the results presented in this paper. However, on the other hand, the results can still be used to anticipate the characteristics of those who are more likely to be affected by the changes. That is, for those areas and age groups where CDEP participation is likely to be reduced, the variables that are found in this paper to be associated with CDEP employment can be used as an indication of the type of people who are likely to move into either unemployment or non-CDEP employment.

In addition to the CDEP scheme, in the language of standard economic theory, there are a number of supply and demand side factors influencing eventual employment outcomes (Hunter 2004). Supply side factors are those which influence whether an Indigenous Australian wishes to offer their labour to the market (for a particular wage). Factors such as age, education participation and health status are likely to be factors common to Indigenous and non-Indigenous Australians in influencing the supply of labour although they are likely to be felt and impact differently. However, Hunter (2004) identified Indigenous specific cultural factors that are important in determining labour supply. These include participation in more traditional lifestyles and being involved in hunting and gathering activities. Childcare and family responsibilities have also been found to be important for female Indigenous Australians (Hunter and Gray 2002). Furthermore, some parts of the Indigenous population have relatively high rates of mobility (Biddle and Hunter 2006a) which may make it difficult to meet the requirements of steady employment.

Demand side factors will influence the number of workers employers are willing to hire (for a particular wage). The demand for the labour of Indigenous Australians is likely to be affected by the type of jobs available in the areas they live, as well as whether they have the skills and characteristics that are required for those jobs. Although it is difficult to measure, Hunter (2004) and Daly (1995) found labour market discrimination to be a possible explanator for the low demand for Indigenous Australian's labour. That is, given the choice between an Indigenous and non-Indigenous Australian with the same measurable skill level, both authors could not discount the proposition that an employer is more likely to hire the non-Indigenous Australian.

This paper does not attempt to isolate the demand and supply side effects that influence employment outcomes, mainly because the data used does not support such an analysis. That is, some of the variables in the NATSISS are likely to influence labour supply, whereas others influence demand, however a large number are likely to be associated with both. As such, both influences are presented together, however the interpretation of the variables is designed to fit into a labour supply/demand model.

## **2.1 Descriptive statistics**

The following two tables present descriptive statistics that indicate how a set of characteristics vary by a person's labour market characteristics. Table 2.1 looks at those who are employed (CDEP and non-CDEP are presented separately), as well as those who are unemployed (by the duration of unemployment). Table 2.2 looks at those who are not in the labour force, broken down by whether the person would like a job or not. The final column in Table 2.2 looks at the total Indigenous population.

The first line in each table gives the number of Indigenous Australian in that category. Due to a few people who did not state their labour force characteristics, the individual cells do not necessarily sum to the totals. However, the seven categories are mutually exclusive and exhaustive.

The rows present the percentage of the applicable population with that characteristic. So, as an example, according to the second row in Table 2.1, 73.1% of those in the CDEP scheme live in Remote or Very Remote Australia, compared to 15.4% of those in non-CDEP employment. Other variables are reported in a similar way. They include: demography; family and culture; housing; health and disability; education; income; financial stress; law and justice; transport; and information technology.

**Table 2.1 Selected characteristics by labour force status - employed and unemployed**

	Employed			Unemployed			
	CDEP	Non-CDEP	Total employed	Less than 1 year	Between 1 and 2 years	More than 2 years	Total unemployed
	Number ('000)						
<b>Indigenous persons aged 15 and over</b>	<b>34.2</b>	<b>96.2</b>	<b>130.4</b>	<b>27.3</b>	<b>4.2</b>	<b>5.6</b>	<b>38.8</b>
	Proportion (%)						
<b>Geographic</b>							
Remote/Very Remote	73.1%	15.4%	30.6%	10.0%	19.4%	13.1%	11.6%
<b>Demographic</b>							
Female	37.5%	46.6%	44.2%	46.6%	37.5%	30.5%	42.6%
Torres Strait Islander or both	11.6%	11.3%	11.4%	11.7%	16.4%	15.8%	12.5%
Married	56.0%	58.5%	57.9%	32.4%	39.7%	44.8%	34.7%
Full-time carer of someone 12 and under	25.7%	24.2%	24.6%	23.4%	31.8%	31.1%	25.8%
<b>Family and culture</b>							
Social activities in last 3 months	95.4%	95.1%	95.2%	93.4%	91.2%	85.2%	91.5%
Voluntary work in last 12 months	19.1%	39.4%	34.1%	32.8%	32.5%	25.9%	31.2%
Support in time of crisis	87.9%	94.6%	92.9%	87.0%	86.3%	91.6%	87.9%
Stressor experienced in last 12 months	84.8%	78.8%	80.4%	89.4%	92.7%	87.9%	89.2%
Cultural event(s) in last 12 months	92.6%	60.3%	68.8%	63.1%	61.6%	70.9%	63.9%
Speaks an Indigenous language	46.9%	10.6%	20.1%	11.5%	15.9%	13.7%	12.5%
Removed or relative removed from family	38.9%	49.4%	46.5%	51.3%	48.6%	47.2%	49.6%
Neighbourhood/community problems	77.8%	74.9%	75.7%	78.8%	75.1%	76.1%	77.2%
<b>Housing</b>							
Household owns or purchasing house	6.5%	48.4%	37.4%	20.6%	14.9%	18.1%	19.0%
Moved dwellings once over last 12 months	20.5%	20.5%	20.5%	32.0%	25.8%	26.9%	30.1%
Moved dwellings twice or more over last 12 months	7.5%	7.1%	7.2%	17.5%	8.1%	8.5%	15.3%
<b>Health and disability</b>							
Self-assessed health fair/poor	14.4%	13.9%	14.0%	16.0%	27.9%	36.0%	20.3%
Has a disability or long-term condition	31.2%	24.4%	26.2%	33.9%	36.6%	39.7%	35.2%
Current daily smoker	58.1%	38.5%	43.6%	59.6%	66.6%	73.7%	63.2%
Risky/high risk alcohol consumption in last 12 months	20.1%	15.9%	17.0%	15.6%	19.8%	22.1%	17.4%
<b>Education</b>							
Attending post-school institution	10.9%	15.0%	13.9%	13.1%	23.3%	8.7%	13.0%
Has a degree or higher	0.8%	7.6%	5.8%	2.7%	7.8%	0.1%	2.7%
Has other post-school qualification	18.5%	33.9%	29.8%	25.7%	18.5%	21.5%	23.5%
Completed Year 12	14.9%	29.2%	18.3%	18.5%	11.1%	11.1%	12.0%
Completed Year 9 or below	41.3%	24.3%	30.2%	42.8%	54.0%	54.0%	50.8%
<b>Equivalised gross household income</b>							
First quintile	35.5%	10.9%	16.8%	61.1%	63.4%	77.1%	63.9%
Fifth quintile	0.7%	15.2%	11.7%	2.4%	0.0%	0.7%	1.8%
<b>Financial stress</b>							
Unable to raise \$2,000 within a week	74.5%	30.5%	42.0%	64.1%	74.1%	87.1%	69.1%
<b>Law and justice</b>							
Arrested by police in last 5 years	24.8%	8.4%	12.7%	33.1%	28.2%	48.9%	34.8%
Incarcerated in last 5 years	11.7%	3.4%	5.6%	15.7%	17.6%	21.0%	16.4%
Victim of physical/threatened violence in last 12 months	25.3%	18.9%	20.6%	38.9%	34.4%	32.0%	37.9%
<b>Difficulty with transport</b>							
Difficulty in (or can't), getting to the places needed	13.1%	4.7%	6.9%	10.6%	21.4%	16.1%	13.1%
<b>Information technology</b>							
Computer in last 12 months	38.7%	77.1%	67.0%	70.5%	68.5%	43.6%	65.6%
Internet in last 12 months	23.2%	62.5%	52.2%	54.0%	45.9%	21.3%	47.3%

Note: Standard Errors for these tables will likely be given as a web appendix

**Table 2.2 Selected characteristics by labour force status - not in the labour force and all Indigenous**

	Not in the labour force (NILF)			All Indigenous Australians
	Wants a job	Doesn't want a job	Total NILF	
	Number ('000)			
<b>Indigenous persons aged 15 and over</b>	<b>38.5</b>	<b>55.7</b>	<b>113.0</b>	<b>282.2</b>
	Proportion (%)			
<b>Geographic</b>				
Remote/Very Remote	20.3%	26.3%	29.0%	27.3%
<b>Demographic</b>				
Female	65.4%	68.8%	64.4%	52.1%
Torres Strait Islander or both	9.3%	8.9%	9.0%	10.6%
Married	37.7%	39.6%	37.2%	46.4%
Full-time carer of someone 12 and under	48.0%	38.5%	36.9%	29.7%
<b>Family and culture</b>				
Social activities in last 3 months	85.0%	84.3%	83.5%	90.0%
Voluntary work in last 12 months	23.0%	16.7%	18.9%	27.6%
Support in time of crisis	88.5%	87.8%	88.4%	90.4%
Stressor experienced in last 12 months	86.0%	80.9%	82.0%	82.3%
Cultural event(s) in last 12 months	64.4%	75.1%	68.8%	68.1%
Speaks an Indigenous language	17.9%	31.4%	25.1%	21.1%
Removed or relative removed from family	53.4%	42.5%	45.1%	46.3%
Neighbourhood/community problems	74.0%	69.9%	71.9%	74.4%
<b>Housing</b>				
Household owns or purchasing house	18.2%	17.5%	19.1%	27.6%
Moved dwellings once over last 12 months	28.5%	20.8%	22.6%	22.7%
Moved dwellings twice or more over last 12 months	8.0%	5.3%	7.0%	8.2%
<b>Health and disability</b>				
Self-assessed health fair/poor	28.2%	33.9%	35.2%	23.4%
Has a disability or long-term condition	41.7%	45.9%	48.8%	36.5%
Current daily smoker	57.7%	48.1%	50.3%	49.0%
Risky/high risk alcohol consumption in last 12 months	13.6%	12.4%	12.5%	15.3%
<b>Education</b>				
Attending post-school institution	10.4%	6.4%	7.9%	11.5%
Has a degree or higher	1.6%	0.4%	1.1%	3.5%
Has other post-school qualification	19.9%	13.3%	15.7%	23.5%
Completed Year 12	11.6%	8.7%	9.0%	17.9%
Completed Year 9 or below	44.3%	61.7%	58.0%	41.1%
<b>Equivalised gross household income</b>				
First quintile	62.5%	66.4%	64.4%	42.5%
Fifth quintile	1.2%	0.8%	0.8%	5.9%
<b>Financial stress</b>				
Unable to raise \$2,000 within a week	71.1%	72.8%	71.0%	57.2%
<b>Law and justice</b>				
Arrested by police in last 5 years	18.9%	12.7%	14.4%	16.4%
Incarcerated in last 5 years	7.4%	5.3%	5.7%	7.1%
Victim of physical/threatened violence in last 12 months	33.4%	20.0%	24.0%	24.3%
<b>Difficulty with transport</b>				
Difficulty in (or can't), getting to the places needed	16.8%	16.5%	16.8%	11.7%
<b>Information technology</b>				
Computer in last 12 months	49.5%	35.9%	38.8%	55.5%
Internet in last 12 months	34.2%	22.5%	26.0%	41.0%

Note: Standard Errors for these tables will likely be given as a web appendix

Although it is beyond the scope of this paper to discuss all the descriptive statistics in detail, it is important to highlight a few key points from the two tables. The first and most obvious is that CDEP employment is much more prevalent in Remote or Very Remote Australia (as shown in Table 2.1). That is, almost three quarters of CDEP workers live in Remote or Very Remote areas as opposed to 15.4% for those in other employment and 27.3% of the total Indigenous population.

Those not in the labour force are much more likely to be female and the full-time carer of someone 12 years and under. These are quite likely supply side factors that limit entrance into the labour market.

The tables also confirms that there are a number of characteristics that are likely to be associated with employment. That is, those in non-CDEP employment are more likely to be owning or purchasing their own home or in the higher income quintiles. Those in CDEP employment are much less likely to live in households which own or are purchasing their own homes than all other groups. This is most likely because those on the CDEP scheme are more likely to live in areas where it is difficult or not possible to purchase a home (see Sanders 2005 for a discussion of the distribution of household tenure). The tables do, however, give evidence that those in CDEP employment have higher incomes than those unemployed or not in the labour force (as the proportion in the bottom quintile is lower).

The education variables indicate that CDEP employment seems to provide an alternative for those with low formal education (that is compared to those in non-CDEP employment). However, those without qualifications or later years of secondary schooling appear to be still more likely to be unemployed or not in the labour force.

The remainder of this section looks in more detail at some employment related characteristics and how they vary by CDEP and non-CDEP employment. The first question asked in 2.2 is how does hours worked vary by CDEP and non-CDEP employment and is this different for males and females? Section 2.3 then look at similar questions regarding income.

## **2.2 Hours worked by CDEP employment**

One of the characteristics of CDEP scheme employment is the high concentration of part-time employment (Hunter 2004). That is, although the CDEP scheme offers an alternative to unemployment, it is rarely a full-time alternative. The following set of graphs plot the percent of the male and female population who report hours usually worked per week. This is collected in five hourly blocks, with those who report 51 hours or more are grouped together.

Figure 2.1a Distribution of hours worked by CDEP and non-CDEP employment - Males

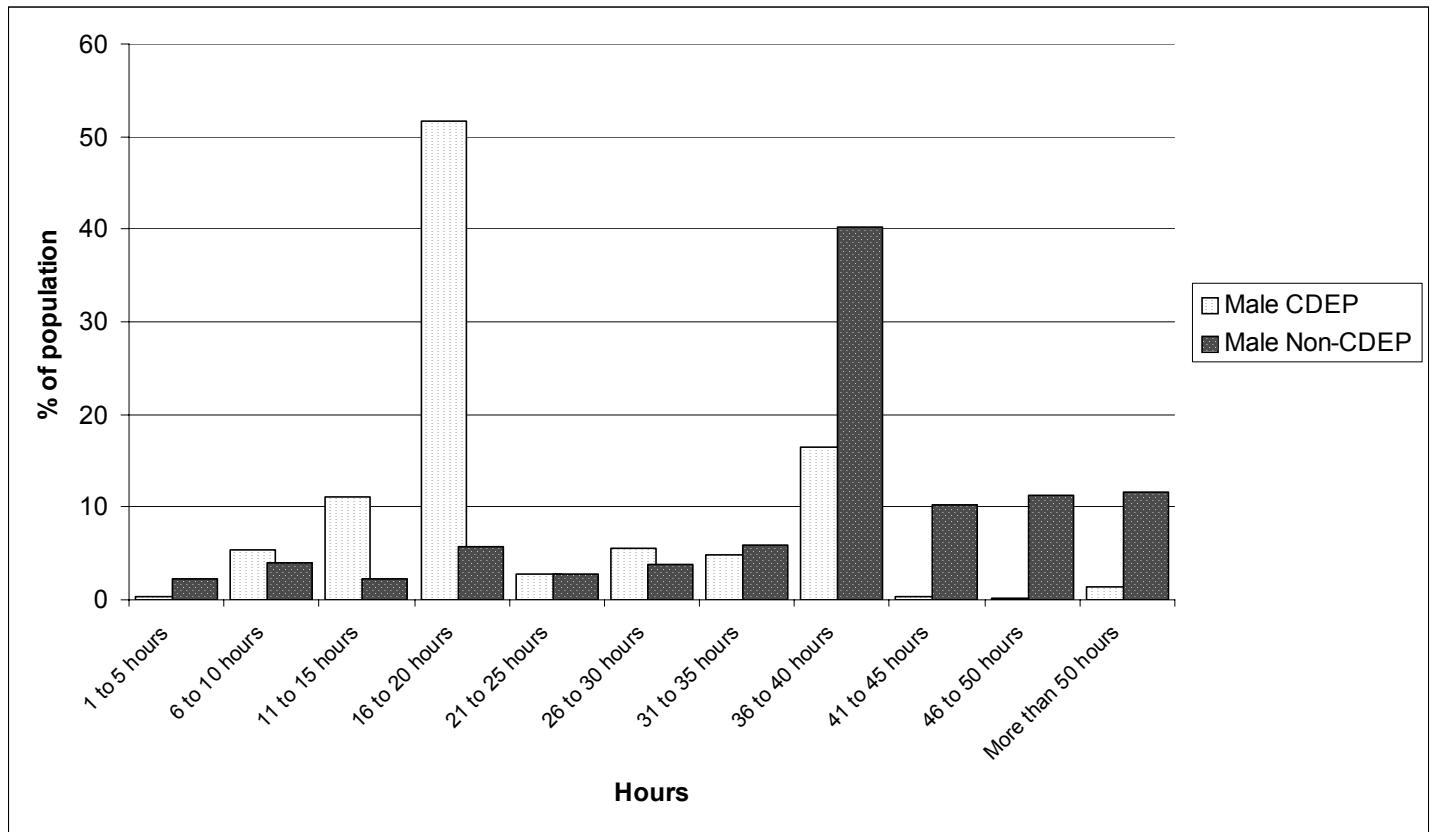
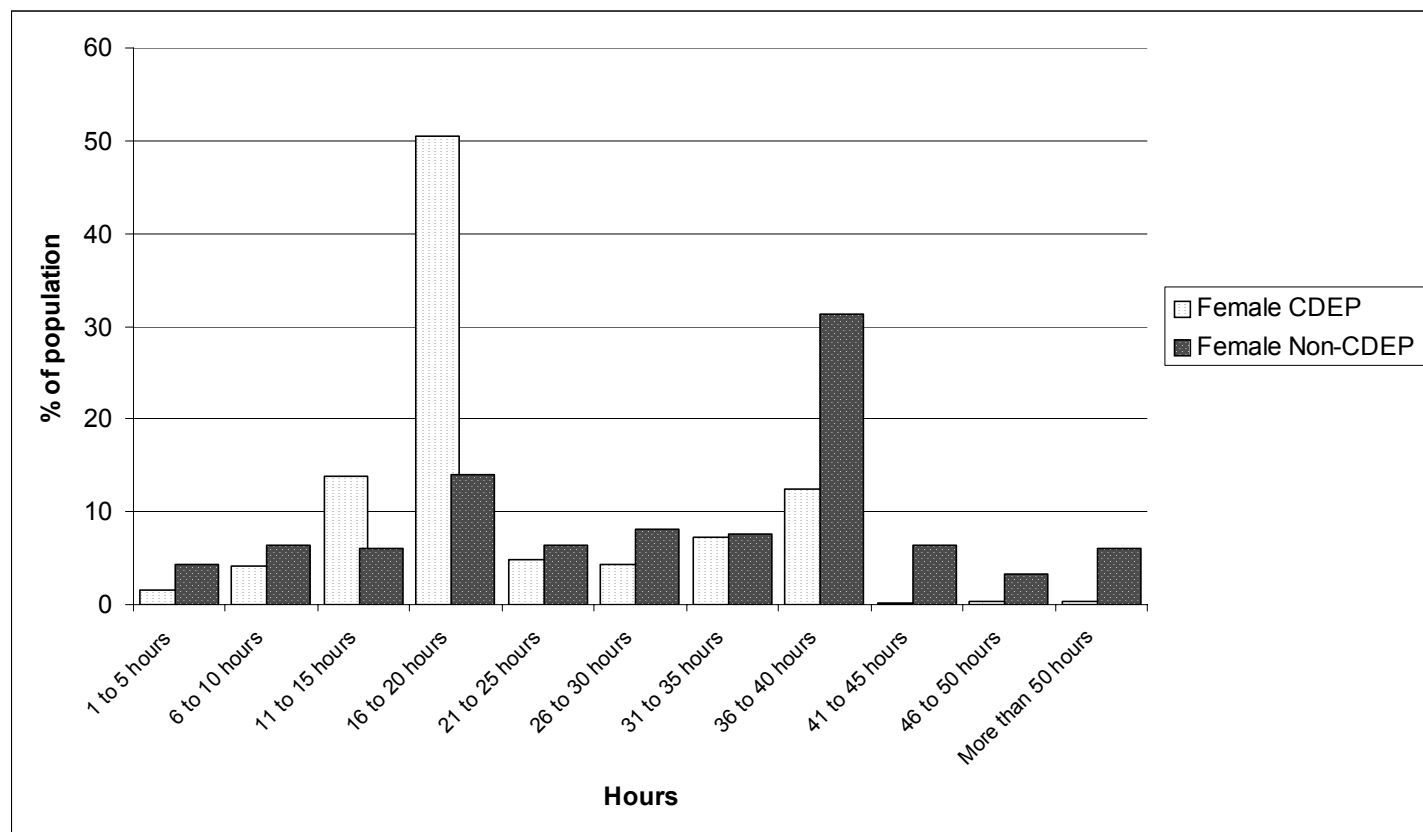


Figure 2.1b Distribution of hours worked by CDEP and non-CDEP employment - Females

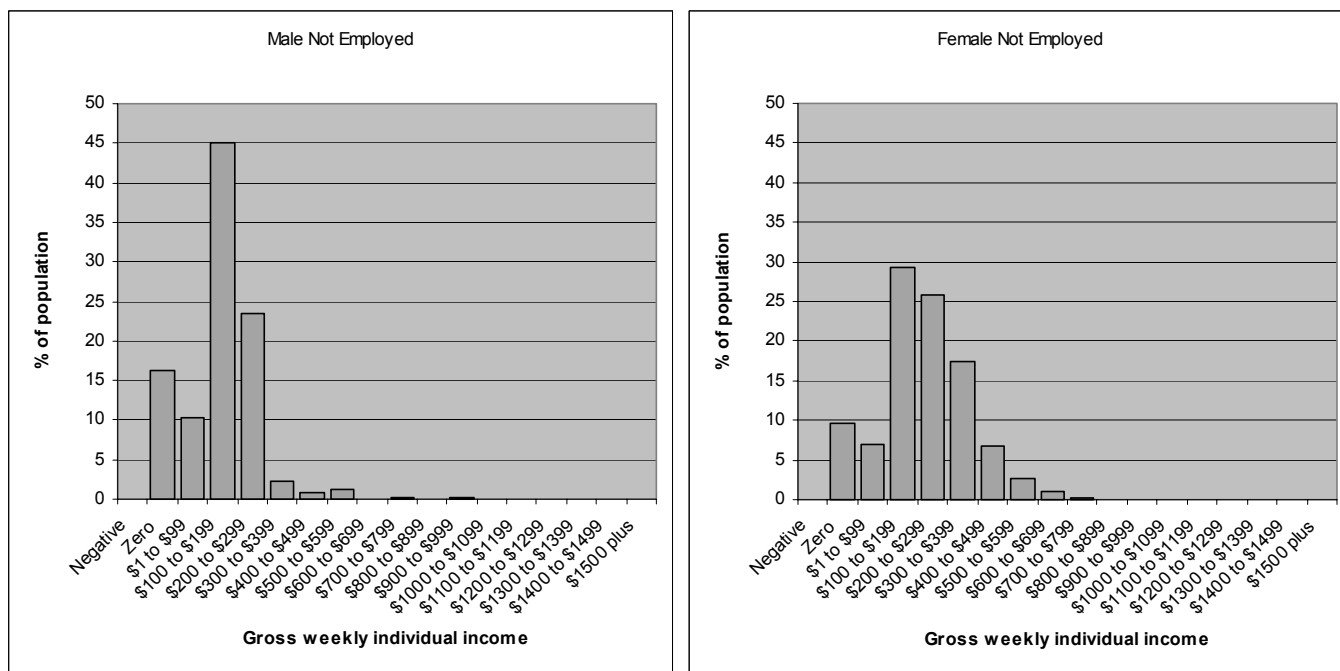


Males and females appear to have similar distributions, with male non-CDEP workers slightly more likely to work 36 hours or more. For both sexes, those in CDEP employment are much more likely to work 16-20 hours than those in non-CDEP employment. Indeed, over half of the respective populations report that range of hours per week compared to 5.7% for male non-CDEP workers and 13.9% for female non-CDEP workers. There are still, however, a reasonably large minority of people who identify as being employed in the CDEP scheme who work more than 35 hours per week (18.4% for males and 13.3% for females).

### 2.3 Income by CDEP employment

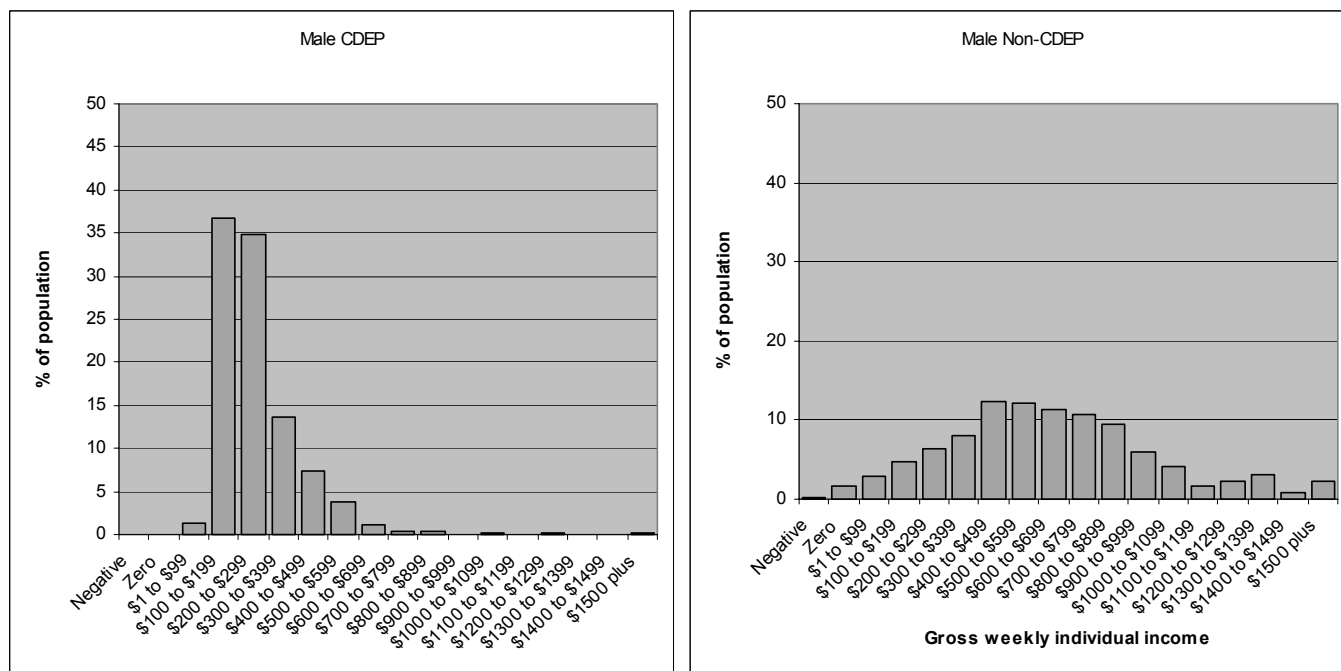
Given the lower number of hours worked for those in CDEP employment, one would expect average income to be higher for those in non-CDEP employment. This was confirmed in Table 2.1, however such summary statistics can not show the whole distribution of income. Figure 2.2 presents the estimated proportion of the Indigenous population by \$100 income group. This begins with those not employed in Figure 2.2a (with males and females presented separately) then males by CDEP and non-CDEP employment in Figure 2.2b and finally females by CDEP and non-CDEP employment in Figure 2.2c.

Figure 2.2a Distribution of weekly gross personal income by sex - not employed



For both males and females who are not employed, there are a reasonably large proportions with zero income. The income group with the highest proportion of the population, however, is \$100 to \$199, with this group being especially prevalent for males. This most likely represents those on standard welfare payments with the higher proportion of females reporting income \$200 or above representing the fact that those with children are entitled to more per week than those without.

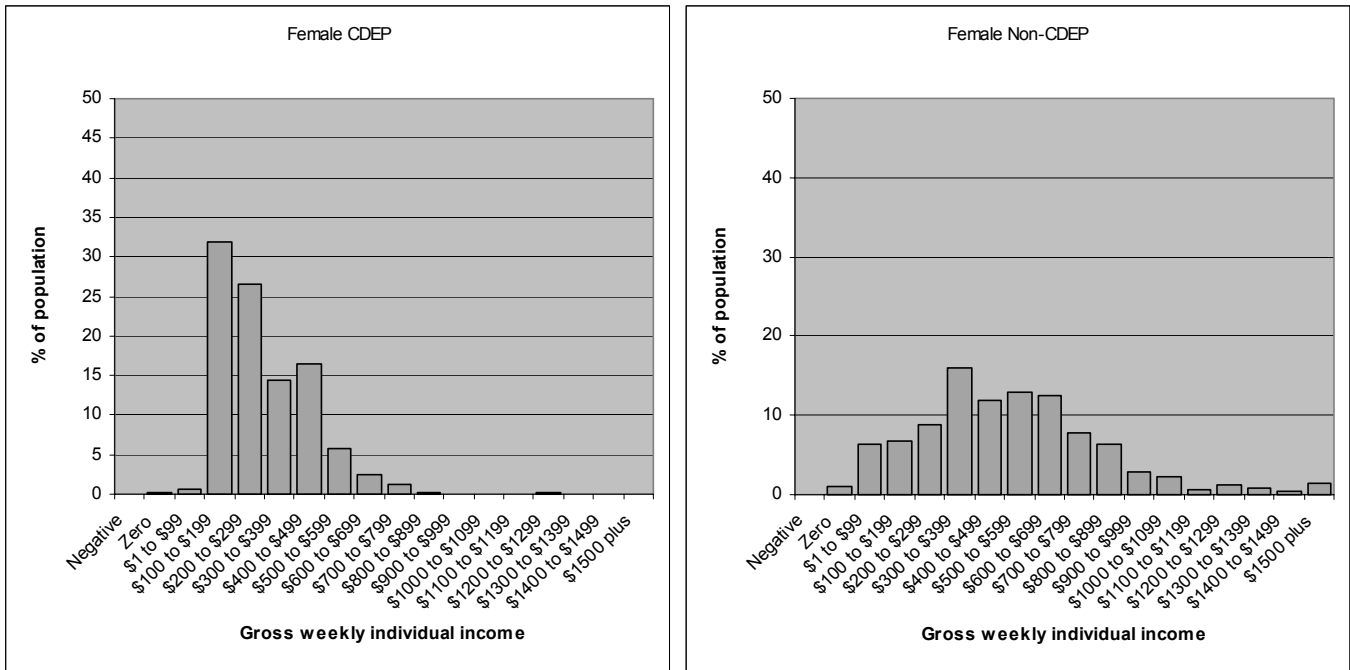
Figure 2.2b Distribution of weekly gross personal income by CDEP and non-CDEP employment - Males



Compared to Figure 2.2a, those males in CDEP employment are much less likely to receive zero income (or income under \$100). The vast majority of CDEP participants, however, still receive \$100 to \$299. This is especially the case for males, as females (over the page) are more likely to receive income of \$300 or more.

The distribution of income for those in non-CDEP employment is much flatter for both males and females with a higher proportion earning under \$100 but also a much higher proportion earning relatively high incomes. Males in non-CDEP employment are more likely to earn incomes in the far right of the distribution than females.

Figure 2.2c Distribution of weekly gross personal income by CDEP and non-CDEP employment - Females



The final question asked in this section is whether the higher incomes for those in non-CDEP employment (in Figure 2.2) are solely because of the higher number of hours worked (shown in Figure 2.1). In other words, for a given number of hours worked, do those in non-CDEP employment earn more than those in the CDEP scheme? To examine this, average weekly income by hours usually worked per week is presented. Males are presented in Figure 2.3a and females in Figure 2.3b.

Figure 2.3a Average weekly gross personal income by hours worked and CDEP - Males

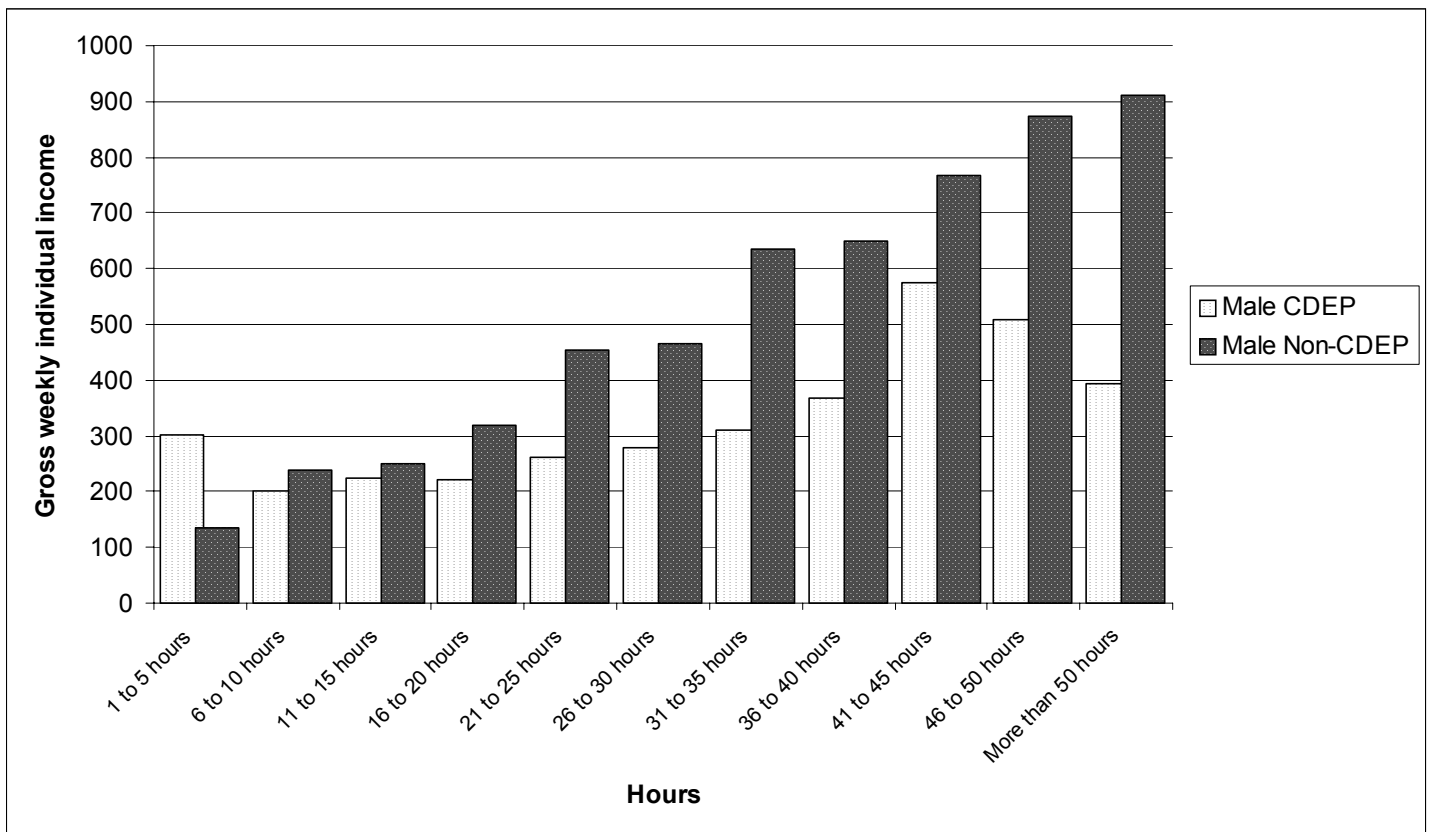
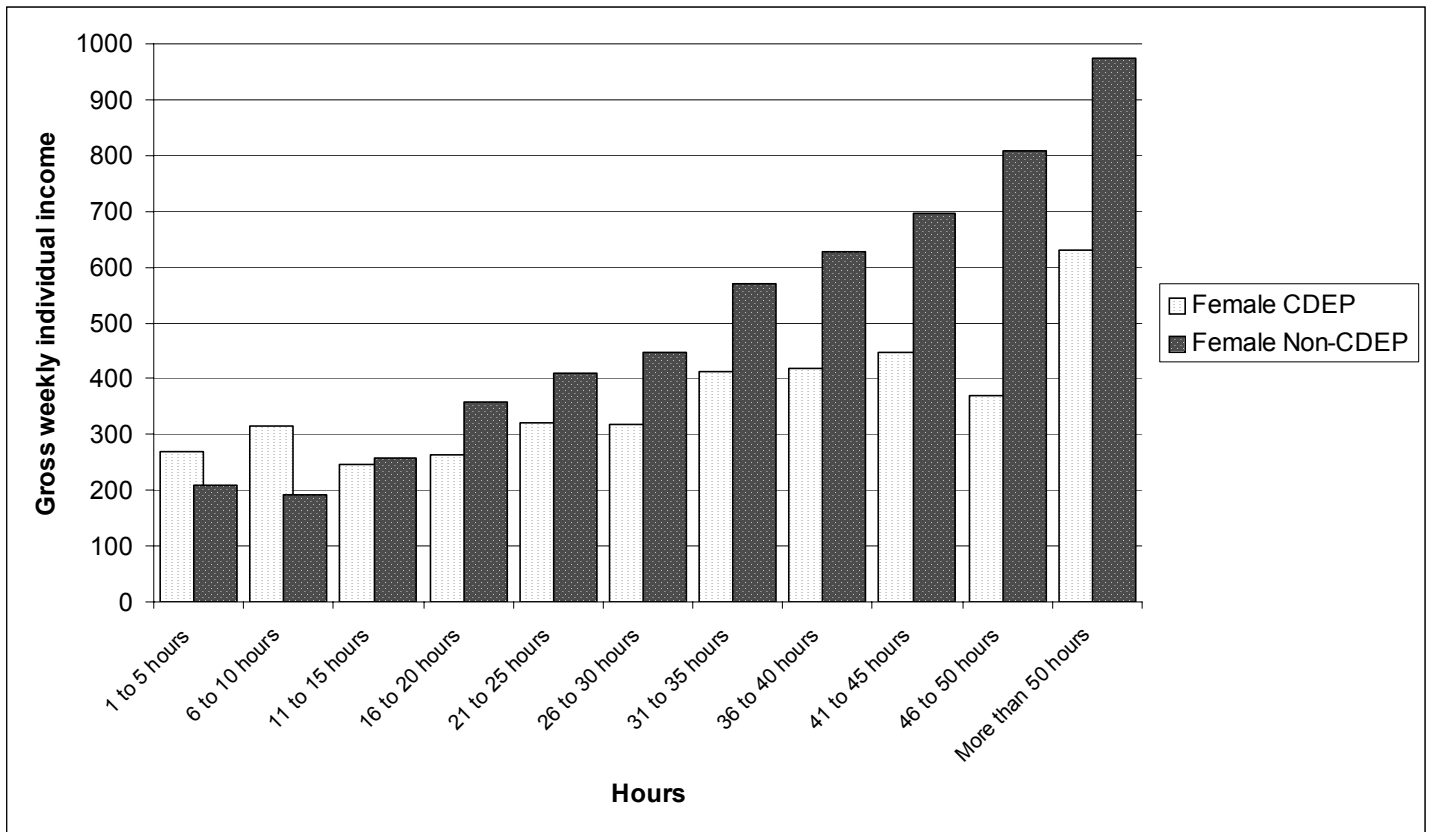


Figure 2.3b Average weekly gross personal income by hours worked and CDEP - Females



Apart from the bottom group for males and the bottom two groups for females, those on non-CDEP employment appear have a higher income for a given number of hours worked per week than those in CDEP employment. That is, not only are those in non-CDEP employment more likely to work close to full-time hours, they also appear to earn more on average per hour than CDEP workers.

### 3. DATA AND METHOD FOR MODELING EMPLOYMENT

The previous section highlighted a number of differences in characteristics across Indigenous Australians by their employment status. This section outlines the data and methods used to model the factors associated with employment in a more formal way. In summary, the factors associated a person's employment outcomes are estimated assuming separate binary probit models. The robustness of assuming the decisions are made independently is then tested by also estimating a multinomial probit model with the dependent variable consisting of four labour market categories: not in the labour force; unemployed; employed in the CDEP scheme; and employed in non-CDEP employment. Such methods allow the associations between the dependent and a particular independent variable to be estimated whilst holding all other independent variables constant.

#### 3.1 Data

In this section, information from ABS (2005a) is summarised, focusing on those issues of particular relevance to the modeling of employment outcomes. Those interested in how they can perform similar analysis using the publicly available Confidentialised Unit Record File (CURF) may also find Biddle and Hunter (2006b) useful. The questionnaire used to derive the data is available at ABS (2004b).

##### *Scope and timing of the NATSISS*

The NATSISS's scope was all Indigenous Australians aged 15 years and over who were usual residents of private dwellings in Australia. The estimated resident Indigenous population as of 31st December 2002 excluding those in non-private dwellings was 466,802 of whom 282,205 (or 60.5% of the population) were aged 15 years or over. Indigenous persons usually resident in non-private dwellings (estimated to be 19,320 persons or 4% of the population) were not within the scope of the survey. Examples of non-private dwellings include hotels, motels, hostels, hospitals, short-stay caravan parks, prisons and other correctional facilities. Biddle and Hunter (2006b) give an overview of some differences in characteristics of those in non-private dwellings based on the 1994 NATSIS.

The NATSISS was collected between August 2002 and April 2003. Given the potential seasonality in employment outcomes the results in this paper can not necessarily be generalised to the rest of the year. On the other hand, given the model does not control for the month when the person was surveyed, variation within the survey period is likely to introduce unexplained variation in outcomes. However, given there are no significant differences between employment to population ratios and labour force participation rates from the NATSISS compared to the 2002 Labour Force Survey (ABS 2005c) which contains information from the whole year, the employment estimates are unlikely to be affected by these two issues. There was, however, a significant difference between the unemployment rates from the two surveys, although this was just as likely to have resulted from differences in the respective questionnaires (for example CDEP employment is not collected on the Labour force Survey).

##### *Collection methodology*

There are two components to the 2002 NATSISS sample design. The first component (in parts of Queensland, South Australia, Western Australia and the Northern Territory) was based on a sample of discrete Indigenous communities and the outstations associated with them. This is the Community Area (CA) sample. In the remainder of these four states and territories, as well as in all of New South Wales, Victoria, Tasmania and the Australian Capital Territory, the data comes from the Non-Community Area (NCA) sample. Around 30 per cent of the sample came from the CAs and 70 per cent from the NCAs.

Those in NCAs were interviewed using Computer Assisted Interviewing (CAI), whereas those in CAs were interviewed using Pen and Paper Interviewing (PAPI).

The CA sample was obtained from a random selection of discrete Indigenous communities and outstations. The sample frame used to design the survey was based on both 2001 Census counts, and information collected in the 2001 Community Housing and Infrastructure Needs Survey (CHINS). Once the communities had been selected, a random selection of dwellings was made. Dwellings and therefore individuals in NCAs were selected using a stratified multi-stage area sample based on the 2001 Census.

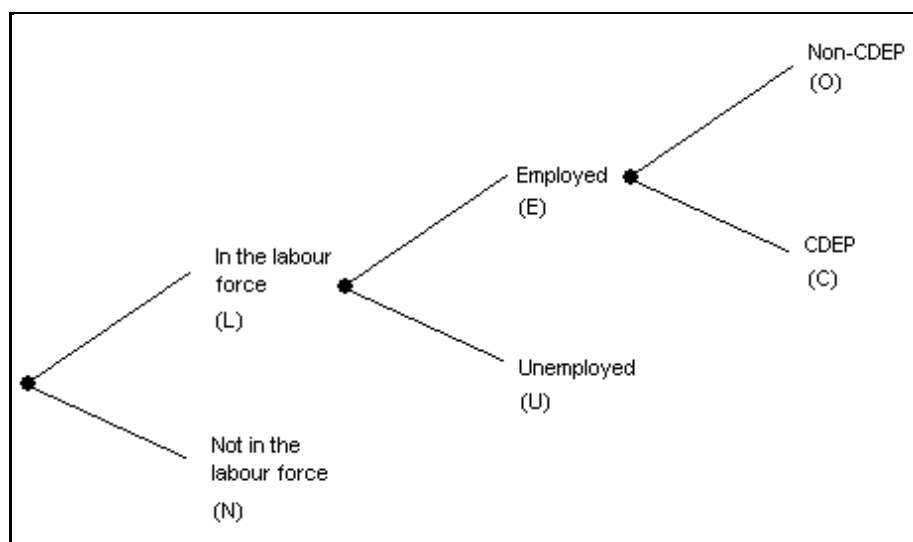
Some of the questions were also different in the two samples. Some of the data items used in this paper had slightly different terminologies across the CA and NCA samples, however there were a few questions where the differences were more pronounced.

The only question with substantial differences that is used in this paper is on disability. As part of the consultative process, Indigenous stakeholders advised that attempts to measure psychological disabilities in remote communities required development of an appropriate instrument sensitive to the circumstances of people in these areas. Because of this, full disability was collected in NCAs, and this is comparable to data items in the 2002 General Social Survey (GSS), but a modified set of disability questions that did not include psychological disability was collected in CAs. This question was combined with the relevant options from the NCA sample to create a new variable which can be used across both samples. This last variable is the one used in this study.

### **3.2 Method - Simplified model of Indigenous employment**

The following outlines the simplified labour market model used in this paper. Based on a hierarchical framework used in labour force analysis within the ABS (see ABS 2005b in particular Section 2.13), employment is treated in this paper as a series of sequential steps. This makes it necessary to use some form of limited dependent variable model as represented by the following diagram.

Figure 3.1 Simplified model of Indigenous employment



The model begins with an individual making a decision as to whether they should enter the labour market or not. Of course this decision is not made in a vacuum and factors both within and beyond a person's control influence the decision. These factors are labelled  $x_1$  and the parameters that link the factors to labour force participation as  $\theta_1$ .

For those who have decided to enter the labour market, a decision is then made about being employed or unemployed. Once again, this decision is not made just by the individual. Instead it is jointly determined by potential employers who decide whether to offer the person a job (demand side factors), and if so, the individual decides whether to accept or not (supply side factors). The factors and parameters that influence this decisions are labeled  $x_2$  and  $\theta_2$  respectively.

The final decision is whether to be employed in CDEP or non-CDEP employment. Once again the decision is made jointly by the individual, employers and representatives of government who decide where CDEP employment is to be situated. The factors and parameters influencing the decision are labeled  $x_3$  and  $\theta_3$ .

To calculate the likelihood function that can be used to estimate the parameters of the model, one must first define the probabilities of each separate occurrence. To do so the ultimate choice can be thought of as three sequential stages.

In the first stage, the probability of being either in or not in the labour force (for individual  $i$ ) is given by the following.

Stage 1:

$$P(\text{Labour force}) = P(L) = F(x_{i,1} \prime \theta_1)$$

Assuming a standard normal cumulative density function, this can be rewritten as:

$$\begin{aligned} P(\text{Not in labour force}) = P(N) &= 1 - F(x_{i,1} \prime \theta_1) \\ &= F(-x_{i,1} \prime \theta_1) \end{aligned}$$

In the second stage, the probabilities are expressed only for those who are in the labour force and are for the probability of being either employed or unemployed. That is

Stage 2:

$$\begin{aligned} P(\text{Employed given labour force}) &= P(E | L) \\ &= F(x_{i,2} \prime \theta_2) \end{aligned}$$

$$\begin{aligned} P(\text{Unemployed given labour force}) &= P(U | L) \\ &= 1 - F(x_{i,2} \prime \theta_2) \\ &= F(-x_{i,2} \prime \theta_2) \end{aligned}$$

Finally, for those who are employed, the probability of being in CDEP or non-CDEP employment are as follows.

Stage 3:

$$\begin{aligned} (\text{Employed non - CDEP given employed}) &= P(O | E) \\ &= F(x_{i,3} \prime \theta_3) \end{aligned}$$

$$\begin{aligned}
(\text{Employed CDEP given employed}) &= P(C | E) \\
&= 1 - F(x_{i,3} | \theta_3) \\
&= F(-x_{i,3} | \theta_3)
\end{aligned}$$

These conditional probabilities can then be used to calculate the unconditional probabilities of the four observed states represented in Figure 3.1. These are given as follows.

$$P(N) = F(-x_{i,1} | \theta_1)$$

$$\begin{aligned}
P(U) &= P(L) \cdot P(U|L) \\
&= F(x_{i,1} | \theta_1) \cdot F(-x_{i,2} | \theta_2)
\end{aligned}$$

$$\begin{aligned}
P(C) &= P(C|E) \cdot P(E) \\
&= P(C|E) \cdot P(E|L) \cdot P(L) \\
&= F(-x_{i,3} | \theta_3) \cdot F(x_{i,2} | \theta_2) \cdot F(x_{i,1} | \theta_1)
\end{aligned}$$

$$\begin{aligned}
P(O) &= P(O|E) \cdot P(E) \\
&= P(O|E) \cdot P(E|L) \cdot P(L) \\
&= F(x_{i,3} | \theta_3) \cdot F(x_{i,2} | \theta_2) \cdot F(x_{i,1} | \theta_1)
\end{aligned}$$

These give four unconditional probabilities that can be used to construct the joint density function. Firstly, for individual  $i$  let:

$$y_{i,1} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

be a binary vector that indicates whether an individual is or is not in the labour force.

Similarly let  $y_{i,2}$ ,  $y_{i,3}$  &  $y_{i,4}$  be binary variables for whether a person is unemployed, employed in the CDEP scheme and employed in non-CDEP employment respectively.

Using these a joint density function can be constructed which, assuming independence between the decisions, is given as follows:

$$f(y_i) = \left[ F(-x_{i,1}'\theta_1) \right]^{y_{i,1}} \cdot \left[ F(x_{i,1}'\theta_1) \cdot F(-x_{i,2}'\theta_2) \right]^{y_{i,2}} \\ \cdot \left[ F(-x_{i,3}'\theta_3) \cdot F(x_{i,2}'\theta_2) \cdot F(x_{i,3}'\theta_3) \right]^{y_{i,3}} \\ \cdot \left[ F(x_{i,3}'\theta_3) \cdot F(x_{i,2}'\theta_2) \cdot F(x_{i,1}'\theta_1) \right]^{y_{i,4}}$$

This gives the following likelihood function:

$$L(\theta_1, \theta_2, \theta_3) = \prod_i f(y_i) \\ = \prod_i \left( \left\{ \left[ F(-x_{i,1}'\theta_1) \right]^{y_{i,1}} \cdot \left[ F(x_{i,1}'\theta_1) \right]^{y_{i,2}+y_{i,3}+y_{i,4}} \right\} \right. \\ \cdot \left. \left\{ \left[ F(-x_{i,2}'\theta_2) \right]^{y_{i,2}} \cdot \left[ F(x_{i,2}'\theta_2) \right]^{y_{i,3}+y_{i,4}} \right\} \right. \\ \cdot \left. \left\{ \left[ F(-x_{i,3}'\theta_3) \right]^{y_{i,3}} \cdot \left[ F(x_{i,3}'\theta_3) \right]^{y_{i,4}} \right\} \right)$$

Taking logs gives:

$$\ln L(\theta_1, \theta_2, \theta_3) = \ln L_1(\theta_1) + \ln L_2(\theta_2) + \ln L_3(\theta_3)$$

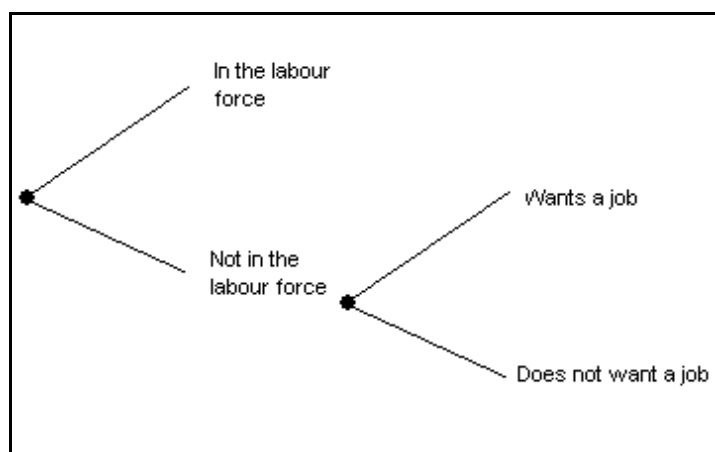
Thus the parameters  $\theta_1$  can be estimated from the entire sample by dividing it into two groups, namely in the labour force and not in labour force. Furthermore the parameters  $\theta_2$  can be estimated by dividing those who are in the labour force into people who are employed and those who are unemployed. Finally the parameter vector  $\theta_3$  can be estimated by dividing those who are employed into part time and full time employees.

The three subsequent binary choice models are estimated by Maximum Likelihood Estimation (MLE) of the standard probit model. The parameters can then be used to calculate an estimate of the association each variable has with the probability of the three events occurring. For more information on MLE in general and the probit model in particular see Greene (2000) and Maddala (1983).

This model can of course be extended to model other labour market outcomes where one can reasonably assume that individuals make choices sequentially. The following diagram represents one such extension

where those not in the labour force are split into those who would like a job but are not looking and others not in the labour force.<sup>2</sup>

**Figure 3.2** Sequential choice model with a breakdown of those not in the labour force



Similar to the previous equations, to measure the factors associated with being someone not in the labour force but who still wants a job the first set of estimates is the probability of being in the labour force or not in the labour force (which have already been estimated). For those not in the labour force, the factors associated with still wanting a job as opposed to not wanting a job are then estimated.

The key assumption of these two models is that the probability of making a particular choice at each stage is independent of the choice at the previous stage. This is a simplifying assumption to make the analysis and exposition tractable as, in reality, individuals are likely to make some of the decisions, at least in part, based on the other probabilities. However, given even this simplified model has not been estimated for the Indigenous population using the 2002 NATSISS (or any other large data sets) this model remains the focus of the analysis. However, to test the robustness of the conclusions drawn from such estimations, a more flexible model is also estimated as outlined below.

### 3.3 Method - Multinomial Probit model of Indigenous employment

An alternative to the sequential choice model that does not assume independence between the decisions is the multinomial probit model. Under the broader category of multinomial choice models it can be assumed that for the dependent variable there are  $m$  possible categories for a person to be in. Each category has a utility associated with it, determined by the other characteristics of the individual (the  $x$ 's in the above specification), the parameters that link these characteristics to the dependent variable (analogous to the  $\theta$ 's) and an individually specific error term that has a mean of zero across the population. Each person in the population of interest will then choose which category to be in based on which

<sup>2</sup>This is similar to the concept of 'discouraged jobseekers' as outlined in ABS (2006: p77) however it also includes those who would like to work but are unable to for personal or family reasons.

has the highest utility. Once again, this should not be interpreted as meaning people are choosing to be unemployed, for example. Rather, the choices are made jointly by the individual, potential employers and those who have a role in providing labour market programs.

Within the broad framework of multinomial choice models, the multinomial probit model assumes that across the population, the error term is distributed via the normal distribution.<sup>3</sup> The parameters of the model are then estimated via maximum likelihood estimation. For more information on the multinomial probit model see Maddala (1983) or McFadden (1983). For more information on how the model is estimated in STATA (the computing package used for this paper) see Long and Freese (2005).

Analysing the data in this way allows the labour market outcomes to be considered jointly, rather than as a series of independent decisions. However, modelling all the outcomes together creates additional problems in that a reference category needs to be specified (by setting the parameters for that category to zero). All other categories are then compared against this reference category. In this paper, being employed in non-CDEP employment is set as the reference category with the factors associated with being not in the labour force, unemployed or employed in the CDEP scheme estimated. The results are presented as marginal effects in Section 4.5.

Because of the added complexity of the model compared to a binary probit model<sup>4</sup> and the amount of information produced for each estimation, only one specification without area level effects is estimated. Furthermore, as one category can only be compared against a reference category (or in the case of marginal effects compared against all other categories together) the extent to which the results can be used to inform policy specifically related to say unemployment or CDEP employment is reduced. Hence, the sequential choice model outlined in Section 3.2 will remain the focus of discussion and conclusions whereas the estimations from the multinomial probit model will be used as a robustness check.

### 3.4 Method - Explanatory variables

While some of the differences in characteristics by employment outcomes that were outlined in the previous section are likely to be outcomes of employment (especially income), only those that are likely to influence either the supply of or demand for labour (for example education) are included as explanatory variables in the model. The following table presents characteristics of the explanatory variables from the 2002 NATSISS. A series of proportions are given across four columns. The first column gives the proportion of the sample who have each of the characteristics and the second column the proportion of those in the labour force with that characteristic. The third column gives the proportion of those not in the labour force with the characteristic and the final column the proportion of those employed. It should be noted that these proportions do not necessarily reflect the population estimates as sample weights are not used in the analysis presented in Section 4.<sup>5</sup>

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<sup>3</sup> This is in comparison to the multinomial logit model where the logistic distribution is assumed. The major benefit of using the multinomial probit model over this other specification is that one does not have to assume the independence of irrelevant alternatives (IIA), though there is a cost in terms of the complexity of the estimations and hence the time taken to estimate the parameters. The IIA assumption would have been particularly restrictive in the analysis of employment patterns where the utility from one category could potentially influence the decision between two other categories (for example the benefits of being employed are likely to influence the decision of whether to be unemployed or not in the labour force).

<sup>4</sup> One of the problems with using the multinomial probit model is that as one adds more categories of dependent variables, the complexity of the likelihood equation to be estimated and hence the estimation time increases substantially. For this reason, only the four category model outlined in Figure 3.1 is estimated, and the difference in characteristics between those not in the labour force who would like a job compared to those who would not is not estimated.

<sup>5</sup> Because of the added complexity of the Multinomial Probit Model, software packages that take into account the survey design for these estimations are not readily available. However, to test the robustness of the main estimations, Table A.5 to A.8 in Appendix A give coeffi-

**Table 3.1** Sample characteristics

Variable name	Whole sample	In the labour force	Not In the labour force	Employed
Female	0.615	0.550	0.699	0.559
Aged 15 to 24	0.244	0.255	0.230	0.224
Aged 35 to 44	0.226	0.258	0.186	0.269
Aged 45 to 54	0.142	0.144	0.139	0.158
Aged 55 plus	0.125	0.055	0.214	0.062
Speaks another language	0.191	0.164	0.226	0.179
Male and Married	0.192	0.254	0.113	0.267
Female and Married	0.297	0.301	0.291	0.330
Has main caring responsibility for child aged 12 or less	0.332	0.288	0.389	0.293
Torres Strait Islander (or both)	0.097	0.106	0.084	0.102
Has a degree or higher	0.029	0.044	0.009	0.051
Completed Year 12 and has an "other" qualification	0.041	0.059	0.018	0.064
Completed Year 12 and has no qualification	0.084	0.106	0.055	0.112
Completed Year 10 and has an "other" qualification	0.107	0.145	0.058	0.151
Completed Year 10 and has no qualification	0.297	0.317	0.271	0.305
Did not complete Year 10 and has an "other" qualification	0.056	0.060	0.051	0.062
Studying - full-time	0.102	0.084	0.124	0.068
Studying - part-time	0.050	0.074	0.021	0.083
Has a disability	0.381	0.295	0.490	0.287
Has a severe transport difficulty or can't get to places	0.134	0.098	0.181	0.083
Was removed from natural family	0.081	0.072	0.093	0.065
Relative was removed from natural family	0.349	0.363	0.331	0.362
Arrested in the last 5 years	0.162	0.170	0.152	0.132
Incarcerated in the last 5 years	0.068	0.073	0.061	0.055
Victoria	0.086	0.083	0.091	0.081
Queensland	0.199	0.208	0.189	0.197
South Australia	0.108	0.111	0.104	0.111
Western Australia	0.167	0.181	0.149	0.188
Tasmania	0.079	0.086	0.069	0.087
Northern Territory	0.165	0.141	0.197	0.151
Australian Capital Territory	0.035	0.042	0.027	0.047
Inner region	0.134	0.131	0.136	0.119
Outer Region	0.268	0.256	0.283	0.235
Remote	0.176	0.168	0.186	0.173
Very Remote	0.264	0.280	0.243	0.314

The other two independent variables included in the model are calculated at the area level. These are the employment to population ratio and unemployment rate of the region (Statistical Local Area) of the person's usual residence. These variables are included to capture the possibility that local labour market characteristics influence a person's own employment outcomes. While these variables are likely to have strong effects on the demand for a person's labour (that is, they capture the jobs available in the area) they may also influence, whether a person supplies their labour in the first place. That is, if a person sees that others around them are not employed, then they may be less likely to attempt to obtain employment themselves.

Such variables are not normally available on sample surveys as there are generally not sufficient sample sizes to obtain accurate estimates. Instead, for this paper estimates are derived from the 2001 Census. From the Census, four variables were calculated for each Statistical Local Area (SLA), two each for males and females. These were based on the male and female Indigenous population who reported their usual residence on the night of the Census as being in that SLA. The employment to population ratio is the

cients and p-values for the main estimations using the jackknife variance estimator function in Stata Version 9.

number of male or female Indigenous Australians who identified as being employed divided by the population in that SLA. The unemployment rate of the area is the number of males or females who were unemployed (not currently employed but actively seeking work and able to commence work) divided by the number of people in the labour force (those either employed or unemployed).<sup>6</sup>

There are two potential estimation problems when using area level variables to explain individual outcomes. The first comes from simultaneous effects or what is often referred to in the literature as the 'reflection problem' (Manski 1993 and Moffitt 2001). This particular estimation problem is caused by the outcomes of those in the area both affecting and being affected by the outcomes of the individual observed in the model. The second potential issue arises from correlated unobservables (Mouw 2006) where a person's choice of area is related to unobserved factors that also affect the dependent variable.

For this paper, the reflection problem is reduced to a certain extent by using a lagged value of the area level employment outcomes. That is, there is less chance that a person's outcomes in 2002 will influence the values for the SLA from the 2001 Census. Biddle and Hunter (2006a) also provide evidence that Indigenous Australians are not strongly affected by the labour market characteristics of potential areas when it comes to choosing where to live. This is especially the case compared to the non-Indigenous population.

This notwithstanding, in the absence of longitudinal or quasi-experimental data, it is not possible to discount either the simultaneous effects or the correlated unobservables problems with regards to the estimations of the area level coefficients. Furthermore, it is difficult to find any theoretical justification for there being possible instrumental variables on the data set that are correlated with the area level factor but not the unobserved factor causing the problems. For this reason, the coefficients for the area level factors should be treated with caution and a separate specification is estimated without the area level factors.

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<sup>6</sup> Information was used from 522 SLAs from the 2001 Census. There were four individuals in the 2002 NATSISS who did not have adequate information on the unemployment rate in the area of which three did not have information on the employment to population ratio. These individuals were only excluded from the analysis using that particular variable.

## 4. RESULTS

Before presenting the results of the analysis, it is important to outline how they can be interpreted. The major output from such estimations are coefficients for each of the explanatory variables (the  $\theta$ s from the previous section which are presented in an appendix for this paper). As the probit model is non-linear, one cannot interpret these coefficients directly as slope coefficients. That is, a one unit increase in one of the independent variables will not necessarily lead to an increase in the probability of the dependent variable equal to its corresponding coefficient. This is because the derivative of the likelihood function (which is used to calculate the probability of the event occurring), taken with respect to one of the dependent variables with all other dependent variables held constant, varies along with the  $x$ 's.

The derivative or change in probability of the likelihood function is therefore affected not only by the value of the dependent variable in question, but also by the estimated probability that you are changing from. For example, if one were looking at the difference between men and women in the probability of being not in the labour force, then this difference would depend on what probability the other characteristics of the person (e.g., age, education, etc.) are predicting.

To interpret the results of the probit model, it is therefore more informative to look at marginal effects. For dichotomous variables (that is which indicate whether or not a person has a given characteristic) the marginal effect of an explanatory variable can be calculated as the change in the estimated probability of the particular event occurring after changing whether or not the person has that characteristic, while holding all other variables constant. When estimating marginal effects when an explanatory variable is dichotomous, it is most intuitive to set up a hypothetical base case. This is an individual with a defined set of characteristics with the marginal effect of a certain variable then being the difference in the estimated probability of the event occurring after changing one characteristic from the base case.

As an example, the marginal effect of being female on the probability of being not in the labour force is found by subtracting the estimated probability for the base case (which amongst other things is male) from the estimated probability of an otherwise identical female. That is, the marginal effect is  $0.538 - 0.450$  which equal  $0.088$ .

The results are presented across three specifications. Specification 1 does not include any characteristics of the region the person lives in. Specification 2 includes the employment to population ratio of the region and Specification 3 the unemployment rate. Given the strong possibility that the two area level variables are jointly determined, they are not included in the same model.

The results for the two area level variables are presented as the change in the probability of the event occurring from a one standard deviation increase in the particular area level variable from the mean of that variable. The following table gives the means and standard deviations that are used for each particular estimation.

**Table 4.1 Mean and standard deviation for the two area level variables by dependent variable**

	Dependent variable			
	Not in the labour force	Unemployed	Employed in the CDEP scheme	Wants a job (for those not in the labour force)
<b>Mean</b>				
Employment to population ratio in the region	40.8	43.4	37.5	44.2
Unemployment rate in the region	18.3	17.6	19.2	16.5
<b>Standard deviation</b>				
Employment to population ratio in the region	13.5	14.1	12.2	14.3
Unemployment rate in the region	11.1	11.2	10.9	10.9

Variables that were not significant at the 10% level of significance are labeled “n.s.” whereas those that were significant at the 10% level of significance but not the 5% level are marked with an \*. Appendix Tables A1 - A4 give the coefficient estimates that were used to derive the marginal effect as well as the p-value that corresponds to that variable. Tables A5 - A8 give coefficients and p-values after taking into account sample weights and using jackknife variance estimation. This second set of estimates results in more conservative standard errors and hence some variables that were estimated to have a coefficient significantly different from zero in the original estimations are not significant in the second.

## 4.1 Results - Not in the labour force estimates

The presentation of results begins by looking at the factors associated with the probability of being not in the labour force.

Table 4.2 Not in the labour force estimates - Marginal effects

Variable name	Specification 1	Specification 2	Specification 3
Female	0.090	0.036	0.106
Aged 15 to 24	n.s.	n.s.	n.s.
Aged 35 to 44	-0.034	-0.034	-0.034
Aged 45 to 54	0.058	0.063	0.057
Aged 55 plus	0.351	0.352	0.358
Speaks another language	0.122	0.108	0.124
Male and Married	-0.188	-0.189	-0.177
Female and Married	-0.114	-0.113	-0.107
Has main caring responsibility for child aged 12 or less	0.234	0.231	0.234
Torres Strait Islander (or both)	-0.038*	n.s.	-0.036*
Has a degree or higher	-0.339	-0.345	-0.315
Completed Year 12 and has an "other" qualification	-0.295	-0.298	-0.274
Completed Year 12 and has no qualification	-0.215	-0.214	-0.202
Completed Year 10 and has an "other" qualification	-0.256	-0.257	-0.241
Completed Year 10 and has no qualification	-0.126	-0.123	-0.121
Did not complete Year 10 and has an "other" qualification	-0.179	-0.178	-0.172
Studying - full-time	0.172	0.174	0.170
Studying - part-time	-0.205	-0.204	-0.192
Has a disability	0.179	0.176	0.175
Has a severe transport difficulty or can't get to places	0.120	0.124	0.119
Was removed from natural family	0.039*	0.036*	0.039*
Relative was removed from natural family	-0.023*	n.s.	-0.023*
Arrested in the last 5 years	n.s.	n.s.	n.s.
Incarcerated in the last 5 years	n.s.	n.s.	n.s.
Victoria	n.s.	n.s.	n.s.
Queensland	n.s.	n.s.	n.s.
South Australia	n.s.	n.s.	n.s.
Western Australia	-0.041	n.s.	n.s.
Tasmania	-0.060	n.s.	n.s.
Northern Territory	0.095	0.059	0.100
Australian Capital Territory	-0.080	n.s.	n.s.
Inner regional area	n.s.	n.s.	n.s.
Outer regional area	n.s.	n.s.	n.s.
Remote area	-0.051	-0.041*	n.s.
Very remote area	-0.163	-0.142	-0.116
Employment to population ratio in the region	n.a.	-0.066	n.a.
Unemployment rate in the region	n.a.	n.a.	0.044
Probability of "base case"	0.413	0.425	0.41
Sample Size	9,359	9,356	9,335
Pseudo R-squared	0.197	0.204	0.209

Note: The base case person is male; aged 25 to 34; does not speak another language; not married; does not have main caring responsibility for a child; is Aboriginal only; did not complete Year 10 or have a qualification; is not studying; does not have a disability; does not have difficulty getting places; was not themselves removed from their natural family nor were their relatives; was not arrested in the last five years; lives in New South Wales; and in a major city.

The first thing to note about the results is that the majority of the individual level variables do not change with the introduction of the area level effects. That is, for the most part, individual characteristics have the same association even after controlling for the local labour market characteristics. The exceptions to this are the Torres Strait Islander and relative removed from the natural family variables which go from being

significant at the 10% level of significance in the first and third column to not significant in the second column.

The marginal effects for the age variables show that, after controlling for all other variables, the probability of being 'not in the labour force' is lowest for Indigenous Australians when they are aged 35 to 44. Not surprisingly, those aged 55 years and over have the highest probability. Of the other individual level variables, marital status and whether or not a person has primary caring responsibility for a child has a strong association with labour force participation. That is, although being married decreases the probability of being 'not in the labour force' (more so for males than females) having main carer responsibility is associated with a probability around 0.234 higher than an otherwise identical person.

Human Capital characteristics also have a strong association. In addition to disability, a person's education was also found to be an important variable explaining the probability of being 'not in the labour force.' All of the education groups have a lower estimated probability than the base case (who did not complete Year 10 or have a qualification) and the higher levels of education have a bigger marginal effect. This most likely reflects the demand for the labour of those with higher education levels being higher than the demand for those with relatively low levels of formal education.

Perhaps as interesting as those variables that were significant are those that were not found to be associated with the probability of being not in the labour force. The variable for being a Torres Strait Islander as opposed to Aboriginal only was not significant at the 5% level of significance, neither was having ones relative removed from their natural family. Having been arrested in the last 5 years was not significant even at the 10% level of significance.

Table 4.1 also shows that the area level effects have a significant association and have the expected signs. That is, a person living in an area with a large proportion of the population employed is less likely to be 'not in the labour force' themselves. On the other hand, those in areas with high unemployment rates are more likely to be 'not in the labour force'. The magnitude of the effect is somewhat higher for the employment to population ratio of the area as opposed to the unemployment rate. That is, not only are a person's observed individual characteristics important, so too are the economic characteristics of the area in which they live.

In the first specification, Indigenous Australians in four States and Territories have a significantly different probability of being 'not in the labour force' than New South Wales. However, after controlling for either the employment to population ratios of the area in which the person lives or the unemployment rate, only those in the Northern Territory remain significantly different. Furthermore, after controlling for the unemployment rate of the region, those in remote areas no longer have a significantly different probability of being 'not in the labour force' compared to those in major cities.

## 4.2 Results - Unemployment estimates

The following table presents the model estimates for the probability of being unemployed. It should of course be kept in mind that the estimates are for those in the labour force only. Hence the alternative to being unemployed is to be employed.

Table 4.3 Unemployment estimates - Marginal effects

Variable name	Specification 1	Specification 2	Specification 3
Female	n.s.	n.s.	0.052
Aged 15 to 24	0.076	0.077	0.073
Aged 35 to 44	-0.041*	-0.042	-0.042
Aged 45 to 54	-0.112	-0.109	-0.101
Aged 55 plus	-0.189	-0.191	-0.167
Speaks another language	n.s.	-0.066	n.s.
Male and Married	-0.107	-0.109	-0.097
Female and Married	-0.154	-0.155	-0.135
Has main caring responsibility for child aged 12 or less	0.042	0.042	0.042
Torres Strait Islander (or both)	0.051*	0.073	0.050
Has a degree or higher	-0.208	-0.199	-0.177
Completed Year 12 and has an "other" qualification	-0.150	-0.153	-0.140
Completed Year 12 and has no qualification	-0.150	-0.143	-0.131
Completed Year 10 and has an "other" qualification	-0.118	-0.112	-0.106
Completed Year 10 and has no qualification	-0.064	-0.059	-0.058
Did not complete Year 10 and has an "other" qualification	-0.114	-0.114	-0.102
Studying - full-time	0.077	0.079	0.073
Studying - part-time	-0.167	-0.166	-0.151
Has a disability	0.059	0.057	0.055
Has a severe transport difficulty or can't get to places	0.142	0.145	0.136
Was removed from natural family	0.097	0.096	0.092
Relative was removed from natural family	n.s.	n.s.	n.s.
Arrested in the last 5 years	0.195	0.194	0.183
Incarcerated in the last 5 years	0.097	0.099	0.088
Victoria	-0.105	-0.077	-0.062
Queensland	n.s.	0.069	0.046
South Australia	n.s.	n.s.	n.s.
Western Australia	n.s.	n.s.	n.s.
Tasmania	-0.087	n.s.	n.s.
Northern Territory	n.s.	n.s.	n.s.
Australian Capital Territory	-0.221	-0.186	-0.182
Inner regional area	n.s.	n.s.	n.s.
Outer regional area	n.s.	n.s.	n.s.
Remote area	-0.124	-0.121	-0.091
Very remote area	-0.224	-0.209	-0.160
Employment to population ratio in the region	n.a.	-0.073	n.a.
Unemployment rate in the region	n.a.	n.a.	0.067
Probability of "base case"	0.338	0.345	0.282
Sample Size	5,241	5,239	5,225
Pseudo R-squared	0.166	0.176	0.177

Note: The base case person is male; aged 25 to 34; does not speak another language; not married; does not have main caring responsibility for a child; is Aboriginal only; did not complete Year 10 or have a qualification; is not studying; does not have a disability; does not have difficulty getting places; was not themselves removed from their natural family nor were their relatives; was not arrested in the last five years; lives in New South Wales; and in a major city.

Like the previous estimates, Table 4.3 shows that the majority of the individual variables did not change with the introduction of the area level variables, the exception being the association with being female, a Torres Strait Islander or speaking a language other than English.

The probability of being unemployed is higher amongst the young than the old but lower for those who are married than those not married. Those Indigenous Australians who have main caring responsibility for a child aged 12 years or less are more likely to be unemployed than employed, implying that it may be difficult for this group to find jobs with flexible working arrangements.

The human capital variables have a strong association with all education having a lower probability of being unemployed as opposed to employed than the base case. Those who are studying full-time have a higher probability of being unemployed than those not studying. This group of Indigenous Australians may be finding it hard to obtain a job to support themselves during their studies, remembering that they are in the labour force and hence have identified that they would like a job. If this is anticipated by Indigenous Australians before commencing their studies, then this may be a disincentive to undertake education in the first place.

Unlike the associations for being not in the labour force exposure to the criminal justice system has a strong association with being unemployed. That is, those who have been arrested in the last 5 years are much more likely to be unemployed compared to those who have not. Furthermore, and keeping in mind that all those who have been incarcerated have also been arrested, the marginal effect for this variable shows that these individuals have a probability even higher than those arrested only.

Those who live in Remote or Very Remote regions are less likely to be unemployed than those in major cities or regional areas, even after controlling for the labour market characteristics of the areas. This confirms that in these areas the CDEP scheme appears to be providing an alternative to being unemployed.

Unlike the not in the labour force estimates, the magnitude of the association between the employment to population ratio of the area and a person's probability of being unemployed is similar to the association between the unemployment rate of the area and a person's individual outcomes. Both have quite large associations showing that area level characteristics are important explanators of a person's probability of being unemployed. That is, even after controlling for a person's education level, age, marital status and a number of other personal characteristics, those who live in high unemployment or low employment areas are still more likely to be unemployed themselves.

### 4.3 Results - CDEP estimates

The following table looks at the factors associated with the probability of being employed in the CDEP scheme as opposed to other employment.

Table 4.4 CDEP estimates - Marginal effects

Variable name	Specification 1	Specification 2	Specification 3
Female	-0.029	n.s.	-0.036
Aged 15 to 24	0.051	0.049	0.053
Aged 35 to 44	-0.025	-0.024	-0.027
Aged 45 to 54	-0.062	-0.060	-0.068
Aged 55 plus	-0.052	-0.050	-0.057
Speaks another language	0.203	0.204	0.210
Male and Married	n.s.	n.s.	n.s.
Female and Married	n.s.	n.s.	n.s.
Has main caring responsibility for child aged 12 or less	n.s.	n.s.	n.s.
Torres Strait Islander (or both)	n.s.	n.s.	n.s.
Has a degree or higher	-0.101	-0.097	-0.113
Completed Year 12 and has an "other" qualification	-0.091	-0.087	-0.103
Completed Year 12 and has no qualification	-0.066	-0.064	-0.074
Completed Year 10 and has an "other" qualification	-0.069	-0.067	-0.077
Completed Year 10 and has no qualification	-0.031	-0.030	-0.034
Did not complete Year 10 and has an "other" qualification	-0.030*	-0.030*	-0.034*
Studying - full-time	n.s.	n.s.	n.s.
Studying - part-time	n.s.	-0.026*	n.s.
Has a disability	0.026	0.025	0.028
Has a severe transport difficulty or can't get to places	0.071	0.069	0.077
Was removed from natural family	n.s.	n.s.	n.s.
Relative was removed from natural family	-0.019	-0.018	-0.020
Arrested in the last 5 years	0.110	0.108	0.121
Incarcerated in the last 5 years	n.s.	n.s.	n.s.
Victoria	n.s.	n.s.	n.s.
Queensland	n.s.	n.s.	n.s.
South Australia	n.s.	n.s.	n.s.
Western Australia	0.059	0.051	0.050
Tasmania	-0.103	-0.100	-0.117
Northern Territory	n.s.	n.s.	n.s.
Australian Capital Territory	n.s.	n.s.	n.s.
Inner regional area	0.121	0.125	0.136
Outer regional area	0.174	0.179	0.188
Remote area	0.348	0.342	0.351
Very remote area	0.502	0.488	0.485
Employment to population ratio in the region	n.a.	0.011	n.a.
Unemployment rate in the region	n.a.	n.a.	-0.017
Probability of "base case"	0.114	0.109	0.101
Sample Size	4,246	4,245	4,236
Pseudo R-squared	0.324	0.324	0.326

Note: The base case person is male; aged 25 to 34; does not speak another language; not married; does not have main caring responsibility for a child; is Aboriginal only; did not complete Year 10 or have a qualification; is not studying; does not have a disability; does not have difficulty getting places; was not themselves removed from their natural family nor were their relatives; was not arrested in the last five years; lives in New South Wales; and in a major city.

Estimates do not change substantially after taking into account the area level effects, although being female is an exception. The table shows as one gets further away from major cities, the probability of being employed in the CDEP scheme as opposed to other employment increases. This is of course not surprising as the CDEP scheme is predominantly a remote and to a lesser extent regional program.

Even after controlling for the area level variables, there are still a number of significant individual level characteristics. The results show that the CDEP scheme is heavily concentrated amongst the young and those who speak an Indigenous language. Furthermore it appears to provide an alternative form of employment especially for those with low levels of human capital and those who have been arrested. Interestingly though, having been incarcerated in the last five years in addition to having been arrested does not appear to have an additional association.

Given the effect of State/Territory is insignificant (apart from Tasmania and Western Australia to a lesser extent) the distribution of the CDEP scheme seems to be influenced more by remoteness than jurisdiction. Nonetheless, those in Western Australia were more likely to be in the CDEP scheme even after controlling for remoteness, whereas those in Tasmania were substantially less likely.

## 4.4 Results - Whether someone not in the labour force still wants a job

The final set of estimates are for those who are not in the labour force only. The probability of a person identifying that they wants a job is modelled.

Table 4.5 Those who want a job but are not in the labour force - Marginal effects

Variable name	Specification 1	Specification 2	Specification 3
Female	n.s.	n.s.	n.s.
Aged 15 to 24	0.040*	0.040*	0.039*
Aged 35 to 44	n.s.	n.s.	n.s.
Aged 45 to 54	-0.105	-0.106	-0.103
Aged 55 plus	-0.249	-0.250	-0.240
Speaks another language	-0.086	-0.084	-0.085
Male and Married	n.s.	n.s.	n.s.
Female and Married	n.s.	n.s.	n.s.
Has main caring responsibility for child aged 12 or less	0.063	0.063	0.061
Torres Strait Islander (or both)	n.s.	n.s.	n.s.
Has a degree or higher	0.265	0.268	0.288
Completed Year 12 and has an "other" qualification	0.113	0.111*	0.111
Completed Year 12 and has no qualification	0.082	0.082	0.080
Completed Year 10 and has an "other" qualification	0.140	0.139	0.135
Completed Year 10 and has no qualification	0.064	0.064	0.064
Did not complete Year 10 and has an "other" qualification	0.111	0.110	0.109
Studying - full-time	0.078	0.078	0.076
Studying - part-time	n.s.	n.s.	n.s.
Has a disability	-0.039	-0.038	-0.039
Has a severe transport difficulty or can't get to places	n.s.	n.s.	n.s.
Was removed from natural family	n.s.	n.s.	n.s.
Relative was removed from natural family	0.033*	0.032*	0.033*
Arrested in the last 5 years	0.048*	0.048*	0.047*
Incarcerated in the last 5 years	n.s.	n.s.	n.s.
Victoria	0.123	0.118	0.128
Queensland	n.s.	n.s.	n.s.
South Australia	0.105	0.106	0.104
Western Australia	0.063	0.062	0.064
Tasmania	0.098	0.089	0.104
Northern Territory	n.s.	n.s.	n.s.
Australian Capital Territory	0.115	0.103*	0.137
Inner regional area	n.s.	n.s.	n.s.
Outer regional area	0.047*	0.050*	0.047*
Remote area	n.s.	n.s.	n.s.
Very remote area	-0.103	-0.106	-0.091
Employment to population ratio in the region	n.a.	n.s.	n.a.
Unemployment rate in the region	n.a.	n.a.	n.s.
Probability of "base case"	0.297	0.298	0.285
Sample Size	4,118	4,117	4,110
Pseudo R-squared	0.154	0.154	0.154

Note: The base case person is male; aged 25 to 34; does not speak another language; not married; does not have main caring responsibility for a child; is Aboriginal only; did not complete Year 10 or have a qualification; is not studying; does not have a disability; does not have difficulty getting places; was not themselves removed from their natural family nor were their relatives; was not arrested in the last five years; lives in New South Wales; and in a major city.

For those who are not in the labour force, age appears to be one of the variables that has the strongest negative association with the probability of an individual identifying that they would like a job, albeit one that is non-linear. Those aged 15 to 24 are slightly more likely to want a job (though the difference is not significant at the 5% level of significance), however there is no significant difference between those aged either 35 to 44 and the base case (aged 25 to 34). Beyond the age of 45, people not in the labour force are much less likely to still want a job. Similarly, those who have a disability are also less likely to want a job, as are those who speak an Indigenous language.

Apart from the Very Remote category (which has a negative association), there is no significant difference across the remoteness variables in the probability of wanting a job. The coefficients on the two area levels in Specifications 2 and 3 were also insignificant. That is, for those who were not in the labour force, the employment to population ratio or the unemployment rate of the area in which a person lives is not associated with whether or not a person reports that they would still like a job.

Those who have the main caring responsibility for a child aged 12 years or less were found to be more likely to want a job. Given these people were shown in Table 4.3 to be more likely to be unemployed if they are in the labour force, the results in Table 4.5 may be able to be interpreted to mean that this group has given up looking for work because they feel that it is unlikely that they will find a job that meets their needs.

Higher education levels are generally positively associated with still wanting a job. The magnitude of this association is generally quite high, especially for those who have a degree. Given these groups were found to be less likely to be not in the labour force and unemployed, the interpretation for this positive marginal effect may be different to that for the main caring responsibility variable.

## 4.5 Results - Multinomial Probit

The final section of empirical results in this paper are for a four category labour force status comparison assuming a multinomial probit model as opposed to the sequential model presented previously. The results are presented as marginal effects which represent the predicted difference in the probability of being in that labour market category for someone with a particular characteristic compared to the base case, whilst holding all other explanatory variables constant. The probability for the base case is given in the second last line of the table. It should be noted that the specifications with the area level variables as explanatory variables are not presented in this paper.

Those variables for which the marginal effect is not significantly different from zero are once again labelled 'n.s.' with those significantly different from zero at the 10% level of significance but not the 5% level marked with a \*. Unlike for the binary probit where the significance of the marginal effects as calculated in this paper matches the significance of the coefficients, this is not the case for the marginal effects for the multinomial probit model. This is because the coefficient estimates are calculated relative to a reference category (employed in non-CDEP employment) whereas the marginal effects refer to differences in the predicted probability of being in the category of interest compared to all the other possible categories. Coefficients and their p-values are given in Table A.5 in Appendix A.

**Table 4.6** Multinomial Probit - Marginal effects

Variable name	Not in the labour force	Unemployed	Employed CDEP	Employed Non-CDEP
Female	0.090	n.s.	-0.053	-0.027*
Aged 15 to 24	n.s.	0.032	n.s.	-0.067
Aged 35 to 44	-0.040	n.s.	n.s.	0.056
Aged 45 to 54	0.048	-0.058	-0.044	0.054
Aged 55 plus	0.339	-0.110	-0.098	-0.130
Speaks another language	0.164	-0.033	0.057	-0.188
Male and Married	-0.214	n.s.	0.054	0.166
Female and Married	-0.123	-0.043	0.052	0.114
Has main caring responsibility for child aged 12 or less	0.239	-0.042	-0.046	-0.152
Torres Strait Islander (or both)	-0.045	0.033	n.s.	n.s.
Has a degree or higher	-0.384	-0.042	-0.057	0.484
Completed Year 12 and has an "other" qualification	-0.347	n.s.	n.s.	0.393
Completed Year 12 and has no qualification	-0.259	-0.028	n.s.	0.286
Completed Year 10 and has an "other" qualification	-0.304	n.s.	n.s.	0.302
Completed Year 10 and has no qualification	-0.147	n.s.	0.021	0.128
Did not complete Year 10 and has an "other" qualification	-0.205	n.s.	0.052	0.172
Studying - full-time	0.172	n.s.	-0.045	-0.114
Studying - part-time	-0.234	-0.044	0.054	0.224
Has a disability	0.185	-0.015	-0.023	-0.148
Has a severe transport difficulty or can't get to places	0.136	0.027	n.s.	-0.148
Was removed from natural family	0.049	0.029	n.s.	-0.063
Relative was removed from natural family	-0.029	n.s.	n.s.	0.035
Arrested in the last 5 years	0.035*	0.080	0.032	-0.146
Incarcerated in the last 5 years	n.s.	0.041	n.s.	-0.066
Victoria	-0.044*	-0.038	n.s.	0.051
Queensland	n.s.	n.s.	n.s.	n.s.
South Australia	n.s.	n.s.	n.s.	n.s.
Western Australia	-0.038*	n.s.	0.062	n.s.
Tasmania	n.s.	n.s.	-0.107	0.158
Northern Territory	0.097	n.s.	n.s.	-0.065
Australian Capital Territory	-0.097	-0.072	n.s.	0.127
Inner regional area	n.s.	n.s.	0.089	-0.067
Outer regional area	-0.044	n.s.	0.123	-0.068
Remote area	-0.137	-0.057	0.277	-0.082
Very remote area	-0.240	-0.081	0.419	-0.098
Probability of "base case"	0.481	0.106	0.124	0.289

Note: The base case person is male; aged 25 to 34; does not speak another language; not married; does not have main caring responsibility for a child; is Aboriginal only; did not complete Year 10 or have a qualification; is not studying; does not have a disability; does not have difficulty getting places; was not themselves removed from their natural family nor were their relatives; was not arrested in the last five years; lives in New South Wales; and in a major city.

The marginal effects presented in Table 4.6 for the most part follow those from the sequential model outlined earlier. That is, those in the older age groups are more likely to be not in the labour force, whereas those in the younger age groups are more likely to be unemployed but less likely to be in non-CDEP employment. Those with higher levels of human capital were more likely to be employed in non-CDEP employment and less likely to be not in the labour force.

There were differences, however, between the results in Table 4.6 and those in Tables 4.2 to 4.4. These can largely be explained by the specification for the multinomial probit model. For example, a number of the marginal effects for the education variables within the unemployment or CDEP employment categories were not significant. However, this is because the probabilities for each category are compared against all other categories, rather than against a specific category like in a sequential model.

## 5. SUMMARY

The focus of this paper was to look at the factors associated with the employment outcomes of Indigenous Australians. The paper looked at how geographic, human capital and other individual factors were associated with the probability of:

- being not in the labour force;
- being unemployed for those in the labour force;
- being employed in the CDEP scheme for those employed;
- wanting a job for those not in the labour force.

For the main estimations, the factors associated with these employment outcomes are estimated assuming separate binary probit models. Such a method allows the associations between the dependent and a particular independent variable to be estimated whilst holding all other independent variables constant.

The results show that lifecycle factors are important explanatory variables in the analysis of Indigenous employment outcomes. After controlling for all other variables, Indigenous Australians are least likely to be not in the labour force when they are aged 35 to 44. Not surprisingly, those aged 55 years and over have the highest probability. Unemployment probabilities follow a more linear path. That is, the probability of being unemployed starts out high for those aged 15 to 24, stays more or less constant for those aged 25 to 44 then decreases quite substantially for those aged 45 to 54 and even more so for those aged 55 plus. Age is also a factor in explaining whether or not a person is employed in the CDEP scheme (as opposed to non-CDEP employment only). Of those who are employed, the young and especially those aged 15 to 24 are most likely to be employed in the CDEP scheme.

A person's education level has a strong and reasonably consistent association with a person's labour market outcomes. Those with higher education levels (especially degrees and other qualifications) are much less likely to be not in the labour force, unemployed and for those who are employed, less likely to be employed in the CDEP scheme. For those not in the labour force, however, those with higher levels of education are more likely to report that they would like a job. Participation in education also has a strong association, however those studying part-time often have different outcomes compared to those studying full-time.

Having been arrested in the five years preceding the survey was positively associated with whether or not a person was unemployed (of those in the labour force) and for those who are employed whether or not they were employed in the CDEP scheme. For those who had been arrested, having been incarcerated was also positively associated with being unemployed, but interestingly was insignificant for the other three estimations.

In addition to the characteristics of the individual, the characteristics of the area in which they lived was also found to be associated with employment outcomes. Those in Remote and Very Remote areas are less likely to be not in the labour force or unemployed than the rest of Australia. Those in Very Remote Australia who are not in the labour force are also less likely to report that they would like a job than those in other Remoteness categories. There is, however, generally no difference between those in major cities and those in inner and outer regional areas.

The labour market characteristics of the area where a person lives also had a significant association with a person's own labour market outcomes, even after controlling for a range of individual characteristics.

Those in high unemployment or low employment areas were much more likely to be not in the labour force and unemployed themselves. The association with being employed in the CDEP scheme was smaller, and the association with wanting a job (for those not in the labour force) was not significant at all.

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## APPENDIX A - COEFFICIENT ESTIMATES AND P-VALUES

**Table A.1** Coefficient estimates and P-values - Not in the labour force

Variable name	Specification 1		Specification 2		Specification 3	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Female	0.226	0.000	0.092	0.043	0.271	0.000
Aged 15 to 24	0.025	0.558	0.026	0.551	0.026	0.556
Aged 35 to 44	-0.087	0.036	-0.087	0.038	-0.092	0.028
Aged 45 to 54	0.147	0.003	0.160	0.001	0.147	0.003
Aged 55 plus	0.939	0.000	0.952	0.000	0.940	0.000
Speaks another language	0.307	0.000	0.273	0.000	0.317	0.000
Male and Married	-0.536	0.000	-0.531	0.000	-0.530	0.000
Female and Married	-0.308	0.000	-0.300	0.000	-0.299	0.000
Has main caring responsibility for child aged 12 or less	0.598	0.000	0.591	0.000	0.596	0.000
Torres Strait Islander (or both)	-0.100	0.066	-0.057	0.299	-0.097	0.077
Has a degree or higher	-1.227	0.000	-1.215	0.000	-1.238	0.000
Completed Year 12 and has an "other" qualification	-0.964	0.000	-0.952	0.000	-0.959	0.000
Completed Year 12 and has no qualification	-0.629	0.000	-0.614	0.000	-0.624	0.000
Completed Year 10 and has an "other" qualification	-0.789	0.000	-0.773	0.000	-0.791	0.000
Completed Year 10 and has no qualification	-0.342	0.000	-0.329	0.000	-0.345	0.000
Did not complete Year 10 and has an "other" qualification	-0.505	0.000	-0.495	0.000	-0.511	0.000
Studying - full-time	0.434	0.000	0.439	0.000	0.431	0.000
Studying - part-time	-0.592	0.000	-0.578	0.000	-0.584	0.000
Has a disability	0.452	0.000	0.445	0.000	0.445	0.000
Has a severe transport difficulty or can't get to places	0.303	0.000	0.311	0.000	0.304	0.000
Was removed from natural family	0.098	0.067	0.091	0.091	0.101	0.063
Relative was removed from natural family	-0.059	0.069	-0.051	0.120	-0.060	0.066
Arrested in the last 5 years	0.050	0.285	0.046	0.325	0.039	0.408
Incarcerated in the last 5 years	-0.016	0.814	-0.024	0.723	-0.016	0.807
Victoria	-0.074	0.228	0.013	0.835	0.011	0.856
Queensland	-0.081	0.119	-0.010	0.849	-0.053	0.316
South Australia	-0.021	0.723	-0.011	0.857	-0.008	0.884
Western Australia	-0.107	0.050	-0.070	0.201	-0.079	0.147
Tasmania	-0.158	0.014	0.004	0.956	-0.079	0.231
Northern Territory	0.239	0.000	0.149	0.018	0.257	0.000
Australian Capital Territory	-0.213	0.024	0.009	0.926	-0.080	0.412
Inner regional area	-0.017	0.778	-0.079	0.185	-0.033	0.579
Outer regional area	-0.004	0.935	-0.065	0.210	-0.013	0.792
Remote area	-0.134	0.020	-0.106	0.068	-0.084	0.149
Very remote area	-0.456	0.000	-0.386	0.000	-0.327	0.000
Employment to population ratio in the region	n.a.	n.a.	-0.013	0.000	n.a.	n.a.
Unemployment rate in the region	n.a.	n.a.	n.a.	n.a.	0.010	0.000
Intercept	-0.221	0.002	0.330	0.001	-0.506	0.000

**Table A.2 Coefficient estimates and P-values - Unemployed**

Variable name	Specification 1		Specification 2		Specification 3	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Female	0.076	0.233	-0.081	0.230	0.149	0.021
Aged 15 to 24	0.201	0.001	0.203	0.001	0.206	0.001
Aged 35 to 44	-0.116	0.056	-0.118	0.054	-0.130	0.035
Aged 45 to 54	-0.334	0.000	-0.320	0.000	-0.335	0.000
Aged 55 plus	-0.620	0.000	-0.621	0.000	-0.621	0.000
Speaks another language	-0.127	0.113	-0.187	0.023	-0.105	0.195
Male and Married	-0.318	0.000	-0.321	0.000	-0.320	0.000
Female and Married	-0.483	0.000	-0.480	0.000	-0.472	0.000
Has main caring responsibility for child aged 12 or less	0.113	0.038	0.111	0.042	0.119	0.030
Torres Strait Islander (or both)	0.135	0.071	0.191	0.012	0.143	0.059
Has a degree or higher	-0.709	0.000	-0.654	0.000	-0.675	0.000
Completed Year 12 and has an "other" qualification	-0.468	0.000	-0.471	0.000	-0.494	0.000
Completed Year 12 and has no qualification	-0.465	0.000	-0.436	0.000	-0.453	0.000
Completed Year 10 and has an "other" qualification	-0.353	0.000	-0.330	0.000	-0.355	0.000
Completed Year 10 and has no qualification	-0.183	0.001	-0.167	0.004	-0.182	0.002
Did not complete Year 10 and has an "other" qualification	-0.340	0.001	-0.337	0.001	-0.338	0.001
Studying - full-time	0.204	0.005	0.206	0.005	0.205	0.005
Studying - part-time	-0.533	0.000	-0.522	0.000	-0.544	0.000
Has a disability	0.158	0.001	0.150	0.002	0.156	0.001
Has a severe transport difficulty or can't get to places	0.368	0.000	0.373	0.000	0.369	0.000
Was removed from natural family	0.254	0.002	0.251	0.003	0.255	0.003
Relative was removed from natural family	-0.040	0.410	-0.039	0.432	-0.048	0.330
Arrested in the last 5 years	0.500	0.000	0.498	0.000	0.489	0.000
Incarcerated in the last 5 years	0.255	0.003	0.257	0.003	0.244	0.005
Victoria	-0.310	0.001	-0.220	0.018	-0.194	0.040
Queensland	0.092	0.226	0.181	0.018	0.132	0.082
South Australia	-0.031	0.725	-0.024	0.780	-0.014	0.868
Western Australia	-0.046	0.572	-0.008	0.920	-0.005	0.953
Tasmania	-0.255	0.007	-0.080	0.411	-0.134	0.162
Northern Territory	0.032	0.736	-0.049	0.614	0.065	0.500
Australian Capital Territory	-0.772	0.000	-0.599	0.000	-0.703	0.000
Inner regional area	0.105	0.213	0.022	0.800	0.060	0.482
Outer regional area	0.013	0.859	-0.070	0.355	-0.018	0.805
Remote area	-0.375	0.000	-0.358	0.000	-0.298	0.001
Very remote area	-0.786	0.000	-0.699	0.000	-0.589	0.000
Employment to population ratio in the region	n.a.	n.a.	-0.015	0.000	n.a.	n.a.
Unemployment rate in the region	n.a.	n.a.	n.a.	n.a.	0.017	0.000
Intercept	-0.417	0.000	0.243	0.084	-0.874	0.000

**Table A.3 Coefficient estimates and P-values - Employed in the CDEP scheme**

Variable name	Specification 1		Specification 2		Specification 3	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Female	-0.168	0.030	-0.114	0.166	-0.191	0.014
Aged 15 to 24	0.233	0.001	0.232	0.001	0.224	0.001
Aged 35 to 44	-0.141	0.030	-0.141	0.029	-0.139	0.032
Aged 45 to 54	-0.417	0.000	-0.423	0.000	-0.422	0.000
Aged 55 plus	-0.331	0.004	-0.330	0.004	-0.334	0.003
Speaks another language	0.730	0.000	0.746	0.000	0.717	0.000
Male and Married	-0.105	0.160	-0.105	0.159	-0.106	0.158
Female and Married	-0.026	0.695	-0.029	0.662	-0.038	0.577
Has main caring responsibility for child aged 12 or less	0.046	0.430	0.049	0.403	0.040	0.495
Torres Strait Islander (or both)	-0.106	0.245	-0.124	0.178	-0.106	0.247
Has a degree or higher	-1.023	0.000	-1.036	0.000	-1.031	0.000
Completed Year 12 and has an "other" qualification	-0.794	0.000	-0.793	0.000	-0.815	0.000
Completed Year 12 and has no qualification	-0.458	0.000	-0.468	0.000	-0.467	0.000
Completed Year 10 and has an "other" qualification	-0.493	0.000	-0.499	0.000	-0.496	0.000
Completed Year 10 and has no qualification	-0.178	0.006	-0.183	0.005	-0.180	0.005
Did not complete Year 10 and has an "other" qualification	-0.174	0.089	-0.178	0.081	-0.182	0.076
Studying - full-time	0.104	0.272	0.105	0.269	0.123	0.197
Studying - part-time	-0.149	0.103	-0.156	0.088	-0.148	0.106
Has a disability	0.124	0.021	0.125	0.020	0.127	0.018
Has a severe transport difficulty or can't get to places	0.307	0.000	0.309	0.000	0.311	0.000
Was removed from natural family	-0.031	0.760	-0.029	0.773	-0.023	0.818
Relative was removed from natural family	-0.103	0.049	-0.106	0.044	-0.103	0.050
Arrested in the last 5 years	0.447	0.000	0.451	0.000	0.457	0.000
Incarcerated in the last 5 years	0.161	0.158	0.157	0.170	0.157	0.170
Victoria	0.030	0.793	-0.011	0.926	-0.040	0.735
Queensland	0.064	0.475	0.017	0.856	0.020	0.821
South Australia	0.096	0.324	0.077	0.434	0.071	0.471
Western Australia	0.265	0.003	0.236	0.008	0.215	0.017
Tasmania	-1.068	0.000	-1.138	0.000	-1.143	0.000
Northern Territory	0.121	0.221	0.141	0.153	0.088	0.374
Australian Capital Territory	-0.002	0.993	-0.090	0.657	-0.168	0.416
Inner regional area	0.482	0.000	0.506	0.000	0.505	0.000
Outer regional area	0.645	0.000	0.675	0.000	0.656	0.000
Remote area	1.111	0.000	1.109	0.000	1.083	0.000
Very remote area	1.501	0.000	1.479	0.000	1.424	0.000
Employment to population ratio in the region	n.a.	n.a.	0.004	0.046	n.a.	n.a.
Unemployment rate in the region	n.a.	n.a.	n.a.	n.a.	-0.008	0.004
Intercept	-1.205	0.000	-1.403	0.000	-0.988	0.000

**Table A.4 Coefficient estimates and P-values - Those who want a job but are not in the labour force**

Variable name	Specification 1		Specification 2		Specification 3	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Female	-0.021	0.741	-0.002	0.979	-0.004	0.949
Aged 15 to 24	0.111	0.090	0.111	0.091	0.112	0.089
Aged 35 to 44	-0.020	0.758	-0.021	0.747	-0.023	0.723
Aged 45 to 54	-0.338	0.000	-0.341	0.000	-0.339	0.000
Aged 55 plus	-1.131	0.000	-1.134	0.000	-1.129	0.000
Speaks another language	-0.269	0.001	-0.263	0.001	-0.273	0.001
Male and Married	0.116	0.180	0.117	0.175	0.121	0.163
Female and Married	0.025	0.648	0.024	0.655	0.023	0.668
Has main caring responsibility for child aged 12 or less	0.174	0.001	0.175	0.001	0.172	0.002
Torres Strait Islander (or both)	0.023	0.790	0.018	0.837	0.025	0.777
Has a degree or higher	0.688	0.002	0.697	0.002	0.752	0.001
Completed Year 12 and has an "other" qualification	0.306	0.049	0.301	0.052	0.304	0.050
Completed Year 12 and has no qualification	0.224	0.016	0.224	0.016	0.223	0.017
Completed Year 10 and has an "other" qualification	0.373	0.000	0.372	0.000	0.366	0.000
Completed Year 10 and has no qualification	0.178	0.001	0.176	0.001	0.179	0.001
Did not complete Year 10 and has an "other" qualification	0.300	0.003	0.299	0.003	0.299	0.003
Studying - full-time	0.214	0.004	0.214	0.004	0.212	0.004
Studying - part-time	0.201	0.163	0.201	0.164	0.197	0.172
Has a disability	-0.115	0.018	-0.113	0.021	-0.118	0.016
Has a severe transport difficulty or can't get to places	0.086	0.138	0.083	0.151	0.090	0.122
Was removed from natural family	0.063	0.418	0.064	0.410	0.057	0.462
Relative was removed from natural family	0.092	0.064	0.091	0.069	0.094	0.060
Arrested in the last 5 years	0.135	0.055	0.135	0.055	0.134	0.057
Incarcerated in the last 5 years	0.156	0.127	0.158	0.123	0.155	0.131
Victoria	0.330	0.000	0.318	0.000	0.349	0.000
Queensland	0.091	0.253	0.083	0.296	0.096	0.227
South Australia	0.286	0.001	0.286	0.001	0.287	0.001
Western Australia	0.174	0.034	0.171	0.037	0.179	0.029
Tasmania	0.268	0.007	0.243	0.018	0.286	0.004
Northern Territory	0.077	0.428	0.089	0.366	0.082	0.396
Australian Capital Territory	0.310	0.036	0.279	0.067	0.372	0.015
Inner regional area	0.081	0.350	0.089	0.307	0.080	0.357
Outer regional area	0.132	0.075	0.139	0.063	0.133	0.074
Remote area	-0.028	0.746	-0.034	0.694	-0.015	0.858
Very remote area	-0.330	0.000	-0.341	0.000	-0.296	0.002
Employment to population ratio in the region	n.a.	n.a.	0.002	0.386	n.a.	n.a.
Unemployment rate in the region	n.a.	n.a.	n.a.	n.a.	0.002	0.323
Intercept	-0.534	0.000	-0.617	0.000	-0.606	0.000

**Table A.5 Coefficient estimates and P-values - Not in the labour force (weighted estimates)**

Variable name	Specification 1		Specification 2		Specification 3	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Female	0.207	0.005	0.056	0.441	0.285	0.000
Aged 15 to 24	0.039	0.616	0.027	0.722	0.032	0.676
Aged 35 to 44	-0.070	0.306	-0.071	0.305	-0.076	0.270
Aged 45 to 54	0.174	0.020	0.186	0.016	0.175	0.024
Aged 55 plus	0.999	0.000	1.011	0.000	0.998	0.000
Speaks another language	0.397	0.000	0.313	0.000	0.396	0.000
Male and Married	-0.643	0.000	-0.625	0.000	-0.623	0.000
Female and Married	-0.345	0.000	-0.332	0.000	-0.334	0.000
Has main caring responsibility for child aged 12 or less	0.649	0.000	0.627	0.000	0.636	0.000
Torres Strait Islander (or both)	-0.221	0.006	-0.151	0.053	-0.209	0.008
Has a degree or higher	-1.326	0.000	-1.300	0.000	-1.315	0.000
Completed Year 12 and has an "other" qualification	-0.892	0.000	-0.914	0.000	-0.912	0.000
Completed Year 12 and has no qualification	-0.716	0.000	-0.710	0.000	-0.714	0.000
Completed Year 10 and has an "other" qualification	-0.775	0.000	-0.748	0.000	-0.775	0.000
Completed Year 10 and has no qualification	-0.365	0.000	-0.355	0.000	-0.367	0.000
Did not complete Year 10 and has an "other" qualification	-0.425	0.000	-0.426	0.000	-0.436	0.000
Studying - full-time	0.405	0.000	0.421	0.000	0.405	0.000
Studying - part-time	-0.524	0.000	-0.474	0.000	-0.487	0.000
Has a disability	0.466	0.000	0.445	0.000	0.456	0.000
Has a severe transport difficulty or can't get to places	0.352	0.000	0.363	0.000	0.356	0.000
Was removed from natural family	-0.023	0.825	-0.025	0.809	-0.020	0.851
Relative was removed from natural family	0.016	0.773	0.018	0.743	0.008	0.880
Arrested in the last 5 years	-0.095	0.228	-0.096	0.235	-0.113	0.154
Incarcerated in the last 5 years	-0.064	0.637	-0.073	0.572	-0.058	0.665
Victoria	0.113	0.139	0.184	0.019	0.197	0.011
Queensland	0.006	0.942	0.040	0.636	0.003	0.971
South Australia	0.059	0.551	0.005	0.958	0.041	0.650
Western Australia	-0.025	0.808	-0.026	0.796	-0.034	0.745
Tasmania	-0.063	0.512	0.079	0.415	0.003	0.973
Northern Territory	0.174	0.098	0.032	0.760	0.163	0.107
Australian Capital Territory	0.064	0.611	0.316	0.015	0.205	0.123
Inner regional area	0.100	0.303	0.019	0.850	0.063	0.520
Outer regional area	0.164	0.062	0.090	0.267	0.144	0.084
Remote area	0.083	0.433	0.103	0.246	0.142	0.157
Very remote area	-0.240	0.017	-0.119	0.234	-0.046	0.662
Employment to population ratio in the region	n.a.	n.a.	-0.016	0.000	n.a.	n.a.
Unemployment rate in the region	n.a.	n.a.	n.a.	n.a.	0.013	0.000
Intercept	-0.470	0.000	0.286	0.066	-0.811	0.000

**Table A.6 Coefficient estimates and P-values - Unemployed (weighted estimates)**

Variable name	Specification 1		Specification 2		Specification 3	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Female	0.134	0.268	0.017	0.894	0.201	0.136
Aged 15 to 24	0.262	0.018	0.265	0.022	0.264	0.022
Aged 35 to 44	-0.156	0.151	-0.162	0.151	-0.168	0.132
Aged 45 to 54	-0.321	0.053	-0.317	0.062	-0.333	0.048
Aged 55 plus	-0.727	0.000	-0.741	0.001	-0.732	0.000
Speaks another language	0.024	0.871	-0.061	0.674	0.026	0.851
Male and Married	-0.285	0.019	-0.262	0.035	-0.271	0.029
Female and Married	-0.574	0.000	-0.570	0.000	-0.571	0.000
Has main caring responsibility for child aged 12 or less	0.275	0.006	0.259	0.009	0.269	0.008
Torres Strait Islander (or both)	0.149	0.293	0.200	0.164	0.159	0.265
Has a degree or higher	-0.543	0.186	-0.444	0.343	-0.489	0.267
Completed Year 12 and has an "other" qualification	-0.526	0.005	-0.591	0.003	-0.596	0.004
Completed Year 12 and has no qualification	-0.600	0.000	-0.579	0.001	-0.602	0.000
Completed Year 10 and has an "other" qualification	-0.484	0.001	-0.456	0.001	-0.482	0.001
Completed Year 10 and has no qualification	-0.193	0.058	-0.190	0.065	-0.195	0.058
Did not complete Year 10 and has an "other" qualification	-0.387	0.060	-0.420	0.038	-0.388	0.060
Studying - full-time	0.287	0.039	0.299	0.034	0.288	0.046
Studying - part-time	-0.517	0.004	-0.486	0.007	-0.496	0.006
Has a disability	0.278	0.000	0.265	0.000	0.277	0.000
Has a severe transport difficulty or can't get to places	0.303	0.013	0.319	0.008	0.301	0.012
Was removed from natural family	0.370	0.026	0.375	0.029	0.371	0.032
Relative was removed from natural family	-0.064	0.499	-0.074	0.447	-0.076	0.438
Arrested in the last 5 years	0.546	0.000	0.530	0.000	0.523	0.000
Incarcerated in the last 5 years	0.269	0.065	0.288	0.051	0.279	0.063
Victoria	-0.286	0.033	-0.237	0.095	-0.248	0.089
Queensland	0.107	0.404	0.144	0.270	0.098	0.435
South Australia	-0.108	0.429	-0.153	0.266	-0.125	0.352
Western Australia	-0.015	0.915	-0.034	0.806	-0.038	0.789
Tasmania	-0.253	0.051	-0.147	0.309	-0.207	0.143
Northern Territory	0.088	0.593	0.015	0.926	0.083	0.611
Australian Capital Territory	-0.819	0.000	-0.723	0.000	-0.844	0.000
Inner regional area	0.160	0.208	0.067	0.603	0.108	0.438
Outer regional area	0.097	0.363	0.024	0.834	0.072	0.519
Remote area	-0.356	0.008	-0.358	0.009	-0.310	0.018
Very remote area	-1.043	0.000	-0.963	0.000	-0.895	0.000
Employment to population ratio in the region	n.a.	n.a.	-0.013	0.011	n.a.	n.a.
Unemployment rate in the region	n.a.	n.a.	n.a.	n.a.	0.011	0.123
Intercept	-0.559	0.006	0.093	0.721	-0.819	0.007

**Table A.7 Coefficient estimates and P-values - Employed in the CDEP scheme (weighted estimates)**

Variable name	Specification 1		Specification 2		Specification 3	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Female	-0.295	0.081	-0.322	0.079	-0.305	0.077
Aged 15 to 24	0.282	0.022	0.286	0.020	0.273	0.028
Aged 35 to 44	-0.090	0.490	-0.089	0.496	-0.088	0.504
Aged 45 to 54	-0.378	0.002	-0.373	0.002	-0.377	0.003
Aged 55 plus	-0.135	0.560	-0.134	0.565	-0.134	0.564
Speaks another language	0.680	0.012	0.662	0.014	0.678	0.012
Male and Married	-0.306	0.043	-0.298	0.045	-0.308	0.041
Female and Married	0.048	0.691	0.049	0.681	0.057	0.639
Has main caring responsibility for child aged 12 or less	-0.028	0.778	-0.030	0.761	-0.025	0.800
Torres Strait Islander (or both)	-0.191	0.214	-0.180	0.242	-0.189	0.221
Has a degree or higher	-1.110	0.000	-1.103	0.000	-1.113	0.000
Completed Year 12 and has an "other" qualification	-0.614	0.023	-0.631	0.017	-0.620	0.025
Completed Year 12 and has no qualification	-0.431	0.023	-0.428	0.024	-0.432	0.021
Completed Year 10 and has an "other" qualification	-0.372	0.021	-0.365	0.022	-0.372	0.021
Completed Year 10 and has no qualification	-0.129	0.217	-0.128	0.222	-0.134	0.204
Did not complete Year 10 and has an "other" qualification	-0.366	0.022	-0.368	0.022	-0.369	0.022
Studying - full-time	0.040	0.805	0.041	0.797	0.053	0.754
Studying - part-time	-0.059	0.818	-0.052	0.840	-0.047	0.852
Has a disability	0.145	0.165	0.145	0.165	0.146	0.163
Has a severe transport difficulty or can't get to places	0.153	0.234	0.153	0.235	0.154	0.230
Was removed from natural family	-0.063	0.677	-0.060	0.691	-0.056	0.714
Relative was removed from natural family	0.031	0.758	0.028	0.775	0.028	0.781
Arrested in the last 5 years	0.556	0.000	0.546	0.000	0.559	0.000
Incarcerated in the last 5 years	0.040	0.873	0.051	0.832	0.039	0.874
Victoria	-0.188	0.340	-0.173	0.382	-0.178	0.393
Queensland	0.077	0.687	0.096	0.628	0.078	0.695
South Australia	0.055	0.791	0.054	0.797	0.056	0.790
Western Australia	0.209	0.306	0.213	0.301	0.201	0.337
Tasmania	-1.138	0.002	-1.109	0.003	-1.135	0.003
Northern Territory	0.072	0.705	0.054	0.782	0.072	0.708
Australian Capital Territory	-0.209	0.419	-0.164	0.532	-0.289	0.290
Inner regional area	0.254	0.290	0.239	0.332	0.254	0.318
Outer regional area	0.409	0.040	0.392	0.059	0.400	0.053
Remote area	0.904	0.000	0.906	0.000	0.905	0.000
Very remote area	1.674	0.000	1.693	0.000	1.675	0.000
Employment to population ratio in the region	n.a.	n.a.	-0.003	0.556	n.a.	n.a.
Unemployment rate in the region	n.a.	n.a.	n.a.	n.a.	0.000	0.996
Intercept	-1.128	0.000	-0.995	0.008	-1.122	0.001

**Table A.8 Coefficient estimates and P-values - Those who want a job but are not in the labour force (weighted estimates)**

Variable name	Specification 1		Specification 2		Specification 3	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Female	-0.030	0.787	-0.063	0.652	-0.019	0.861
Aged 15 to 24	0.071	0.537	0.066	0.561	0.071	0.537
Aged 35 to 44	0.115	0.316	0.115	0.316	0.110	0.336
Aged 45 to 54	-0.317	0.016	-0.315	0.018	-0.317	0.016
Aged 55 plus	-1.201	0.000	-1.194	0.000	-1.196	0.000
Speaks another language	-0.264	0.015	-0.279	0.018	-0.266	0.015
Male and Married	0.216	0.129	0.216	0.130	0.222	0.122
Female and Married	0.114	0.261	0.114	0.264	0.116	0.255
Has main caring responsibility for child aged 12 or less	0.141	0.112	0.138	0.122	0.137	0.128
Torres Strait Islander (or both)	0.110	0.448	0.129	0.353	0.112	0.436
Has a degree or higher	0.582	0.087	0.576	0.091	0.600	0.080
Completed Year 12 and has an "other" qualification	0.174	0.467	0.183	0.447	0.174	0.467
Completed Year 12 and has no qualification	0.121	0.468	0.116	0.490	0.120	0.474
Completed Year 10 and has an "other" qualification	0.232	0.140	0.234	0.158	0.228	0.161
Completed Year 10 and has no qualification	0.119	0.164	0.121	0.155	0.121	0.159
Did not complete Year 10 and has an "other" qualification	0.100	0.587	0.104	0.570	0.091	0.627
Studying - full-time	0.132	0.277	0.136	0.265	0.131	0.286
Studying - part-time	0.250	0.285	0.258	0.271	0.249	0.285
Has a disability	-0.074	0.314	-0.080	0.275	-0.075	0.313
Has a severe transport difficulty or can't get to places	0.093	0.346	0.096	0.341	0.096	0.339
Was removed from natural family	-0.019	0.900	-0.022	0.882	-0.021	0.886
Relative was removed from natural family	0.155	0.074	0.160	0.061	0.158	0.070
Arrested in the last 5 years	0.118	0.337	0.124	0.309	0.113	0.363
Incarcerated in the last 5 years	0.010	0.956	0.001	0.998	0.014	0.939
Victoria	0.297	0.012	0.319	0.010	0.297	0.015
Queensland	-0.090	0.598	-0.092	0.594	-0.091	0.596
South Australia	0.149	0.249	0.133	0.322	0.148	0.254
Western Australia	0.023	0.856	0.023	0.853	0.027	0.832
Tasmania	0.173	0.218	0.210	0.217	0.177	0.235
Northern Territory	-0.234	0.159	-0.267	0.106	-0.233	0.159
Australian Capital Territory	0.286	0.135	0.341	0.062	0.327	0.085
Inner regional area	-0.042	0.805	-0.048	0.788	-0.041	0.812
Outer regional area	0.157	0.306	0.149	0.374	0.157	0.317
Remote area	0.073	0.685	0.086	0.615	0.076	0.664
Very remote area	-0.254	0.138	-0.220	0.140	-0.243	0.124
Employment to population ratio in the region	n.a.	n.a.	-0.004	0.602	n.a.	n.a.
Unemployment rate in the region	n.a.	n.a.	n.a.	n.a.	0.001	0.894
Intercept	-0.419	0.028	-0.251	0.557	-0.444	0.036

**Table A.9 Coefficient estimates and P-values - Multinomial Probit (reference category is not in the labour force)**

Variable name	Unemployed		Employed - CDEP		Employed - non-CDEP	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Female	-0.225	0.002	-0.432	0.000	-0.237	0.000
Aged 15 to 24	0.137	0.062	0.031	0.666	-0.223	0.001
Aged 35 to 44	-0.004	0.955	0.060	0.399	0.214	0.001
Aged 45 to 54	-0.508	0.000	-0.346	0.000	0.051	0.501
Aged 55 plus	-1.688	0.000	-1.311	0.000	-0.964	0.000
Speaks another language	-0.500	0.000	-0.014	0.858	-0.883	0.000
Male and Married	0.394	0.000	0.690	0.000	0.821	0.000
Female and Married	-0.039	0.588	0.486	0.000	0.515	0.000
Has main caring responsibility for child aged 12 or less	-0.688	0.000	-0.676	0.000	-0.852	0.000
Torres Strait Islander (or both)	0.260	0.005	0.028	0.782	0.139	0.092
Has a degree or higher	0.789	0.000	0.718	0.001	1.995	0.000
Completed Year 12 and has an "other" qualification	0.776	0.000	0.748	0.000	1.661	0.000
Completed Year 12 and has no qualification	0.388	0.000	0.576	0.000	1.170	0.000
Completed Year 10 and has an "other" qualification	0.660	0.000	0.745	0.000	1.330	0.000
Completed Year 10 and has no qualification	0.271	0.000	0.384	0.000	0.594	0.000
Did not complete Year 10 and has an "other" qualification	0.313	0.012	0.672	0.000	0.815	0.000
Studying - full-time	-0.374	0.000	-0.561	0.000	-0.637	0.000
Studying - part-time	0.199	0.158	0.759	0.000	0.991	0.000
Has a disability	-0.419	0.000	-0.450	0.000	-0.737	0.000
Has a severe transport difficulty or can't get to places	-0.085	0.253	-0.318	0.000	-0.696	0.000
Was removed from natural family	0.069	0.463	-0.159	0.115	-0.264	0.002
Relative was removed from natural family	0.023	0.697	0.044	0.443	0.143	0.004
Arrested in the last 5 years	0.333	0.000	0.095	0.221	-0.512	0.000
Incarcerated in the last 5 years	-0.176	0.093	-0.017	0.879	-0.227	0.049
Victoria	-0.172	0.110	0.230	0.069	0.208	0.023
Queensland	0.165	0.067	0.174	0.075	0.049	0.533
South Australia	-0.016	0.877	0.125	0.242	0.004	0.962
Western Australia	0.058	0.548	0.355	0.000	0.009	0.912
Tasmania	-0.030	0.794	-0.823	0.000	0.425	0.000
Northern Territory	-0.263	0.021	-0.262	0.014	-0.350	0.000
Australian Capital Territory	-0.430	0.022	0.376	0.100	0.478	0.000
Inner regional area	0.131	0.191	0.446	0.001	-0.129	0.142
Outer regional area	0.024	0.782	0.624	0.000	-0.107	0.161
Remote area	-0.138	0.174	1.238	0.000	0.031	0.720
Very remote area	-0.111	0.290	1.940	0.000	0.205	0.021
Intercept	-0.548	0.000	-1.700	0.000	-0.184	0.098

**Table A.10 Coefficient estimates and P-values - Multinomial Probit (reference category is unemployed)**

Variable name	Not in the labour force		Employed - CDEP		Employed - non-CDEP	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Female	0.225	0.002	-0.207	0.019	-0.012	0.878
Aged 15 to 24	-0.137	0.062	-0.106	0.199	-0.360	0.000
Aged 35 to 44	0.004	0.955	0.064	0.441	0.218	0.004
Aged 45 to 54	0.508	0.000	0.162	0.139	0.559	0.000
Aged 55 plus	1.688	0.000	0.377	0.016	0.724	0.000
Speaks another language	0.500	0.000	0.486	0.000	-0.383	0.000
Male and Married	-0.394	0.000	0.296	0.001	0.427	0.000
Female and Married	0.039	0.588	0.524	0.000	0.554	0.000
Has main caring responsibility for child aged 12 or less	0.688	0.000	0.012	0.866	-0.164	0.014
Torres Strait Islander (or both)	-0.260	0.005	-0.232	0.039	-0.121	0.200
Has a degree or higher	-0.789	0.000	-0.072	0.777	1.206	0.000
Completed Year 12 and has an "other" qualification	-0.776	0.000	-0.028	0.865	0.885	0.000
Completed Year 12 and has no qualification	-0.388	0.000	0.188	0.101	0.782	0.000
Completed Year 10 and has an "other" qualification	-0.660	0.000	0.085	0.427	0.670	0.000
Completed Year 10 and has no qualification	-0.271	0.000	0.113	0.137	0.323	0.000
Did not complete Year 10 and has an "other" qualification	-0.313	0.012	0.359	0.010	0.502	0.000
Studying - full-time	0.374	0.000	-0.187	0.079	-0.262	0.004
Studying - part-time	-0.199	0.158	0.560	0.000	0.793	0.000
Has a disability	0.419	0.000	-0.031	0.636	-0.319	0.000
Has a severe transport difficulty or can't get to places	0.085	0.253	-0.233	0.007	-0.611	0.000
Was removed from natural family	-0.069	0.463	-0.229	0.048	-0.334	0.001
Relative was removed from natural family	-0.023	0.697	0.022	0.746	0.120	0.046
Arrested in the last 5 years	-0.333	0.000	-0.238	0.005	-0.845	0.000
Incarcerated in the last 5 years	-0.176	0.093	-0.193	0.098	-0.403	0.001
Victoria	0.172	0.110	0.402	0.004	0.380	0.001
Queensland	-0.165	0.067	0.009	0.932	-0.116	0.214
South Australia	0.016	0.877	0.141	0.249	0.020	0.850
Western Australia	-0.058	0.548	0.297	0.007	-0.049	0.628
Tasmania	0.030	0.794	-0.793	0.000	0.455	0.000
Northern Territory	0.263	0.021	0.001	0.991	-0.086	0.473
Australian Capital Territory	0.430	0.022	0.807	0.002	0.908	0.000
Inner regional area	-0.131	0.191	0.315	0.033	-0.259	0.012
Outer regional area	-0.024	0.782	0.599	0.000	-0.131	0.145
Remote area	0.138	0.174	1.376	0.000	0.169	0.107
Very remote area	0.111	0.290	2.051	0.000	0.316	0.003
Intercept	0.548	0.000	-1.152	0.000	0.365	0.005

**Table A.11 Coefficient estimates and P-values - Multinomial Probit (reference category is CDEP employment)**

Variable name	Not in the labour force		Unemployed		Employed - non-CDEP	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Female	0.432	0.000	0.207	0.019	0.195	0.019
Aged 15 to 24	-0.031	0.666	0.106	0.199	-0.254	0.001
Aged 35 to 44	-0.060	0.399	-0.064	0.441	0.153	0.036
Aged 45 to 54	0.346	0.000	-0.162	0.139	0.397	0.000
Aged 55 plus	1.311	0.000	-0.377	0.016	0.347	0.004
Speaks another language	0.014	0.858	-0.486	0.000	-0.869	0.000
Male and Married	-0.690	0.000	-0.296	0.001	0.131	0.115
Female and Married	-0.486	0.000	-0.524	0.000	0.030	0.683
Has main caring responsibility for child aged 12 or less	0.676	0.000	-0.012	0.866	-0.176	0.006
Torres Strait Islander (or both)	-0.028	0.782	0.232	0.039	0.111	0.281
Has a degree or higher	-0.718	0.001	0.072	0.777	1.277	0.000
Completed Year 12 and has an "other" qualification	-0.748	0.000	0.028	0.865	0.913	0.000
Completed Year 12 and has no qualification	-0.576	0.000	-0.188	0.101	0.594	0.000
Completed Year 10 and has an "other" qualification	-0.745	0.000	-0.085	0.427	0.585	0.000
Completed Year 10 and has no qualification	-0.384	0.000	-0.113	0.137	0.210	0.003
Did not complete Year 10 and has an "other" qualification	-0.672	0.000	-0.359	0.010	0.143	0.216
Studying - full-time	0.561	0.000	0.187	0.079	-0.075	0.460
Studying - part-time	-0.759	0.000	-0.560	0.000	0.233	0.038
Has a disability	0.450	0.000	0.031	0.636	-0.287	0.000
Has a severe transport difficulty or can't get to places	0.318	0.000	0.233	0.007	-0.378	0.000
Was removed from natural family	0.159	0.115	0.229	0.048	-0.105	0.329
Relative was removed from natural family	-0.044	0.443	-0.022	0.746	0.099	0.096
Arrested in the last 5 years	-0.095	0.221	0.238	0.005	-0.607	0.000
Incarcerated in the last 5 years	0.017	0.879	0.193	0.098	-0.210	0.089
Victoria	-0.230	0.069	-0.402	0.004	-0.022	0.862
Queensland	-0.174	0.075	-0.009	0.932	-0.125	0.209
South Australia	-0.125	0.242	-0.141	0.249	-0.121	0.269
Western Australia	-0.355	0.000	-0.297	0.007	-0.346	0.000
Tasmania	0.823	0.000	0.793	0.000	1.248	0.000
Northern Territory	0.262	0.014	-0.001	0.991	-0.088	0.437
Australian Capital Territory	-0.376	0.100	-0.807	0.002	0.102	0.652
Inner regional area	-0.446	0.001	-0.315	0.033	-0.574	0.000
Outer regional area	-0.624	0.000	-0.599	0.000	-0.731	0.000
Remote area	-1.238	0.000	-1.376	0.000	-1.207	0.000
Very remote area	-1.940	0.000	-2.051	0.000	-1.735	0.000
Intercept	1.700	0.000	1.152	0.000	1.516	0.000

**Table A.12 Coefficient estimates and P-values - Multinomial Probit (reference category is non-CDEP employment)**

Variable name	Not in the labour force		Unemployed		Employed - CDEP	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Female	0.237	0.000	0.012	0.878	-0.195	0.019
Aged 15 to 24	0.223	0.001	0.360	0.000	0.254	0.001
Aged 35 to 44	-0.214	0.001	-0.218	0.004	-0.153	0.036
Aged 45 to 54	-0.051	0.501	-0.559	0.000	-0.397	0.000
Aged 55 plus	0.964	0.000	-0.724	0.000	-0.347	0.004
Speaks another language	0.883	0.000	0.383	0.000	0.869	0.000
Male and Married	-0.821	0.000	-0.427	0.000	-0.131	0.115
Female and Married	-0.515	0.000	-0.554	0.000	-0.030	0.683
Has main caring responsibility for child aged 12 or less	0.852	0.000	0.164	0.014	0.176	0.006
Torres Strait Islander (or both)	-0.139	0.092	0.121	0.200	-0.111	0.281
Has a degree or higher	-1.995	0.000	-1.206	0.000	-1.277	0.000
Completed Year 12 and has an "other" qualification	-1.661	0.000	-0.885	0.000	-0.913	0.000
Completed Year 12 and has no qualification	-1.170	0.000	-0.782	0.000	-0.594	0.000
Completed Year 10 and has an "other" qualification	-1.330	0.000	-0.670	0.000	-0.585	0.000
Completed Year 10 and has no qualification	-0.594	0.000	-0.323	0.000	-0.210	0.003
Did not complete Year 10 and has an "other" qualification	-0.815	0.000	-0.502	0.000	-0.143	0.216
Studying - full-time	0.637	0.000	0.262	0.004	0.075	0.460
Studying - part-time	-0.991	0.000	-0.793	0.000	-0.233	0.038
Has a disability	0.737	0.000	0.319	0.000	0.287	0.000
Has a severe transport difficulty or can't get to places	0.696	0.000	0.611	0.000	0.378	0.000
Was removed from natural family	0.264	0.002	0.334	0.001	0.105	0.329
Relative was removed from natural family	-0.143	0.004	-0.120	0.046	-0.099	0.096
Arrested in the last 5 years	0.512	0.000	0.845	0.000	0.607	0.000
Incarcerated in the last 5 years	0.227	0.049	0.403	0.001	0.210	0.089
Victoria	-0.208	0.023	-0.380	0.001	0.022	0.862
Queensland	-0.049	0.533	0.116	0.214	0.125	0.209
South Australia	-0.004	0.962	-0.020	0.850	0.121	0.269
Western Australia	-0.009	0.912	0.049	0.628	0.346	0.000
Tasmania	-0.425	0.000	-0.455	0.000	-1.248	0.000
Northern Territory	0.350	0.000	0.086	0.473	0.088	0.437
Australian Capital Territory	-0.478	0.000	-0.908	0.000	-0.102	0.652
Inner regional area	0.129	0.142	0.259	0.012	0.574	0.000
Outer regional area	0.107	0.161	0.131	0.145	0.731	0.000
Remote area	-0.031	0.720	-0.169	0.107	1.207	0.000
Very remote area	-0.205	0.021	-0.316	0.003	1.735	0.000
Intercept	0.184	0.098	-0.365	0.005	-1.516	0.000