

Further investigations into
indigenous labour supply: what
discourages discouraged workers?

B.H. Hunter and M.C. Gray

CAEPR Working Paper No. 2/1999

ISSN 1442 - 3871
ISBN 0 7315 4901 5

Dr Boyd Hunter is a Research Fellow and Mr Matthew Gray is a Post-doctoral Fellow at the Centre for Aboriginal Economic Policy Research, The Australian National University. Dr Hunter is also a Ronald Henderson Research Fellow.

Table of Contents

Summary	v
Acknowledgments.....	vii
Introduction	1
Labour force status and the discouraged worker literature	2
Describing attachment to the labour force	3
Modelling labour force status and discouraged workers in indigenous populations	8
Data and empirical specification	9
Results.....	11
Conclusion	18
Appendix A. Multinomial logit regression analysis	20
Appendix B. Sensitivity analysis of marginal effects of using the parsimonious specification	25
References	27

Tables

Table 1. Labour force status and attachment to the labour force by age and sex: indigenous Australians, 1994.....	4
Table 2. Labour force status and attachment to the labour force by indigenous status and sex (per cent), 1994	5
Table 3. Main reason indigenous 'discouraged workers' are not looking for work by part-of-State, age and sex (per cent), 1994.....	6
Table 4. Labour force status by educational participation, indigenous Australians aged between 15 and 64 years, 1994	7
Table 5. Marginal effects on the probability of being in various labour force states for indigenous males who are not currently studying, 1994.....	16
Table 6. Marginal effects on the probability of being in various labour force states for indigenous females who are not currently studying, 1994	17
Table A1. Descriptive statistics for regression analysis.....	20
Table A2. Multinomial logistic regression of discouraged workers and other labour force states, males 1994	21
Table A3. Multinomial logistic regression of discouraged workers and other labour force states, females 1994.....	23
Table B1. Sensitivity tests using a parsimonious specification in the regression for indigenous males, 1994.....	25
Table B2. Sensitivity tests using a parsimonious specification in the regression for indigenous females, 1994	26

Summary

Indigenous people are far more likely to be discouraged from looking for work than other Australians. Understanding the microeconomic determinants of what discourages particular workers has important implications for overcoming the labour force disadvantage faced by indigenous Australians. This paper focuses on the interaction between labour supply and demand, and particularly on examining the factors that lead to indigenous people who want to work not looking for work and therefore remaining outside the workforce. A discouraged worker is defined, for the purposes of this paper, as someone that wants to work but is not actively looking for a job. Data from the 1994 National Aboriginal and Torres Strait Islander Survey is used in the analysis.

The conventional economic models of labour supply are somewhat unsatisfying in that they only allow a limited role for social environmental factors. The contribution of this paper is two-fold. First it extends the range of factors examined in studies of indigenous labour supply to include cultural and social environmental factors. Second it focuses on what discourages indigenous discouraged workers.

Cultural factors are found to be particularly important in determining indigenous labour supply. However, they are by no means the only factors affecting labour supply. Indeed, age, educational attainment and family factors are found to be more important. None-the-less, the clear message is that work which attempts to explain indigenous labour force participation needs to take account of cultural factors.

Describing attachment to the labour force

Information is presented on attachment to the labour force for indigenous and non-indigenous Australians. In addition, data on the main reasons why indigenous discouraged workers are not looking for work are presented.

The Australian Bureau of Statistics definition of discouraged workers does not classify as discouraged workers those who state personal reasons as the reason for not looking for work. The predominance of personal reasons among both the indigenous and non-indigenous populations indicates how potentially sensitive the results of an analysis of indigenous labour force status based narrowly on the ABS definition may be.

- Indigenous males are almost four times more likely than non-indigenous males to want to work but may not be actively looking for work (15.8 as opposed to 4.2 per cent). Indigenous females are almost three times more likely to be discouraged workers than non-indigenous females (29.3 as opposed to 10.0 per cent).
- A higher proportion of young indigenous males (aged between 15 and 24 years) are discouraged workers than prime age indigenous males (aged between 25 and 44 years). The desire to work declines with age, especially after 45 years of age. There is a commensurate decrease in the proportion of indigenous people over 45 years old who are discouraged workers.
- There are distinct gender patterns relating to discouraged indigenous workers' reasons for not looking for work. Nearly one-half of discouraged females indicated that childcare and other family responsibilities were the major reason for not looking for work. Amongst male discouraged workers, around 40 per cent said that studying was the major reason for not looking for work. Lack of jobs was also an important reason given both by indigenous males and females.
- Geographic breakdown indicates that in capital cities, childcare and studying are the main reasons for not actively looking for work. However, demand-side factors

relating to the lack of suitable jobs, or indeed any jobs, dominates in rural and remote areas, with 28.2 per cent of discouraged workers nominating this as the main reason why they are not looking for work.

- Lack of childcare is the primary reason given among the prime-aged group (49.6 per cent of discouraged workers aged between 25 and 44 years). In contrast, studying is the main reason given by indigenous youth (51.9 per cent). There are also reasonably large numbers of older indigenous persons (aged over 25 years) who are returning to study.
- If the other reason and not stated categories are ignored, then the reasons given by indigenous discouraged workers aged 45 and over are dominated by demand-side factors (20.7 per cent).
- Indigenous secondary students are two-and-a-half times as likely to be discouraged workers (33.9 per cent) as indigenous people not studying (11.6 per cent). Indigenous post-secondary students are approximately twice as likely to be discouraged workers (23.0 per cent) as compared to persons not studying.

Modelling labour force status and discouraged workers in indigenous populations

The determinants of indigenous labour force status are estimated using a multinomial logit model that includes economic, cultural and social environmental factors as explanatory variables. The labour force states modelled are non-Community Development Employment Projects (CDEP) scheme employment, CDEP employment, unemployment, discouraged worker and other not in the labour force (NILF), or rather, NILF excluding discouraged workers. Students are excluded from the analysis in this section in order to better align our definition of discouraged worker with that used by the International Labour Organisation. Prisoners are excluded from all calculations.

The effect of social environmental factors on labour supply is primarily through the presence of other adults who are either employed or unemployed. Both of these variables have a large impact on employment prospects.

Cultural factors are found to be particularly important in determining indigenous labour supply. The variables that capture access to traditional lifestyles, such as whether a respondent speaks an indigenous language or engages in hunting and gathering, are associated with significant reductions in labour supply and declines in the desire to work in the mainstream labour market. However, cultural factors are by no means the only factors affecting indigenous labour supply. Indeed, in quantitative terms, age, educational attainment and family factors are far more important. A summary of the effects of some of the other variables is presented below.

- Having been arrested is associated with a significantly lower probability of non-CDEP employment and an increased probability of being unemployed, but has little impact upon the probability of being a discouraged worker or being in the other NILF category (that is, labour supply).
- Compared to indigenous females in other urban areas, indigenous females in capital cities have lower participation rates because of an increase in the probability of being a discouraged worker. Females in rural areas also have lower participation rates, but this is because of a higher probability of being in the other NILF category rather than being a discouraged worker.
- Male labour force participation rates do not differ much by geographic region of residence, presumably because the CDEP scheme provides work for most of those who want it in rural and remote areas, which offsets the greater non-CDEP scheme labour market opportunities in other urban and major urban areas.

- Increases in the level of educational attainment beyond Year 9 are associated with higher non-CDEP employment rates for both males and females. There are corresponding decreases in the probability of being in CDEP employment and the other NILF category.
- The effects of education on the probability of being unemployed differ between males and females, with an increase in educational attainment associated with a lower probability of being unemployed for males, whereas for females it is associated with an increased probability of being unemployed.

Concluding remarks

Labour market policies of successive governments have emphasised the importance of encouraging the economic independence of indigenous Australians through addressing education policy and labour market programs. This paper confirms the importance of labour supply factors but also emphasises the interaction between the supply and demand side of the labour market. Indigenous people want to work as much as other Australians, and policies aimed at increasing the demand for their labour are crucial. However, in addition to addressing demand, some attention needs to be paid to cultural and social factors. At the very least, this paper highlights the difficulty in increasing participation rates given the feedback between the concentration of unemployment in indigenous families and labour supply and employment prospects.

Acknowledgments

We are indebted to Professor Jon Altman, Ms Ngaire Hosking, Ms Siobhan McDonnell, Mr Bill Arthur and Drs Anne Daly, Jerry Schwab and John Taylor for comments. Editorial assistance was provided by Linda Roach and Hilary Bek, with layout by Jennifer Braid.

Introduction

The analysis of indigenous labour force status is complicated by indigenous-specific cultural/social factors, the behaviour of potential employers and the interaction between these supply and demand factors. For example, Aborigines pursuing traditional hunter-gatherer lifestyles in remote areas, although gainfully employed, are not counted among the employed as they do not satisfy the standard criteria for employment as working for pay or profit (Altman and Taylor 1989). Demand-side factors may also influence the probability of employment where racial discrimination combined with the Australian system of fixed award wages, reduces the employment prospects of otherwise identical individuals (Altman and Daly 1993). This paper focuses on the interaction between labour supply and demand with a particular focus on examining the factors that lead to indigenous people who want to work not looking for work and therefore remaining outside the workforce.

Persons who want a job but are not looking for work are often called discouraged workers. The International Labour Organisation (ILO) defines 'discouraged workers' as persons who want a job and are currently available for work but have given up actively searching for work because they believe they cannot find it (Husmanns, Mehran and Verma 1990). The reason for a person not continuing to seek work may relate to the labour market situation that may cause a person to believe that no suitable job is available in the area. Or the reason may relate to personal factors, such as the belief that the qualifications required for employment are lacking, or that employers want younger employees. While the official ILO definition attempts to exclude personal reasons the ILO recognises that it may be difficult to draw a clear distinction, as respondents may not be able to abstract their personal circumstances from the labour market situation.

There are arguments both for and against treating discouraged workers as unemployed and therefore as participating in the labour market (Husmanns, Mehran and Verma 1990: 107). The argument for the inclusion of discouraged workers among the unemployed (as opposed to those outside the labour force) is that these people are without work and are willing and available for work. It is also argued that discouraged workers might also be expected to behave similarly to the unemployed during an economic recovery and to be particularly likely to re-enter the core labour force. The basic argument against the inclusion of the discouraged worker among the unemployed relates to measurement problems. For example, while unemployment depends on objective criteria, discouragement is essentially a subjective definition (Finnegan 1981). Also there is empirical evidence in certain countries (but not in all) that the labour force attachment of discouraged workers is not significantly different from that of other groups of persons outside the labour force, and that discouraged workers have no special tendency to re-enter the workforce in a recovery. The relative merits of such arguments can only be evaluated in the context of specific studies of the labour force attachment of discouraged workers compared to other groups. This paper attempts to discern whether indigenous discouraged workers are different from other groups in the indigenous population.

Indigenous people are far more likely to be discouraged from looking for work than other Australians (Taylor and Hunter 1998). The public debate about discouraged workers is often confined to examining the macroeconomic consequences of not utilising a potential resource (see for example, Bowen and Finnegan 1969; Kuch and Sharir 1978; Clark and Summers 1980; Husmanns, Mehran and Verma 1990). However, understanding the microeconomic determinants of what discourages particular workers has important implications for the perpetuation of the labour force disadvantage of indigenous Australians.

The definition of 'discouraged workers' utilised in the empirical analysis of this paper is not strictly consistent with that used by the ILO or the Australian Bureau of Statistics (ABS) (ABS/Centre for Aboriginal Economic Policy Research (CAEPR) 1996). The National Aboriginal and Torres Strait Islander Survey (NATSIS) data do not directly include information on the availability to work of anybody who was not currently looking for work. However, the NATSIS questionnaire does ask the reasons why a respondent is not available to start work. This paper defines a NATSIS respondent as a discouraged worker if they want a job, but are not actively looking for work and have not indicated any reason why they cannot start work.

Studies of the determinants of the labour force status of indigenous Australians cannot ignore indigenous-specific institutional features such as the Community Development Employment Projects (CDEP) scheme. Nearly 25 per cent of indigenous employment is in the CDEP scheme. Under the CDEP scheme, indigenous communities get a grant of a similar magnitude to their collective unemployment benefit entitlement to undertake community defined 'work'. The recipients are then expected to work part-time for their entitlements. Historically the CDEP scheme was available on a one-in-all-in basis for each community. The current policy, which evolved gradually in the mid 1990s, means that when the CDEP scheme is provided in a community, the unemployed have the choice as to whether or not they participate (Sanders 1993).

The main purpose of this paper is to consider the determinants of labour force status for indigenous people. It augments Daly's (1995) analysis of indigenous labour force status by utilising detailed information on the social and economic characteristics of households. The focus on discouraged workers permits a more subtle exploration of the labour supply decisions of indigenous people. Following Daly (1995), a multinomial logit model will be used to consider the main factors which determine whether a person is employed in the CDEP scheme, other employed, unemployed, a discouraged worker or otherwise not in the labour force (other not in the labour force (NILF)).

The first section of the paper reviews the theoretical and empirical literature on discouraged workers. The second part compares the incidence of discouraged workers among indigenous and other Australians. This section also describes the main reasons why indigenous discouraged workers are not looking for work. The third section discusses the statistical techniques used to analyse the determinants of labour force status. Students are excluded from this section because their labour force participation is, or should be, constrained and therefore they are not directly comparable to those people who are not similarly constrained. The data and the empirical specifications are then discussed and the results of the estimates presented. The conclusion reflects on the implications of the results for policy.

Labour force status and the discouraged worker literature

Labour force status is, according to neoclassical analysis, determined in a two-stage process. In the first stage an individual decides whether or not they wish to supply their labour to the market. In the second stage whether or not they are employed is determined by a combination of factors including labour demand conditions, and their incentives to actively search for work and accept any job offers they may receive (Daly and Hunter 1999).

The decision to supply labour to the market will depend upon a range of factors including the level of unemployment benefits, macroeconomic conditions, the level of labour demand in the local labour market as well as the social and economic conditions facing an individual and their family. For example, the individual labour supply decision can be significantly affected by changes in a spouse's productivity, either at home or in market work. If a spouse is in full-time work and recession hits

resulting in unemployment, then the individual's productivity in the market, and hence wage received, declines temporarily. This spouse may find it beneficial to engage in household production rather than look for work and thus becomes a discouraged worker.¹ However, if the wage that a non-working spouse could receive does not decline too much, then the spouse may actively look for work.² This latter phenomenon is known as the additional worker effect. In the economy at large, the discouraged worker effect usually dominates the additional worker effect, evidence for which is that the labour force participation rate shrinks during recession and expands during economic recovery.

The conventional economic models of labour supply are somewhat unsatisfying in that they only allow a limited role for social environmental factors (Killingsworth 1983).³ In such models, social factors only affect labour supply through their effect on an individual's or family's preferences for leisure versus 'work'. Such assumptions are not warranted in the indigenous population where a history of social exclusion from the mainstream institutions of Australian society have direct implications for behaviour and the desire to 'work' in the market economy. This paper gives greater prominence to the role of the cultural/social factors, which, presumably, directly influence indigenous labour market participation and, therefore, attachment to the labour force. However, data constraints mean that the statistical model used is a reduced form model that cannot distinguish between the underlying behavioural mechanisms for the effect of social factors. Notwithstanding, the empirical analysis will highlight the relative importance of such factors for the labour market outcomes of indigenous Australians.

Describing attachment to the labour force

Table 1 summarises attachment to the labour force amongst indigenous people. Labour force attachment is measured by: the desire to work; whether an individual is actively looking for work; and whether the individual was available to start work last week. It is apparent that amongst indigenous males and females the desire to work declines with age, especially after 45 years of age.

The rate at which people actively look for work appears to decline in a manner commensurate with the desire for work. Females who want to work, however, tend to experience a larger fall in the incidence of looking for work with age. For example, while older females (45 to 64 years) have similar rates of desire to work to males in the same age group (19.4 per cent as opposed to 24.8 per cent), they are only half as likely to be actively looking for work (7.8 per cent as opposed to 19.1 per cent).

Given that NATSIS does not contain direct information on the availability to start work for those not looking for work, discouraged workers are defined, for the purposes of this section, as those who want to work but are not actively looking for work.⁴ Females are far more likely to be discouraged workers in all three age groups examined. In the prime age group, females were more than three times more likely to want work but not be actively looking for it (19.9 per cent as opposed to 6.4 per cent of males aged between 25 and 44 years).

Of indigenous people who want to work and are actively looking for work the majority are available to start work (that is, they are unemployed). This corresponds to the overall patterns of indigenous unemployment analysed in more detail and with better data in Hunter and Gray (1998).

Table 1. Labour force status and attachment to the labour force by age and sex: indigenous Australians, 1994

	15-24 years		25-44 years		45-64 years	
	Male	Female	Male	Female	Male	Female
Employed	38.2	23.9	53.8	31.8	43.4	28.3
Not employed	61.8	76.1	46.2	68.2	56.6	71.7
Do not want to work (other NILF*)	13.1	20.4	5.4	24.7	31.9	52.3
Want to work	48.8	55.7	40.8	43.5	24.8	19.4
Discouraged workers* (not actively looking for work)	14.1	21.4	6.4	19.9	5.7	11.7
Actively looking for work	34.7	34.3	34.4	23.6	19.1	7.8
Marginally attached (not available to start working last week)	2.4	8.5	3.5	5.5	4.2	3.2
Unemployed* (available to start working last week)	32.3	25.8	30.9	18.1	14.9	4.5
Total	100.0	100.0	100.0	100.0	100.0	100.0
Civilian population	30,400	30,500	40,700	42,900	14,300	15,100

Note: * refers to the categories used in the regression analysis.

Source: Various figures in ABS/CAEPR (1996).

The comparison of indigenous and total Australian statistics for labour force attachment reveals several similarities and differences between indigenous and non-indigenous Australians (Table 2). Given that the numbers of indigenous Australians are such a small component of the total Australian population, the last two columns in Table 2 can be taken to indicate the situation for non-indigenous Australians.

It is well known that indigenous Australians have low employment rates. However, this does not appear to impinge upon their desire to work. Indeed, if the potential labour force is defined as those who either work or want to work, then indigenous Australians are more motivated to work than other Australians. For example, only 16.2 per cent of indigenous males indicated they did not want to work compared to 21.4 per cent of other males. One explanation for the difference might be the different demographic profiles of the indigenous and non-indigenous populations with older people being more likely to withdraw from the work force.⁵ Another explanation may be the differential rates of participation in full-time education. Notwithstanding ad hoc explanations of such observations, it is clear that indigenous people want to work at least as much as other Australians.

Using the definition of discouraged workers outlined above, it is clear that the rate of discouraged workers is much higher amongst the indigenous population. Indigenous males are almost four times more likely than other males to want work but are not be actively looking for work (15.8 as opposed to 4.2 per cent). While females are generally more likely to be discouraged from looking for work than males, indigenous females are almost three times more likely to be discouraged than non-indigenous females (29.3 as opposed to 10.0 per cent). Of those who are actively looking for work, almost everybody was available to start work in the last week. Whatever variation there was in availability to work between indigenous and other Australians must be explained by the differences in the numbers actively looking for work.

Table 2. Labour force status and attachment to the labour force by indigenous status and sex, 1994

	Indigenous		Total Australian	
	Male Per cent	Female Per cent	Male Per cent	Female Per cent
Employed	45.0	27.1	67.0	49.0
Not employed	54.9	72.9	33.0	51.0
Do not want to work (other NILF*)	16.2	31.9	21.4	35.5
Want to work	38.8	41.0	11.6	15.4
Discouraged workers* (not actively looking for work)	15.8	29.3	4.2	10.0
Actively looking for work	22.9	11.6	7.4	5.4
Marginally attached (not available to start working last week)	0.9	1.1	0.4	0.5
Unemployed* (available to start working last week)	22.0	10.5	7.0	4.9
Total	100.0	100.0	100.0	100.0
Civilian population aged 15 and over	88,500	92,900	6,877,900	7,096,700

Note: * refers to the categories used in the regression analysis.

Source: Indigenous statistics are derived, based on Monthly Labour Force Survey (MLFS) definitions, from Tables A1.1 and A1.2 in ABS/CAEPR 1996). Total Australia statistics are derived from the September 1994 editions of *Persons Not in the Labour Force, Australia* (ABS 1994b) and *The Labour Force, Australia* (ABS 1994a).

The importance of analysing the reason for not looking for work is highlighted by the distinct gender patterns for indigenous workers observed above. Childcare and other family responsibilities are the main reasons why indigenous female discouraged workers do not look for work (Table 3). However, the gender breakdown of reasons shows that family responsibilities are only predominant among females with almost half indicating it is the reason for not looking (46.3 per cent). Male discouraged workers tend to emphasise studying as the major reason (42.1 per cent). Demand-side factors, including both no jobs at all and no jobs in the local area or line of work, are the second most important reasons for males (19.1 per cent) and the third most important reason for females (behind childcare and studying).

The geographic breakdown indicates that in capital cities childcare and studying are the main reasons for wanting to work but not being actively looking for work. However, demand-side factors relating to the lack of suitable jobs, or indeed any jobs, dominates in rural and remote areas with 28.2 per cent of discouraged workers nominating this as the main reason why they are not looking for work.

There are also several patterns discernible between age groups. Childcare is the primary reason given among the prime-aged group (49.6 per cent). In contrast, studying is the main reason given by indigenous youth (51.9 per cent). There are also reasonably large numbers of older indigenous persons (aged over 25 years) who are returning to studies. This is consistent with the census estimates of indigenous study patterns given in Gray, Hunter and Schwab (1999). If the other reasons and not stated categories are ignored, then the reasons given by indigenous discouraged workers aged 45 and over are dominated by demand-side factors (20.7 per cent).

It is interesting to note that concerns that welfare payments may be affected do not feature strongly for any group examined with the possible exception of older discouraged workers (14.7 per cent). This observation is somewhat surprising given the high replacement rates (that is, the ratios of welfare payments to expected wages) for most indigenous people (Daly and Hunter 1999). One explanation might be that the wages are so low that they do not affect welfare entitlements and hence the incentives to look for work.⁶

Table 3. Main reason indigenous discouraged workers are not looking for work by part-of-State, age and sex 1994

	Part-of-State			Age			Sex		Persons Per cent
	Capital city	Other urban	Rural or remote	15-24	25-44	45 and over	Male	Female	
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	
Childcare and other family responsibilities	34.7	37.7	25.2	20.9	49.6	13.8	4.5	46.3	33.4
No jobs at all	2.5	6.2	15.8	8.2	8.0	6.9	10.0	7.1	7.9
No jobs in local area or line of work	3.4	6.2	12.4	4.8	8.0	13.8	9.1	6.5	7.3
Studying/returning to studies	31.9	28.2	24.1	51.9	10.8	6.9	42.1	21.4	28.1
Welfare payments/pension may be affected	2.0	7.1	3.0	1.9	4.5	14.7	7.8	3.1	4.4
Other	20.6	11.9	8.6	5.8	14.8	36.2	18.8	10.9	13.2
No reason/not stated	4.8	2.7	10.9	6.5	4.3	7.8	7.8	4.7	5.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of discouraged workers aged 15 years and over	6,655	10,582	6,916	10,400	11,052	2,726	7,601	16,647	24,155

Notes: Discouraged workers are defined for the purposes of this table as those people who want work, but are not actively looking for it. Capital cities are Perth, Adelaide, Hobart, Melbourne, Sydney, Brisbane, Canberra and Darwin; other urban areas are defined as areas with populations of greater than 1,000 which are not a capital city; and rural and remote areas have populations of less than 1,000.

Source: Derived from Table 45 in ABS (1995).

The conventional ABS definition of a discouraged job seeker uses these reasons for not looking for work to classify whether a person is a discouraged worker. For example, job seekers are discouraged if employers' attitudes or behaviours dissuade them from looking for work. Individuals who are not looking for work for personal reasons but state that they want to work are not classified as being a discouraged worker.

Unfortunately, it is not possible to get correspondence between the NATSIS and MLFS categories to allow a comparison between the indigenous and non-indigenous reasons for not looking for work. However, it is possible to observe that personal reasons also dominate the reasons given in the MLFS survey (ABS 1994b). Almost three-quarters of MLFS respondents who are not in the labour force and want to work indicate they were not looking for work for personal reasons (especially childcare or attending an educational institution).

The predominance of personal reasons for not looking for work among both the indigenous and non-indigenous populations indicates how potentially sensitive the results of an analysis of indigenous labour force status based narrowly on the ABS definition of discouraged worker might be. Given that the theoretical literature on the discouraged worker emphasises the relative productivity of family members in both market and non-market work and the level of welfare entitlements, it would diminish the paper to exclude either family responsibilities or welfare reasons from the analysis.

Given the prominence of studying and returning to study as a reason for not looking for work, it is important to articulate the linkages between educational participation, indigenous labour force status and, in particular, being a discouraged worker. Table 4 illustrates the exceptionally low rates of employment among indigenous school students. Only 7.5 per cent of indigenous secondary school students are employed compared to 27.2 per cent of all Australian secondary school students (ABS 1994c).⁷ Given that ABSTUDY and AUSTUDY entitlements are of a similar magnitude, it is remarkable that employment rates are so low among indigenous students.⁸ It is likely that this reflects the lack of employment opportunities for indigenous students given the large proportion that indicated that they wanted to work but were not actually looking for it.⁹ The rates of employment amongst indigenous post-secondary students are also relatively low at 37.6 per cent as compared to 49.9 per cent amongst non-indigenous post-secondary students (ABS 1994c).

Table 4. Labour force status by educational participation, indigenous Australians aged between 15 and 64 years, 1994

	Not studying	Post-secondary education	Still at school	Total
Non-CDEP employed	28.9	37.6	7.4	27.7
CDEP employed	10.8	3.5	0.1	9.6
Unemployed	18.0	14.9	5.0	16.8
Discouraged workers	11.6	21.0	33.9	13.8
Other NILF	30.8	23.0	53.6	32.1
Total	100.0	100.0	100.0	100.0
Population aged 15 to 64 years	151,017	9,712	13,079	173,808

Source: Unpublished NATSIS data.

Table 4 also reveals that indigenous secondary students are about three times more likely to be discouraged workers than indigenous people who are not studying (33.9 per cent being discouraged workers as compared to 11.6 per cent of persons not studying). Indigenous post-secondary students are approximately twice as likely

to be discouraged workers (23.0 per cent) as compared to persons not studying. These patterns appear to indicate that there may be many indigenous students participating in education primarily because they are unable to obtain satisfactory, or even any, employment.

The frustrated labour supply of indigenous students may affect the quality of their educational experience. The inability to get jobs and therefore being discouraged from looking for work feeds back into the student's experience in two ways: it affects the amount of financial resources available to indigenous youth and it limits their work experience. The low income of many indigenous students will affect their attitude to education by compelling them to either be dependent on parents (guardians) for finances, or seek other, potentially illegal, sources of money and goods.¹⁰ The lack of labour market experience among indigenous students may constrain their perceptions of the value of education and limit the number of potential contacts and role models for future employment opportunities. Clearly, it is important to attempt to account for the role of education in explaining whether indigenous people are discouraged from looking for work.

As indicated above, indigenous students are excluded from the statistical modelling that follows because their labour force participation is necessarily constrained. Another rationale for leaving them out of the empirical analysis is that they are more likely to not be looking for work for the personal reasons which the ILO definition of discouraged workers attempts to exclude.¹¹

If it is valid to exclude students, then it is necessary to justify why other 'personal reasons' for not looking for work are not excluded from the definition of discouraged workers used in the remainder of this paper. Given the difficulty in distinguishing the effect of personal circumstances from that of labour market conditions,¹² we will attempt to indirectly discern the different effects of the various economic, demographic and social factors on labour force participation and attachment. That is, our analysis tries to discern whether discouraged workers are different from those currently participating in the labour market after controlling for social/family factors that indicate differences in personal circumstances.

Modelling labour force status and discouraged workers in indigenous populations

The main purpose of this paper is to identify the determinants of indigenous labour force status using a model that includes economic, cultural and social environmental factors. The NATSIS data is the first data set that allows this type of analysis for indigenous Australians. Not only does the NATSIS provide information on those who want to work but are not looking for work it also includes a unique range of social environmental data on factors such as arrest, household composition and family history. The labour force states modelled are non-CDEP employment, CDEP employment, unemployment, discouraged worker and other NILF (that is, NILF excluding discouraged workers).

As the dependent variable is not continuous, ordinary linear regression is inappropriate and it is necessary to use a technique appropriate for a dependent variable with only five possible values. Multinomial logit (logistic) regression was chosen, as the five possible outcomes were categorical, rather than ordinal. That is, it is not possible to rank or order the outcomes for the CDEP scheme employed, unemployed or the two NILF categories against non-CDEP employment.

Logistic regression can be most easily explained in the case where the dependent variable has two possible values. To focus our thoughts, consider a model of labour force participation where a respondent either works or seeks work ($Y=1$) or does not ($Y=0$). The economic theory described above indicates that the probability of

a person being in these two alternatives states will depend upon, sex, age, marital status, level of educational attainment, work history, macroeconomic conditions, local demand conditions, and family or social environment. These explanatory variables will be denoted with an \mathbf{x} . The probability of being in each labour force state can be summarised as depending upon the coefficients of each of the explanatory variables (denoted by β) and a generalised functional relationship between these factors and the probability of labour force participation (denoted by F):

$$\text{Probability (Y=1)}=F(\mathbf{b}'\mathbf{x}) \quad (1)$$

$$\text{Probability (Y=0)}=1-F(\mathbf{b}'\mathbf{x}) \quad (2)$$

Note that in this case the probability of not participating in the labour force ($Y=0$) is simply one minus the probability of participating in the labour force. This is because in this model there are only two outcomes, one of which a person must be in. The function, F , known in technical terms as the cumulative distribution function, could take a number of forms depending upon the distribution of data in the population being examined. Two commonly used distributions are the normal distribution and a closely related functional form, the logistic distribution.

Given that in this paper there are five possible labour force states, the model needs to be extended to the multinomial form. That is, instead of taking only two values, the dependent variable Y_j takes five values:

$Y_i=1$ if a person is employed non-CDEP,

$Y_i=2$ if a person is employed in the CDEP scheme,

$Y_i=3$ if a person is unemployed.

$Y_i=4$ if a person is discouraged from looking for work,

$Y_i=5$ if a person is outside the labour force (other NILF).

McFadden (1973) showed that if the non-deterministic component of the data (the 'error term') is independent and identically distributed with a Weibull distribution, $F(\epsilon_i)=\exp(e^{-\epsilon_i})$, then

$$\text{Probability (Y}_i=j)=\frac{e^{\mathbf{b}'\mathbf{x}_{ij}}}{\sum_{j=1}^{J=4} e^{\mathbf{b}'\mathbf{x}_{ij}}} \quad (3)$$

and the Probability ($Y_i=5$)= $1-P_1-P_2-P_3-P_4$

The estimation of the multinomial logit model has several technical advantages over alternative models. First, it is relatively straightforward to estimate (Greene 1997). Second, the error term approximates a widely used normal distribution for which the statistical properties are well known (see Agresti (1984) and Hosmer and Lemeshow (1989) for fuller discussions).

The multinomial logit coefficients for a particular labour force category (see Appendix A) are a function of the 'log odds ratio', that is, the probability of being in that category divided by the probability of being NILF. Given the complexity of interpreting the log odds ratios, and hence the coefficient, the results are reported using marginal effects (Tables 4 and 5). The statistical significance reported is for the coefficients in Appendix A.¹³

Data and empirical specification

Empirical studies of indigenous labour force status have identified many factors that are associated with the various labour force states. For instance, Daly (1995) identifies age, marital status, number of dependents, educational attainment and

geography as the major factors in her analysis of 1991 Census data. Borland and Hunter's (1999) analysis of the NATSIS incorporates several social environmental and cultural factors which are related to the employment status of indigenous persons, including whether a person voted in a recent election, whether they have a long-term health condition, whether they were taken from their natural parents in youth and whether they have been arrested in the previous five years. Hunter and Borland (1997) conclude that the general significance of these sociocultural indicators means that labour economists should consider controlling for such factors where possible.

In addition to the variables used by Borland and Hunter (1999), this study extends the range of cultural/social variables included in the model in order to account for the possibility that the social environment is directly impinging upon whether a person becomes a discouraged worker. The first set of cultural/social variables used attempt to capture the role of substitution between traditional lifestyles and market work. The variable for hunter-gatherers and whether a person speaks an indigenous language attempts to capture the links with indigenous culture. Because that data on hunting and gathering are provided from a question on voluntary work, the role of other voluntary work is also examined. If there is any significant difference in the estimates of the effects of engaging in hunting and gathering and other 'voluntary' work on labour force status, then it should be possible to identify the unique effect of traditional indigenous activities on labour supply.

The second set of social environmental factors include the characteristics of other household members and whether a family has access to childcare. The inclusion of the latter variable is easy to justify given the importance of childcare as a reason for not looking for work. The access to childcare is proxied by a variable that indicates whether a respondent's house is within ten kilometres of the nearest preschool.¹⁴ The household is also used as the basis for the other social environmental factors because the immediate family may not be the sole social influence on people living in large indigenous households (Hunter 1999).

Two variables are used to measure the labour force characteristics of other household members: the first captures whether anyone else in the household is employed; and the second measures whether anyone else is unemployed. Another variable measures whether another household member has been arrested, while the final household variable indicates whether the average level of schooling of other householders is greater than Year 10. All these household variables equal zero if there is only one adult in the house.

The correlations between these new 'innovative' variables not included in previous studies, indicate that they provide independent information about social environmental factors. For example, the correlation between those variables which attempt to capture the relationship of traditional lifestyles and market work are all less than 0.25 (most much less than 0.2). Similarly, the weak correlations between the innovative household variables mean that they can all be included in the empirical analysis.¹⁵

All due care was taken to ensure that these innovative variables are not related to labour force status by definition or through some behavioural mechanism (that is, they are not 'endogenous'). For example, the social environmental variables are all constructed in terms of the characteristics of other household members and, therefore, exclude the characteristics of the person being analysed. However, given that it is impossible to completely discount the possibility of endogeneity bias, a sensitivity analysis of the validity of the new specification was conducted.

As discussed, the effects of the explanatory variables on labour force status cannot easily be understood from the coefficient estimates. To aid interpretation the marginal effects of the model are presented. The marginal effect for an explanatory

variable shows the effect of a change in the explanatory variable for which the marginal effect is being calculated on the probability of being in each labour force state.

While marginal effects are easier to interpret than the underlying coefficients they still have to be interpreted relative to the omitted categories in the regression specification. That is, the change in the probabilities of being in various labour force states is measured relative to a hypothetical reference person. The hypothetical reference person, or so-called base case, is taken to be an indigenous Australian, who:

- is aged 25-44 (that is, 'prime-aged');
- lives in an urban region outside a capital city;
- left school between Years 6 and 9;
- has no post-school qualification;
- has no difficulty in speaking English;
- did not complete a training course in the previous 12 months;
- voted in a recent Federal, State or ATSIC election;
- does not have long-term health condition;
- has not been arrested in the previous five years;
- has no children under 12 years old;
- is married;
- is not living in a racially mixed family;
- was not taken from their natural parents;
- does not engage in hunting and gathering activities;
- does not speak an indigenous language;
- does not do any voluntary work;
- lives in a household where no other adults have been arrested or are employed or unemployed;
- lives in a household where the average level of education of adults is less than Year 10; and
- whose family lives less than ten kilometres from a preschool.

The hypothetical reference person is intended to characterise a representative member of the indigenous population and hence was chosen using sample information on the most likely outcome for each explanatory variable. The probability of being in the various labour force states for the base case is given in the last row of Tables 4 and 5.

Results

The multinomial logit regressions were estimated with and without the innovative variables to test whether the main results are sensitive to the inclusion of these variables.¹⁶ Given that there was little change in the reported results for indigenous males and females from the inclusion of these (potentially 'endogenous') variables, the marginal effects for the full model are reported in this section. The marginal effects for the parsimonious model are presented in Appendix B.¹⁷

The marginal effects shown in Tables 5 and 6 indicate the change in the probability of being in the respective labour force states from a one unit change in the explanatory variable being examined, holding all other variables at the values for the hypothetical reference person described above. Since all the variables used are 'dummy variables', this simply means that these tables show how the probability of being employed non-CDEP, CDEP, unemployed, discouraged worker or other NILF changes as a characteristic changes, holding all other characteristics constant.¹⁸ For

example, if an indigenous male has been arrested they are significantly less likely to be employed and more likely to be unemployed. Table 5 shows that the experience of arrest reduces the probability of being in non-CDEP employment by 20.7 percentage points but increases the probability of unemployment by a similar amount. That is, being arrested does not change the labour supply decision but does affect the probability of being employed outside the CDEP scheme.

The results for females also indicate a significant effect of arrest on employment prospects outside the CDEP scheme but little impact on labour force participation rate. While the magnitude of these results is basically consistent with Borland and Hunter (1999), it does not sit easily with their conclusion, based on the effect of the various types of arrest, that interaction with the criminal justice system is more likely to effect labour supply rather than labour demand. However, while labour supply in the formal workforce may not be affected, the intensity and type of job search may be affected and hence the probability of securing a job could lessen as a result of the experience of arrest.

The results for the full model indicate that young people (aged 15 to 24 years) are a little less likely to be in the labour force than people aged 25 to 44 years. Indigenous youth are much less likely to be in non-CDEP employment and more likely to be unemployed. Indigenous male youth are also much more likely to be discouraged workers, there being 3.6 percentage points more than in the analogous category for prime aged males. Older males and females tend to be concentrated in the other NILF category. That is, they are about 20 percentage points less likely to want work than their respective prime-aged populations. This is reflected in a lower probability of being in non-CDEP or CDEP scheme employment and being unemployed. Older indigenous females are also less likely to be a discouraged worker.

The effect of region of residence is consistent with those found in existing studies. CDEP scheme employment is concentrated in rural and remote areas. Females in capital cities are 8.0 percentage points more likely to be discouraged workers relative to females living in other urban areas. The female participation rate in rural areas is 4.0 percentage points lower than that of other urban areas, largely because more women are in the other NILF category. That is, females in capital cities have lower participation rates because they want to work, but are not looking for work (and are available), whereas rural females have lower participation rates because they do not want work or are not available for whatever reason.

In contrast, male participation rates do not vary much by geographic area, presumably because the CDEP scheme provides work for most of those who want it in rural and remote areas. That is, the availability of the CDEP scheme in such areas offsets the greater labour market opportunities in urban areas. This is consistent with the observation that there are not significantly higher numbers of discouraged workers in remote areas but males are 23.1 percentage points more likely to be in CDEP scheme employment and 11.6 and 12.4 percentage points less likely to be in non-CDEP scheme employment and unemployed, respectively.

While the indigenous-specific institutional factors like the CDEP scheme eliminate geographic differences in labour supply for males, some residual differences remain for females, presumably because they are less likely to be employed in the CDEP scheme (Hunter and Gray 1998). That is, the fact that areas outside the capital cities have access to fewer jobs leads to lower employment and labour supply for females.

All qualifications and levels of educational attainment over Year 9 are associated with higher non-CDEP employment rates for both males and females. There are corresponding decreases in the probability of being in CDEP employment, and other NILF categories. There are different effects from education on the probability of being unemployed between males and females. For example, increases

in educational attainment are associated with a lower probability of unemployment for males. For females, they are associated with an increased probability of being unemployed. The latter may reflect an increased desire to work by females without any concomitant success in looking for it. For example, females who complete a degree are 2.5 percentage points more likely to be unemployed than those who have not.

Interestingly, for males there is a relatively small effect from level of educational attainment on the probability of being a discouraged worker. In contrast, the level of education appears to substantially reduce the probability of being a discouraged worker for females.

The overwhelming effect of education appears to be to increase the prospects of non-CDEP scheme employment. Tertiary degrees among females are associated with an increase in the probability of such employment for the reference female by almost one-quarter (25.0 percentage points). The effect for males is somewhat smaller with the probability of non-CDEP employment increased by 14.8 percentage points relative to the reference male. Daly (1995) also found that education is particularly important for indigenous females.

The effects of socioeconomic factors on the probability of labour force status are consistent with previous studies. Voting in a recent election is associated with a higher probability of non-CDEP employment for both males and females, and lowers unemployment rates among males. While the discouraged worker effect for males was significant and positive it was extremely small in magnitude. The net impact was to increase the labour supply of males by about 4.1 percentage points and females by about 15 percentage points, mainly through the increased chance of working.

Long-term health problems are associated with a lower probability of being in non-CDEP employment, especially for males. There is even a small significant negative impact on unemployment probability among males. However, this only translates into a 6.1 percentage point reduction in male labour supply. The effect of arrest is discussed above.

Family factors also conform with our expectations. The presence of children in a family has a small positive or no effect on the probability of a male participating in the labour market but has a large negative effect on female participation. The presence of one child under 12 years of age reduces female participation rates by 12.1 percentage points, while the presence of more children reduces participation rates by over 22 percentage points compared to indigenous women without children. The reduction is due to an increase in the probability of being in the other NILF category as well as an increase in the probability of being a discouraged female worker, particularly in families with two or more children. This may reflect the fact that a disproportionate portion of the reduced participation rates result from a decline in the probability of being in non-CDEP scheme employment. While access to preschool was controlled for in the regression framework, it appears that family responsibility remains a major factor behind the large numbers of discouraged indigenous females.

Marriage is associated with an increase in the probability of labour market participation among males of 8.8 percentage points and a fall among females of over 10 percentage points. These changes in labour supply arise from two very different sources. The increase in male participation rates arises primarily from a large increase in non-CDEP scheme employment and reductions in the other NILF category and unemployment rates. In contrast, married females are less likely to participate because of a fall in the unemployment rates relative to unmarried females. Employment prospects are also worse if a female is married.

Sole parenthood also results in a substantially lower probability of participation in the labour force amongst females, mostly as a result of a

substitution between being unemployed and the two NILF categories (discouraged worker and, more importantly, the other NILF category) but also some fall in the probability of employment. Male sole parents are much less likely to be unemployed largely because of an increased probability of being in non-CDEP or CDEP scheme employment. They are also significantly more likely to be a discouraged worker.

Living in a racially 'mixed family' is associated with substantially better employment prospects outside the CDEP scheme. Indeed, CDEP scheme employment has a negative association with this variable, presumably because 'intermarriage' rates are highest in large urban areas where the opportunities for CDEP scheme employment are very low (Riley 1994). There is a small net (3.8 to 4.6 percentage points) increase in participation rates associated with living in a mixed family.

Being taken from one's natural family does not have any direct influence on labour supply for either males or females. However, as Borland and Hunter (1999) point out, it has a substantial influence on arrest and, therefore, is likely to affect labour market participation through this avenue.¹⁹

Cultural factors and social environmental influences on labour supply are particularly interesting because they are rarely, if ever, examined in the detail presented here. Engaging in hunting and gathering activities, appears to be a substitute for market-based activities, especially for females. Indigenous females are 8.3 percentage points less likely to participate in the labour market almost entirely through the increase in the other NILF category. This resulted from a 2.6 percentage point decline in the probability of non-CDEP employment and a 5.7 percentage point decline in unemployment.

Indigenous males who engaged in hunter-gatherer activities are 7.4 percentage points less likely to be in non-CDEP employment, but slightly more likely to be in CDEP scheme employment, be unemployed and NILF.

Speaking an indigenous language has little effect on the labour supply decision of females. However, there is some effect on the attachment to the labour force as revealed by the significantly reduced probability of being a discouraged worker and a consequent increase in the chance of being in the other NILF category. Indigenous language is associated with a small reduction in the labour market participation of males. The source of this reduction in the probability of supplying labour is a significant fall in the prospects of non-CDEP employment (7.5 percentage points) and a smaller fall in the probability of being unemployed (1.7 percentage points). Males who speak an indigenous language are 3.5 percentage points more likely to be in the CDEP scheme, probably because they are more likely to live in very remote areas.²⁰

Participating in voluntary work is associated with an increased labour supply for both males and females. However, engaging in voluntary work is not associated with any substantial change in the proportion of discouraged workers. The increased labour supply from engaging in such work results in better prospects of non-CDEP employment. This may indicate that voluntary work could be associated with improved attachment to the community, helps build work-related skills, and could even be helpful in developing useful employment contacts. Voluntary work is not a substitute for participating in the mainstream labour market; rather it appears to complement it.

The results also indicate that there are no significant differences in the probabilities of being a discouraged worker, or in any other labour force state, between Torres Strait Islanders and Aborigines, for either males or females. That is, any differences observed result from the differences in the characteristics of populations. Differences in demography, geography, household structures and, most importantly, educational attainments are likely to explain the slightly higher employment rates among Torres Strait Islanders (ABS/CAEPR 1997).

The social environment is a particularly important determinant of labour supply. The presence of other adults in a household who are employed both increases labour supply and reduces unemployment. Among indigenous males, if other employed persons are present, the chance of unemployment falls by 14.7 percentage points. This is counterbalanced by a larger increase in the probability of employment. The net effect on labour supply is to increase the participation rates for the reference males and females by 5.9 and 13.0 percentage points, respectively.

In contrast, unemployment among other adults in a household is associated with a lower probability of supplying labour, higher unemployment probabilities and lower employment probabilities, both in non-CDEP and CDEP scheme employment. Males in such households are 13.5 percentage points more likely to be unemployed and 21.6 percentage points less likely to be employed.²¹

The effects of the social environment for females are similar to those found for males. The effects on labour supply are very substantial for females increasing the probability of participating by 13.0 percentage points, most of which is from an increase in the probability of being in the other NILF category.

The presence of poor adult role models, as indicated by other householders who have been arrested, is not substantially related to labour supply, but has some effect on employment prospects. The prospects of non-CDEP employment are reduced by 7.6 and 4.5 percentage points for males and females, respectively. Living in a household where the other adult residents, on average, have at least Year 10 level of education is associated with greater labour supply and more employment outside the CDEP scheme. It is also associated with significantly fewer female discouraged workers.

In general, the proportion of discouraged workers is not substantially affected by these social environmental variables. However, there are small but significant reductions in the number of discouraged workers when there are other adults in the house who are unemployed. The effect of living with other unemployed people on reducing labour supply is almost entirely through increases in the other NILF category. That is, many people in such households lose any desire to work as well as the impetus to actively look for work.

Finally, living in a household that is less than ten kilometres from the nearest preschool is not associated with large changes in male labour supply. However, for females, childcare access is significantly associated with greater employment prospects outside the CDEP scheme and less discouraged female workers. The net effect of access to childcare/preschool is a small increase in participation rate of 4.2 percentage points.

Table 5. Marginal effects on the probability of being in various labour force states for indigenous males who are not currently studying, 1994

	Labour force			NILF	
	Non-CDEP scheme employed	CDEP scheme employed	Unemployed	Discouraged workers	Other NILF
Demography/geography					
Aged 15 to 24	-12.2	4.1	6.3	3.6	-1.8
Aged 45 to 64	-4.7	-2.2	-10.7	0.5	17.1
Capital city	10.9	-6.0	-5.6	0.8	-0.1
Rural	-4.6	9.1	-5.6	0.2	0.8
Remote	-11.6	23.3	-12.4	1.1	-0.4
Education/skill variables					
Less than six years schooling	-6.4	-1.6	-2.4	0.1	10.3
Year 10 to 11	5.5	0.9	-3.7	-1.2	-1.5
Year 12	10.1	-2.1	-5.1	-2.0	-0.9
Degree/diploma	14.8	-1.5	-4.4	-1.2	-7.6
Vocational qualification	20.3	-4.6	-7.8	-1.5	-6.4
Other qualification	17.0	-3.9	-5.9	-0.8	-6.5
Difficulty with English	-8.7	3.9	1.3	0.3	3.1
Completed training	9.1	-1.4	-0.5	-2.2	-4.9
Socioeconomic status					
Voted	10.0	1.2	-7.1	0.7	-4.8
Health problem	-3.5	-2.4	-0.1	1.1	5.0
Arrested	-20.7	1.7	16.8	0.7	1.6
Family					
One child under 12	-4.2	0.5	2.3	0.7	0.8
Two to three children	-5.7	1.2	0.0	2.0	2.6
Four or more children	-13.5	1.8	10.5	1.2	0.0
Married	15.3	2.2	-8.8	-1.7	-7.1
Sole parents	5.9	5.2	-16.0	3.3	1.6
Mixed family	17.5	-7.5	-6.3	-0.3	-3.5
Taken from natural family	5.1	-1.1	-6.6	0.0	2.7
Cultural					
Hunter-gatherer	-7.4	2.1	2.3	-0.3	3.2
Indigenous language	-7.5	3.5	-1.7	1.9	3.8
Voluntary work	8.0	-0.2	-5.2	1.3	-4.0
Torres Strait Islander	-7.6	2.6	7.9	-1.1	-1.8
Social environment of household					
Others employed	10.8	9.8	-14.7	-0.8	-5.1
Others unemployed	-15.4	-6.2	13.5	-0.4	8.5
Others arrested	-7.6	4.4	2.6	0.6	0.0
Others Year 10	8.6	-0.2	-5.8	-0.6	-2.0
Close to preschool	-3.1	-2.4	8.7	-2.4	-0.8
Base probability	48.0	9.9	29.1	3.0	10.0

Notes: The base probabilities in the last row indicate what the probability is that a reference person is in the various labour force states. The marginal effects in the other rows indicate the change in this probability from a change in the respective explanatory variables. For example, if a reference male was arrested, then they are 20.7 percentage points less likely to be employed in non-CDEP scheme employment. Since the reference person is still in one of the labour force states, the marginal effects must sum to zero in each row. Therefore, if any of the marginal effects for a variable are based on a significant coefficient, then the other marginal effects in that row (that is, for that variable) are also likely to be statistically significant.

Source: Appendix Table A2.

Table 6. Marginal effects on the probability of being in various labour force states indigenous females who are not currently studying, 1994

	Labour force			NILF	
	Non-CDEP scheme employed	CDEP scheme employed	Unemployed	Discouraged workers	Other NILF
Demography/geography					
Aged 15 to 24	-12.6	0.5	9.4	1.1	1.6
Aged 45 to 64	-8.0	-1.5	-9.9	-4.0	23.4
Capital city	-0.8	-4.2	-2.4	8.0	-0.7
Rural	-6.1	5.3	-3.1	-3.1	7.1
Remote	-6.7	13.6	-7.4	-2.0	2.5
Education/skill variables					
Less than six years schooling	-2.2	-2.3	-2.6	-8.5	15.5
Year 10 to 11	9.2	-0.4	-0.5	-1.8	-6.6
Year 12	23.7	0.3	-2.8	-5.3	-16.0
Degree/diploma	25.0	1.1	2.5	-9.0	-19.6
Vocational qualification	17.4	-2.6	3.6	-3.8	-14.6
Other qualification	16.5	0.8	2.7	-2.2	-17.7
Difficulty with English	-9.5	1.9	2.6	2.9	2.1
Completed training	16.3	0.5	9.0	-10.5	-15.4
Socioeconomic status					
Voted	13.7	1.1	0.0	-4.0	-10.9
Health problem	-3.7	0.2	1.3	1.3	0.9
Arrested	-13.1	0.6	9.7	1.9	1.0
Family					
One child under 12	-8.5	0.2	-3.8	7.2	4.9
Two to three children	-16.3	-0.9	-5.3	11.4	11.1
Four or more children	-20.5	-1.2	-4.9	14.9	11.7
Married	-3.1	0.2	-7.7	4.4	6.2
Sole parents	-4.8	-1.6	-8.0	7.3	7.1
Mixed family	9.5	-3.9	-1.0	-0.3	-4.3
Taken from natural family	-2.0	2.2	-1.7	-0.8	2.3
Cultural					
Hunter-gatherer	-2.6	0.0	-5.7	0.6	7.7
Indigenous language	-2.3	0.4	-1.6	-3.4	6.9
Voluntary work	6.6	-0.7	3.9	-1.0	-8.8
Torres Strait Islander	-3.3	-0.2	-2.9	-0.3	6.7
Social environment of household					
Others employed	10.8	7.8	-5.6	-3.6	-9.4
Others unemployed	-8.4	-3.6	1.0	-1.6	12.7
Others arrested	-4.5	2.7	-0.5	1.7	0.6
Others to Year 10	4.9	-1.1	2.7	-2.1	-4.4
Close to preschool	4.8	-0.6	0.0	-7.0	2.8
Base probability	29.4	4.7	14.0	16.0	35.9

Notes: The base probabilities in the last row indicate what the probability is that a reference person is in the various labour force states. The marginal effects in the other rows indicate the change in this probability from a change in the respective explanatory variables. For example, if a reference male was arrested, then they are 20.7 percentage points less likely to be employed in non-CDEP scheme employment. Since the reference person is still in one of the labour force states, the marginal effects must sum to zero in each row. Therefore, if any of the marginal effects for a variable are based on a significant coefficient, then the other marginal effects in that row (that is, for that variable) are also likely to be statistically significant.

Source: Appendix Table A3.

Conclusion

The contribution of this paper is two-fold: extending the range of factors examined in studies of indigenous labour supply to include cultural and social environmental factors and focusing on what discourages indigenous discouraged workers. The factors that affect labour force status and employment shown in this paper are consistent with those found by previous studies (Daly 1995; Borland and Hunter 1999).

Cultural factors are found to be particularly important in determining indigenous labour supply. The variables that capture the access of an individual to traditional lifestyles, whether a respondent speaks an indigenous language or engages in hunting and gathering, are associated with significant reductions in labour supply and declines in the desire to work in the mainstream labour market. However, cultural factors are by no means the only factors affecting indigenous labour supply. Indeed, age, educational attainment and family factors are far more important.

The role of voluntary work in increasing employment probabilities points to the importance of access to information about jobs and job search behaviour. The substantial positive effect on non-CDEP scheme employment for those who engage in voluntary work may also result from being involved in a culture of work and hence being more aware of what it takes to secure and keep a job. Voluntary work clearly complements participation in the mainstream labour market.²² This result provides a validation for the inclusion of approved voluntary work under the auspices of the 'mutual obligation' policy regime that has been implemented for young unemployed since 1 July 1998 (Press release from Minister for Employment, Education, Training and Youth Affairs, 'Mutual Obligation: Fact Sheet', 8 July 1998).

The effect of the household environment on labour supply is primarily through the presence of other adults who are either employed or unemployed. Both of these variables also have a large impact on employment prospects. Given that regional variation in unemployment and employment will be reflected in the labour force status of other household members, this may reflect the role of local demand factors. Alternatively, the presence of positive and negative role models may be an important determinant of indigenous labour force status. The comparison of the results reported in the text with those in Appendix B which exclude such factors reveals that the social environmental variables are picking up unmeasured regional variations in employment and unemployment. Therefore, we should probably place more emphasis on the role of demand-side factors in explaining the effect of other adults in the household.

However, local demand conditions or the presence of role models in the household are less important factors underlying the large numbers of indigenous discouraged workers than the age variables, educational attainment and family factors. Access to childcare is a major factor. There are substantial reductions in the number of female discouraged workers who live reasonably close to a preschool. Notwithstanding, providing access to childcare only results in a small increase in labour supply, presumably because females with children experience multiple disadvantages which discourages them from looking for work.

Cultural factors do not seem to be an important determinant of the number of discouraged workers. The exception to this is females that speak an indigenous language have a slightly lower probability of being a discouraged worker. Such females are less attached to the labour market than others without access to traditional culture.

The results of this paper must be viewed in the context of the work of Gray and Hunter (1999). Their results document the risks and potential biases involved in relying solely on cross-sectional studies such as the NATSIS. Their conclusion that it

is important to trace the labour market experience of individuals across time remains valid. In the context of labour supply, it is particularly important to ascertain whether a discouraged worker has undertaken any previous job search activities. However, in the absence of such information, it is necessary to document the factors related to the various labour market states for indigenous people.

While this paper has documented the effect of various factors on indigenous labour supply, through their effect on the participation rate, one should bear in mind that there is a clear interrelationship between labour supply and demand. The existence of substantial numbers of indigenous discouraged workers indicates this interaction. Presumably, the substantial fraction of the population who want work but are discouraged from looking for it is an indication of frustration in job search behaviour. The lack of employment opportunities or the relative productivity in non-market work (that is, either in hunting and gathering or looking after children) compared to market work are classic reasons for being a discouraged worker.

The high concentration of unemployment in many indigenous families, documented by Daly and Hunter (1999), highlights the importance of understanding the social environmental determinants of attachment to the labour force. While available evidence for other Australian families shows there is a correlation between the labour force status of partners,²³ Gregory (1999) finds that the concentration of unemployment in Australian families with dependents is increasing. He finds that the proportion of dependent children living in families where no adult works almost doubled in the last two decades. Given that it is unlikely that preferences have changed significantly in a short period, the importance of social environmental and cultural factors identified in this paper probably reflects a subtle labour supply response to local demand conditions and institutional changes.²⁴ One such mechanism could be the disproportionate burden of recent structural change borne by disadvantaged Australians (Gregory and Hunter 1996).

The above analysis of indigenous discouraged workers points to a role for demand-side factors, but it is extremely difficult to effectively separate out supply and demand-side factors. For example, educational attainment is widely believed to increase individual productivity, but it may also increase the desire to work by, *inter alia*, increasing the opportunity costs of not working. The role of employer behaviour is clearer when examining those who work part-time but want to work more hours (the so-called underemployed). In such cases, the lack of demand for their labour is clearly preventing such workers from working more hours. Future research should avail itself of the NATSIS data on underemployment to further tease out the role of the demand-side factors. While education is clearly a major determinant of labour supply and the desire to work, it is important to remember this is a study of indigenous people and not a 'macro' analysis. The findings of Gray and Hunter (1999) highlight how results can change when one examines the population as a whole. For example, educational attainment is much less important for the indigenous cohorts as a whole than it is in cross-sectional studies such as these.

Labour market policies of successive governments have emphasised the importance of encouraging the economic independence of indigenous Australians through addressing education policy and labour market programs (namely, *Working Nation*, Minister for Aboriginal and Torres Strait Islander (1998) and the Indigenous Employment Policy, to be progressively implemented from 1 July 1999). This paper demonstrates the importance of labour supply factors and the interaction between the supply and demand side of the labour market. Indigenous people want to work as much as other Australians. However, in addition to addressing the demand for indigenous labour some attention needs to be paid to cultural and social factors. At the very least, this paper highlights the difficulty in increasing participation rates given the feedback between the concentration of unemployment in indigenous families, documented in Daly and Hunter (1999), and labour supply and employment prospects.

Appendix A. Multinomial logit regression analysis

Table A1. Descriptive statistics for regression analysis

	Males		Females	
	Mean	Standard deviation	Mean	Standard deviation
Non-CDEP employed	30.7	46.2	20.1	40.1
CDEP employed	20.0	40.0	9.2	29.0
Unemployed	23.7	42.5	10.4	30.6
Discouraged worker	6.3	24.4	17.1	37.7
Other NILF	19.2	39.4	43.1	49.5
TSI	7.0	25.5	6.9	25.3
AGE1524	27.0	44.4	27.2	44.5
AGE4564	21.1	40.8	20.1	40.1
CAPCITY	11.0	31.3	12.3	32.8
RURAL	18.2	38.6	16.4	37.1
REMOTE	24.6	43.1	22.8	41.9
BELOWY6	10.7	31.0	9.6	29.5
YEAR1011	37.0	48.3	40.8	49.1
YEAR12	6.2	24.2	8.1	27.3
QDEGRDIP	1.7	12.8	3.8	19.2
QVOCAT	9.1	28.8	6.6	24.8
QOTHER	5.0	21.8	4.2	20.0
DIFINENG	14.7	35.4	15.5	36.2
COMPLETE	6.7	25.0	4.5	20.7
VOTED	76.3	42.5	78.9	40.8
HEALTH	33.5	47.2	40.5	49.1
ARRESTED	33.2	47.1	11.1	31.4
ONEKID	20.0	40.0	22.8	42.0
TWOTHKID	26.3	44.1	32.0	46.7
FOURPKID	9.4	29.1	10.3	30.4
MARRIED	56.1	49.6	53.9	49.9
SOLEPAR	2.5	15.6	19.5	39.6
MIXEDF	18.0	38.4	18.1	38.5
TAKEN	8.5	27.9	8.3	27.6
HUNTGATH	17.6	38.1	10.4	30.6
INDIGLAN	31.6	46.5	29.0	45.4
VOLWORK	31.2	46.3	28.3	45.0
OTHEREMP	40.1	49.0	41.4	49.3
OTHERUNE	28.0	44.9	30.8	46.2
OTHERARR	30.3	46.0	32.2	46.7
OTHSCHHI	18.8	39.1	16.4	37.0
PSACCESS	88.7	31.7	90.5	29.4
Observations	3,298		3,861	

Notes: TSI = whether a Torres Strait Islander; AGE1524 = whether aged 15 to 24 years old; AGE4564 = whether aged 45 to 64 years old; CAPCITY = lives in a capital city; OTHURBAN = lives in non-capital city urban area; RURAL = lives in rural non-remote area (remote = more than 100 kilometres from a TAFE institution); REMOTE = lives in a rural remote area; BELOWY6 = highest level of schooling completed - less than Year 6; YEAR1011 = highest level of schooling completed - Year 10 or 11; YEAR12 = completed Year 12 schooling; QDEGRDIP = degree or diploma; QVOCAT = vocational post-school qualification; QOTHER = other post-school qualification; QNONE = no post-school qualification; DIFENG = has difficulty in speaking English; COMPLETE = completed training course in last 12 months; VOTED = voted in one of most recent Federal, State, ATSIC, or local land council elections; HEALTH = have a long-term health condition; ARRESTED = whether arrested in previous five years; ONEKID = 1 child aged 0-12 years; TWOTHKID = 2-3 children aged 0-12 years; FOURPKID = greater than or equal to 4 children aged 0-12 years; MARRIED = whether married; SOLEPAR = whether a sole parent; MIXEDF = lives in family with non-Indigenous persons; TAKEN = taken from natural family; HUNTGATH = whether engaged in hunter-gathering activities; INDIGLAN = whether speaks an indigenous language; VOLWORK = whether does any voluntary work; OTHEREMP = whether other adults in household are employed; OTHERUNE = whether other adults in household are unemployed; OTHERARR = whether other adults in household have been arrested in last five years; OTHSCHHI = whether average educational attainment of other adults in household is over Year 10; PSACCESS = whether lives within ten kilometres of preschool facility (proxy for access to childcare).

Table A2. Multinomial logistic regression of discouraged workers and other labour force states, males 1994

	Non-CDEP employment		CDEP scheme employment		Unemployed		Discouraged Workers	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
TSI	0.025 (0.1)	0.050 (0.2)	0.427 (1.7)	0.597 (2.6)**	0.435 (1.7)	0.493 (2.0)*	-0.262 (0.6)	-0.168 (0.4)
AGE1524	-0.091 (0.5)	-0.164 (1.0)	0.549 (3.2)**	0.532 (3.3)**	0.397 (2.5)*	0.392 (2.6)*	0.995 (4.7)**	0.938 (4.5)**
AGE4564	-1.102 (6.9)**	-1.051 (6.8)**	-1.247 (6.8)**	-1.181 (6.9)**	-1.457 (8.1)**	-1.438 (8.1)**	-0.848 (3.4)**	-0.817 (3.4)**
CAPCITY	0.211 (1.1)	0.294 (1.6)	-0.936 (2.6)**	-0.873 (2.6)*	-0.207 (1.1)	-0.083 (0.4)	0.229 (0.8)	0.293 (1.0)
RURAL	-0.179 (1.0)	-0.165 (1.1)	0.577 (3.0)**	0.796 (4.7)**	-0.290 (1.7)	-0.401 (2.6)**	0.000 (0.0)	0.343 (1.5)
REMOTE	-0.237 (1.3)	-0.275 (1.7)	1.249 (7.0)**	1.654 (10.7)**	-0.513 (2.8)**	-0.660 (3.9)**	0.344 (1.5)	0.757 (3.6)**
BELOWY6	-0.850 (4.1)**	-0.954 (5.0)**	-0.885 (4.1)**	-0.818 (4.2)**	-0.795 (3.6)**	-0.901 (4.3)**	-0.679 (2.4)*	-0.511 (1.9)
YEAR1011	0.274 (1.9)	0.348 (2.5)*	0.251 (1.6)	0.277 (1.9)	0.029 (0.2)	0.006 (0.0)	-0.350 (1.7)	-0.414 (2.0)*
YEAR12	0.288 (1.1)	0.541 (2.0)*	-0.136 (0.4)	0.090 (0.3)	-0.093 (0.3)	-0.066 (0.2)	-1.043 (2.1)*	-0.810 (1.7)
QDEGRDIP	1.718 (3.0)**	1.500 (2.8)**	1.284 (2.0)	0.887 (1.4)	1.286 (2.0)*	0.974 (1.6)	0.912 (1.0)	0.708 (0.8)
QVOCAT	1.369 (5.0)**	1.517 (5.9)**	0.384 (1.2)	0.617 (2.0)*	0.703 (2.5)*	0.733 (2.7)**	0.333 (0.8)	0.443 (1.1)
QOTHER	1.350 (4.2)**	1.451 (4.5)**	0.552 (1.4)	0.605 (1.6)	0.820 (2.3)*	0.846 (2.4)*	0.747 (1.6)	0.927 (2.1)*
DIFINENG	-0.471 (2.6)*	-0.549 (3.1)**	0.062 (0.4)	0.120 (0.8)	-0.227 (1.3)	-0.278 (1.7)	-0.173 (0.7)	-0.098 (0.4)
COMPLETE	0.857 (2.9)**	0.849 (3.0)**	0.528 (1.6)	0.515 (1.6)	0.665 (2.3)*	0.645 (2.3)*	-0.644 (1.1)	-0.400 (0.8)
VOTED	0.625 (4.4)**	0.749 (5.5)**	0.524 (3.3)**	0.646 (4.4)**	0.173 (1.3)	0.177 (1.4)	0.654 (3.2)**	0.705 (3.5)**
HEALTH	-0.480 (3.8)**	-0.417 (3.5)**	-0.680 (4.7)**	-0.641 (4.8)**	-0.409 (3.3)**	-0.339 (2.8)**	-0.101 (0.6)	-0.083 (0.5)
ARRESTED	-0.708 (5.1)**	-0.807 (6.2)**	0.009 (0.1)	0.047 (0.4)	0.311 (2.4)*	0.267 (2.2)*	0.051 (0.3)	0.149 (0.8)

Table A2. continued

ONEKID	-0.165 (1.0)	-0.067 (0.4)	-0.028 (0.2)	0.133 (0.8)	0.000 (0.0)	0.017 (0.1)	0.131 (0.6)	0.139 (0.6)
TWOTHKID	-0.357 (2.3)*	-0.315 (2.1)*	-0.121 (0.7)	-0.073 (0.5)	-0.230 (1.5)	-0.194 (1.3)	0.272 (1.2)	0.206 (0.9)
FOURPKID	-0.331 (1.4)	-0.410 (1.8)	0.162 (0.6)	0.053 (0.2)	0.306 (1.3)	0.215 (1.0)	0.334 (1.0)	0.332 (1.1)
MARRIED	0.919 (6.4)**	0.871 (6.4)**	0.790 (5.1)**	0.604 (4.2)**	0.273 (1.9)	0.257 (1.9)	0.098 (0.5)	0.071 (0.4)
SOLEPAR	-0.036 (0.1)	-0.117 (0.3)	0.270 (0.7)	-0.028 (0.1)	-0.949 (2.3)*	-0.753 (1.9)	0.597 (1.5)	0.609 (1.5)
MIXEDF	0.735 (4.1)**	0.908 (5.6)**	-0.983 (3.6)**	-0.944 (3.7)**	0.179 (1.0)	0.268 (1.6)	0.322 (1.2)	0.364 (1.5)
TAKEN	-0.135 (0.7)		-0.356 (1.5)		-0.492 (2.4)*		-0.232 (0.8)	
HUNTGATH	-0.445 (1.9)		-0.082 (0.3)		-0.202 (0.8)		-0.374 (1.3)	
INDIGLAN	-0.491 (3.2)**		-0.018 (0.1)		-0.382 (2.4)*		0.171 (0.8)	
VOLWORK	0.661 (3.7)**		0.490 (2.3)*		0.312 (1.6)		0.864 (3.4)**	
OTHEREMP	0.910 (7.1)**		1.397 (10.0)**		0.003 (0.0)		0.387 (2.1)*	
OTHERUNE	-1.002 (7.5)**		-1.593 (9.8)**		-0.233 (1.8)		-0.768 (4.0)**	
OTHERARR	-0.176 (1.2)		0.365 (2.4)*		0.083 (0.6)		0.184 (1.0)	
OTHSCHHI	0.388 (2.4)*		0.207 (1.2)		0.003 (0.0)		-0.017 (0.1)	
PSACCESS	0.018 (0.1)		-0.134 (0.7)		0.435 (1.9)		-0.516 (2.1)*	
CONSTANT	0.008 (0.0)	-0.127 (0.7)	-1.189 (3.9)**	-1.191 (5.7)**	0.190 (0.6)	0.440 (2.4)*	-1.439 (3.8)**	-1.989 (7.0)**
Observations	3,298	3,366	3,298	3,366	3,298	3,366	3,298	3,366

Notes: Robust z-statistics in parentheses. * significant at 5 level; ** significant at 1 level. The pseudo-R²s are 0.207 and 0.166 for the full and parsimonious models respectively. Other NILF category is used as the omitted category for this multinomial logit regression.

Table A3. Multinomial logistic regression of discouraged workers and other labour force states, females 1994

	Non-CDEP employment		CDEP scheme employment		Unemployed		Discouraged workers	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
TSI	-0.290 (1.5)	-0.242 (1.3)	-0.220 (0.8)	-0.199 (0.9)	-0.400 (1.4)	-0.423 (1.6)	-0.192 (0.9)	-0.286 (1.4)
AGE1524	-0.603 (4.5)**	-0.675 (5.2)**	0.063 (0.4)	0.024 (0.2)	0.469 (3.3)**	0.405 (2.9)**	0.022 (0.2)	-0.010 (0.1)
AGE4564	-0.818 (5.3)**	-0.767 (5.1)**	-0.882 (4.0)**	-0.932 (4.5)**	-1.728 (6.7)**	-1.674 (6.7)**	-0.789 (4.9)**	-0.801 (5.1)**
CAPCITY	-0.007 (0.0)	0.033 (0.2)	-2.117 (2.9)**	-2.053 (2.8)**	-0.165 (0.9)	-0.110 (0.6)	0.428 (3.0)**	0.445 (3.2)**
RURAL	-0.411 (2.8)**	-0.403 (3.0)**	0.566 (2.8)**	0.782 (4.2)**	-0.435 (2.4)*	-0.477 (2.8)**	-0.398 (2.7)**	-0.341 (2.4)*
REMOTE	-0.325 (2.1)*	-0.303 (2.2)*	1.287 (7.2)**	1.710 (11.1)**	-0.820 (3.7)**	-0.939 (4.8)**	-0.200 (1.4)	-0.197 (1.5)
BELOWY6	-0.435 (2.0)*	-0.466 (2.3)*	-1.012 (3.8)**	-1.084 (4.3)**	-0.563 (1.8)	-0.682 (2.2)*	-1.119 (4.6)**	-1.082 (4.6)**
YEAR1011	0.475 (4.0)**	0.618 (5.4)**	0.123 (0.8)	0.242 (1.7)	0.166 (1.2)	0.235 (1.8)	0.083 (0.8)	0.135 (1.3)
YEAR12	1.180 (6.1)**	1.377 (7.4)**	0.656 (2.5)*	0.631 (2.5)*	0.368 (1.5)	0.414 (1.8)	0.189 (0.9)	0.289 (1.4)
QDEGRDIP	1.403 (5.4)**	1.541 (6.3)**	0.995 (2.4)*	1.062 (2.7)**	0.952 (2.7)**	1.078 (3.2)**	-0.048 (0.1)	-0.056 (0.2)
QVOCAT	0.986 (5.3)**	1.048 (5.9)**	-0.290 (0.7)	-0.270 (0.7)	0.752 (3.4)**	0.860 (4.0)**	0.251 (1.2)	0.287 (1.4)
QOTHER	1.126 (4.6)**	1.098 (4.8)**	0.829 (2.6)**	0.742 (2.4)*	0.856 (2.9)**	0.838 (2.8)**	0.537 (2.0)*	0.537 (2.1)*
DIFINENG	-0.445 (2.6)**	-0.536 (3.2)**	0.272 (1.7)	0.305 (2.1)*	0.112 (0.6)	0.046 (0.3)	0.111 (0.8)	0.070 (0.5)
COMPLETE	1.002 (4.5)**	1.116 (5.1)**	0.665 (1.8)	0.613 (1.7)	1.058 (4.1)**	1.163 (4.5)**	-0.507 (1.5)	-0.465 (1.4)
VOTED	0.894 (6.2)**	0.985 (6.9)**	0.528 (3.0)**	0.592 (3.5)**	0.268 (1.9)	0.293 (2.1)*	0.044 (0.4)	0.063 (0.6)
HEALTH	-0.157 (1.5)	-0.175 (1.7)	0.026 (0.2)	-0.080 (0.6)	0.066 (0.5)	0.084 (0.7)	0.051 (0.5)	0.046 (0.5)
ARRESTED	-0.615 (3.0)**	-0.764 (3.9)**	0.093 (0.4)	-0.053 (0.3)	0.499 (2.9)**	0.435 (2.7)**	0.086 (0.6)	-0.018 (0.1)

Table A3. continued

ONEKID	-0.470 (3.4)**	-0.402 (3.0)**	-0.087 (0.5)	-0.021 (0.1)	-0.441 (2.5)*	-0.446 (2.6)*	0.245 (1.6)	0.211 (1.4)
TWOTHKID	-1.076 (7.6)**	-1.019 (7.4)**	-0.488 (2.7)**	-0.446 (2.7)**	-0.752 (4.5)**	-0.725 (4.4)**	0.270 (2.0)*	0.240 (1.8)
FOURPKID	-1.470 (6.5)**	-1.458 (6.7)**	-0.574 (2.4)*	-0.531 (2.4)*	-0.717 (3.2)**	-0.746 (3.3)**	0.377 (2.2)*	0.309 (1.8)
MARRIED	-0.292 (2.2)*	-0.211 (1.7)	-0.145 (0.9)	-0.078 (0.5)	-0.629 (4.1)**	-0.639 (4.3)**	0.130 (1.0)	0.147 (1.1)
SOLEPAR	-0.359 (2.1)*	-0.411 (2.5)*	-0.583 (2.5)*	-0.777 (3.5)**	-1.021 (4.9)**	-0.915 (4.5)**	0.195 (1.2)	0.285 (1.9)
MIXEDF	0.408 (2.9)**	0.556 (4.4)**	-1.587 (4.7)**	-1.429 (4.5)**	0.051 (0.3)	0.024 (0.1)	0.111 (0.7)	0.142 (1.0)
TAKEN	-0.133 (0.7)		0.321 (1.5)		-0.190 (0.9)		-0.113 (0.7)	
HUNTGATH	-0.289 (1.4)		-0.186 (0.7)		-0.721 (2.5)*		-0.159 (0.7)	
INDIGLAN	-0.255 (1.9)		-0.091 (0.6)		-0.300 (1.8)		-0.418 (3.2)**	
VOLWORK	0.483 (3.8)**		0.131 (0.6)		0.525 (3.3)**		0.216 (1.5)	
OTHEREMP	0.617 (5.6)**		1.278 (8.9)**		-0.205 (1.6)		0.052 (0.5)	
OTHERUNE	-0.641 (5.4)**		-1.730 (8.5)**		-0.237 (1.8)		-0.412 (3.8)**	
OTHERARR	-0.180 (1.5)		0.438 (2.9)**		-0.055 (0.4)		0.084 (0.8)	
OTHSCHHI	0.283 (1.9)		-0.120 (0.6)		0.308 (1.9)		-0.013 (0.1)	
PSACCESS	0.099 (0.5)		-0.194 (1.0)		-0.080 (0.3)		-0.442 (2.4)*	
CONSTANT	-0.899 (3.1)**	-0.958 (5.0)**	-2.214 (7.0)**	-2.219 (9.6)**	-0.503 (1.5)	-0.758 (3.6)**	-0.543 (2.0)*	-1.143 (6.1)**
Observations	3861	3966	3861	3966	3861	3966	3861	3966

Notes: Robust z-statistics in parentheses. * significant at 5 level; ** significant at 1 level. The pseudo-R²s are 0.167 and 0.140 for the full and parsimonious models respectively. Other NILF category is used as the omitted category for this multinomial logit regression.

Appendix B. Sensitivity analysis of marginal effects of using the parsimonious specification

Table B1. Sensitivity tests using a parsimonious specification in the regression for indigenous males, 1994

	Labour force			NILF	
	Non-CDEP scheme employed	CDEP scheme employed	Unemployed	Discouraged workers	Other NILF
Torres Strait Islander	-8.6	4.8	7.3	-1.1	-2.4
Demography/geography					
Aged 15 to 24	-13.7	5.1	6.5	3.8	-1.7
Aged 45 to 64	-4.9	-2.4	-10.2	0.4	17.1
Capital city	11.3	-7.1	-4.0	0.8	-0.9
Rural	-7.1	14.2	-8.5	1.4	0.1
Remote	-19.7	35.5	-15.5	2.1	-2.4
Education/skill variables					
Less than six years schooling	-8.8	-0.7	-3.6	0.9	12.2
Year 10 to 11	7.4	0.9	-4.7	-1.5	-2.0
Year 12	14.4	-2.0	-7.6	-2.1	-2.7
Degree/diploma	17.1	-3.1	-5.2	-1.3	-7.6
Vocational qualification	22.3	-4.7	-8.7	-1.6	-7.4
Other qualification	18.8	-4.7	-6.3	-0.6	-7.3
Difficulty with English	-10.8	5.9	0.5	0.7	3.7
Completed training	9.6	-1.6	-0.6	-2.1	-5.3
Socioeconomic status					
Voted	12.2	2.0	-8.5	0.7	-6.3
Health problem	-3.0	-2.9	0.4	1.0	4.6
Arrested	-22.1	3.2	15.3	1.3	2.3
Family					
One child under 12	-2.9	1.7	0.6	0.5	0.1
Two to three children	-5.5	1.5	0.0	1.6	2.3
Four or more children	-13.4	1.7	9.1	1.7	1.0
Married	14.9	1.1	-7.2	-1.7	-7.1
Sole parents	3.3	1.9	-11.3	3.9	2.2
Mixed family	20.6	-9.0	-6.5	-0.6	-4.6
Base probability	48.4	11.5	26.0	3.2	10.9

Notes: The base probabilities in the last row indicate the probability that a reference person is in the various labour force states. The base probabilities and marginal effects differ from those reported in Table 5 because they are based on the coefficients which use a parsimonious specification for the multinomial logit regression (see Appendix A for the full model). That is, it excludes the potentially endogenous variables such as cultural and social environmental factors.

Table B2. Sensitivity tests using a parsimonious specification in the regression for indigenous females, 1994

	Labour force			NILF	
	Non-CDEP scheme employed	CDEP scheme employed	Unemployed	Discouraged workers	Other NILF
Torres Strait Islander	-2.2	-0.2	-2.7	-1.6	6.7
Demography/geography					
Aged 15 to 24	-13.4	0.8	7.8	1.2	3.5
Aged 45 to 64	-7.6	-2.4	-8.4	-4.0	22.4
Capital city	0.4	-5.8	-1.5	7.6	-0.7
Rural	-7.6	9.7	-3.7	-2.9	4.5
Remote	-10.4	26.1	-7.9	-3.9	-4.0
Education/skill variables					
Less than six years schooling	-2.7	-3.4	-3.2	-7.3	16.6
Year 10 to 11	12.0	-0.3	-0.6	-2.0	-9.1
Year 12	27.8	-0.6	-3.3	-5.1	-18.9
Degree/diploma	27.1	1.1	2.3	-8.9	-21.7
Vocational qualification	18.9	-3.8	4.1	-3.5	-15.8
Other qualification	16.5	0.6	2.3	-1.7	-17.7
Difficulty with English	-10.9	3.2	1.8	2.5	3.4
Completed training	18.6	-0.2	8.4	-9.6	-17.2
Socioeconomic status					
Voted	15.1	1.7	-0.1	-3.9	-12.8
Health problem	-3.9	-0.3	1.6	1.2	1.4
Arrested	-14.6	0.4	8.7	1.4	4.2
Family					
One child under 12	-7.5	0.7	-3.4	5.6	4.6
Two to three children	-15.9	-1.0	-4.4	9.7	11.6
Four or more children	-20.7	-1.3	-4.2	12.5	13.6
Married	-1.8	0.5	-7.6	3.7	5.2
Sole parents	-6.3	-3.0	-6.3	8.5	7.1
Mixed family	13.8	-5.3	-1.8	-0.6	-6.1
Base probability	30.4	6.6	12.1	14.4	36.5

Notes: The base probabilities in the last row indicate the probability that a reference person is in the various labour force states. The base probabilities and marginal effects differ from those reported in Table 6 because they are based on the coefficients which use a parsimonious specification for the multinomial logit regression (see Appendix A for the full model). That is, it excludes the potentially endogenous variables such as cultural and social environmental factors.

References

- Agresti, A. 1984. *Analysis of Ordinal Categorical Data*, Wiley, New York.
- Altman, J.C. and Daly, A.E. 1993. 'Do fluctuations in the Australian macroeconomy influence Aboriginal employment status?', in A. Hodgkinson, D. Kelly and N. Verucci (eds) *Responding to Unemployment: Perspectives and Strategies*, Labour Market Analysis Program, University of Wollongong, Wollongong.
- Altman, J.C. and Taylor, L. 1989. *The Economic Viability of Aboriginal Outstations and Homelands*, Australian Government Publishing Service, Canberra.
- Australian Bureau of Statistics (ABS) 1994a. *The Labour Force, Australia*, cat. no. 6203.0, ABS, Canberra.
- Australian Bureau of Statistics (ABS) 1994b. *Persons Not in the Labour Force, Australia*, cat. no. 6220.0, ABS, Canberra.
- Australian Bureau of Statistics (ABS) 1994c. *Transition from Education to Work, Australia*, cat. no. 6227.0, ABS, Canberra.
- Australian Bureau of Statistics (ABS) 1995. *National Aboriginal and Torres Strait Islander Survey 1994: Detailed Findings*, cat. no. 4190, ABS, Canberra.
- Australian Bureau of Statistics/Centre for Aboriginal Economic Policy Research (ABS/CAEPR) 1996. *1994 National Aboriginal and Torres Strait Islander Survey: Employment Outcomes for Indigenous Peoples*, cat. no. 4199.0, ABS, Canberra.
- Australian Bureau of Statistics/Centre for Aboriginal Economic Policy Research (ABS/CAEPR) 1997. *National Aboriginal and Torres Strait Islander Survey 1994: Torres Strait Islanders in Queensland*, cat. no. 4179.3, ABS, Canberra.
- Borland, J. and Hunter, B.H. 1999. 'Does crime affect employment status? The case of indigenous Australians', *Economica*, forthcoming.
- Bowen, W.G. and Finnegan, T.A. 1969. *The Economics of Labour Force Participation*, Princeton University Press, Princeton.
- Clark, K.B. and Summers, L.H. 1980. 'Labour force participation: timing and persistence', in R. Cross (ed.) *Unemployment Hysteresis and the Natural Rate Hypothesis*, Basil Blackwell, Oxford.
- Crawford, D., Pollak, R. and Vella, F. 1998. 'Simple inference in multinomial and ordered logit', *Econometric Reviews*, 17 (3): 289-99.
- Daly, A.E. 1995. *Aboriginal and Torres Strait Islander People in the Australian Labour Market*, cat. no. 6253.0, Australian Bureau of Statistics, Canberra.
- Daly, A.E. and Hunter, B.H. 1999. 'Incentives to work: replacement ratios and the cost of job loss among unemployed indigenous Australians', *Australian Economic Review*, 32 (3): 1-18.
- Department of Employment, Education and Training 1995. *Student Assistance Management Information System*, Commonwealth of Australia, Canberra.
- Finnegan, T.A. 1981. 'Discouraged workers and economic fluctuations', *Industrial and Labour Relations Review*, 35 (1): 88-102.
- Gray, M.C., Hunter, B.H. and Schwab, R.G. 1999. 'Trends in indigenous educational participation and attainment, 1986-96', *Australian Journal of Education*, forthcoming.
- Gray, M.C. and Hunter, B.H. 1999. 'Determinants of employment and labour force participation: a cohort analysis of indigenous and non-indigenous Australians, 1986-96', *CAEPR Discussion Paper No. 186*, Centre for Aboriginal Economic Policy Research, The Australian National University, Canberra.
- Greene, W.H. 1997. *Econometric Analysis*, Prentice Hall, New Jersey.
- Gregory, R.G. 1999. 'Children and the changing labour market: joblessness in families with dependent children', unpublished paper prepared for the conference Labour Market Trends and Family Policies: Implications for Children, Centre for Economic Policy Research, The Australian National University, Canberra.

- Gregory, R.G. and Hunter, B.H. 1996. 'Increasing regional inequality and the decline of manufacturing', in P. Sheehan, B. Grewal and M. Kumnick (eds) *Dialogues on Australia's Future: In Honour of the Late Professor Ronald Henderson*, Centre for Strategic Economic Studies, Melbourne.
- Hosmer, D. and Lemeshow, S. 1989. *Applied Logistic Regression*, Wiley, New York.
- Hunter, B.H. 1999. 'Three nations, not one: indigenous and other Australian poverty', *CAEPR Working Paper No. 1*, Centre for Aboriginal Economic and Policy Research, The Australian National University, Canberra (available on WWW at : <http://online.anu.edu.au/caepr/>).
- Hunter, B.H. and Borland, J. 1997. 'The interrelationships between arrest and employment: more evidence on the social determinants of indigenous employment', *CAEPR Discussion Paper No. 136*, Centre for Aboriginal Economic Policy Research, The Australian National University, Canberra.
- Hunter, B.H. and Gray, M.C. 1998. 'Recent changes in the Australian workforce: a focus on the structure of indigenous employment', *Australian Bulletin of Labour*, 24 (3): 220-40.
- Husmanns, R., Mehran, F. and Verma, V. 1990. *Surveys of Economically Active Population, Employment, Unemployment and Underemployment*, International Labour Organisation, Geneva.
- Killingsworth, M. 1983. *Labor Supply*, Cambridge University Press, Cambridge.
- Kuch, P.J. and Sharir, S. 1978. 'Added and discouraged worker effects in Canada, 1953-74', *Canadian Journal of Economics*, XI (1): 112-20.
- McFadden, D. 1973. 'Conditional logit analysis of qualitative choice behaviour', in P. Zarembka (ed.) *Frontiers in Econometrics*, Academic Press, New York.
- Miller, P. and Volker, P. 1987. 'The youth labour market in Australia', *Economic Record*, 63 (182): 203-19.
- Miller, P.W. 1989. 'The structure of Aboriginal and non-Aboriginal youth unemployment', *Australian Economic Papers*, 28 (5): 39-56.
- Miller, P.W. 1997. 'The burden of unemployment on family units: an overview', *The Australian Economic Review*, 30 (1): 16-30.
- Minister for Aboriginal and Torres Strait Islander Affairs 1998. *Removing the Welfare Shackles: A Discussion Paper on a Reform Initiative for Indigenous Economic Development*, unpublished report, Parliament House, Canberra.
- Riley, J.B. 1994. 'Demographic implications of Aboriginal outmarriage', *Journal of the Australian Population Association*, 11 (2): 149-59.
- Sanders, W. 1993. 'The rise and rise of the CDEP scheme: an Aboriginal 'workfare' program in times of persistent unemployment', *CAEPR Discussion Paper No. 54*, Centre for Aboriginal Economic Policy Research, The Australian National University, Canberra.
- Taylor, J. and Hunter, B.H. 1998. *The Job Still Ahead: Economic Costs of Continuing Indigenous Employment Disparity*, Office of Public Affairs, Aboriginal and Torres Strait Islander Commission, Canberra.
- Teese, R., Charlton, M. and Polesel, J. 1995. 'Aboriginal students in secondary school: a preliminary analysis of learning outcomes and student perceptions of schooling', Educational Outcomes Survey, University of Melbourne, Melbourne.

Notes

1. The economics literature describes this phenomenon as a 'substitution effect' that accompanies a falling expected wage and therefore leads to persons who would otherwise have been in the workforce becoming discouraged. That is, people decide that spending time at home is more productive than spending time in job search.
2. Note that family wellbeing or utility is affected by both consumption and saving.

3. (Killingsworth 1983) describes three kinds of economic models of the relation between family membership and labour supply: the male chauvinist models; the family budget constraint models; and a third set of models which characterise labour supply as a 'game' between family members.

In the male chauvinist models of labour supply, the wife views her husband's earnings as a kind of property income when making labour supply decisions whereas the husband decides solely on the basis of his own wage and the family's actual property income. That is, only the wife's problem is different from the simple model of labour supply.

The second set of models are the family utility or family budget constraint models. In these models the family aims to maximise total family utility which is assumed to depend on total family consumption and on the leisure of each family member. The family is assumed to pool the total earnings (and implicitly consumption spending) so that utility is maximised subject to a family budget constraint. This model broadens the simple framework in a number of respects: there are two substitution effects; the own substitution effect; and the effects on the family members labour supply of an income compensated rise in the wage of some other family members (the cross-substitution effects). If the cross substitution effects are equal, then this model reduces to the simple model.

The third set of models could be called the individual utility, family budget constraint models. These models set up a competitive 'game' between family members with reaction curves. That is, taking the others' behaviour as given, how much labour does each family member need to supply to lead to an equilibrium where all parties supply less labour than they would if they cooperated. There are no intra-family cross substitution effects that arise from the joint utility function. Instead, there are indirect income effects which arise because consumption and earnings are pooled - if the husband's wage rises then this increases the labour supply through his substitution effect and therefore increases the income available for the wife's consumption and if leisure is a normal good then the wife's labour supply is reduced - these indirect income effects need not be equal for husband and wife.

While the three groups of models are theoretically rigorous, they are somewhat unsatisfying in that they do not adequately incorporate the effect of social environmental factors on labour supply and attachment to the labour force. At best they allow only an indirect effect by permitting social factors to affect the individual's or family's preferences for leisure.

4. The official ABS definition also specifies that a discouraged worker must be available to work within four weeks. However, the empirical section of this paper adopts a loose definition of availability that includes all NATSIS respondents who did not answer the question which asked why a person could not start work. If this criteria were used on Tables 1 and 2 a few individuals would be re-classified as non-discouraged workers but the patterns observed remain the same.
5. Another explanation might be that the exigencies of being among the poorest Australians might make it more necessary to work for a living. In economic jargon, this is called an 'income effect' whereby many non-indigenous people choose not to work because they have higher incomes.
6. Possibly because of the prevalence of part-time employment amongst indigenous workers (ABS/CAEPR 1996).
7. The statistics for all Australian students are available for May 1994 whereas the statistics for the indigenous students are for June 1994. This is unlikely to cause significant biases because students do not normally start or finishing studying between May and June.

8. Indeed, the average expenditure on ABSTUDY recipients was actually less than that for AUSTUDY recipients in 1994 (Department of Employment, Education and Training 1995). In future, Dr Kemp claims that 'ABSTUDY benefits payable to Indigenous students will be at the same level as Youth Allowance benefits paid to non-Indigenous students—except in cases where special provision needs to be made to cater effectively for the particular disadvantages faced by many Indigenous students' (Press Release by Minister for Education and Youth Affairs, Parliament House, Canberra, 17 December 1998).
9. It is worth juxtaposing the large number of indigenous students who want a job but are not looking for work with the poor attitudes to school of many students. (Teese, Charlton and Polesel 1995) found that almost 60 per cent of Year 10 Aboriginal students described their school as being a prison. The number of non-Aboriginal Year 10 students who were similarly disaffected was just under 30 per cent. Unfortunately, there is no available data that documents the overlap between attitudes to school and indigenous labour force behaviour.
10. Stealing is a relatively common crime among indigenous youth with 51.4 per cent of the NATSIS respondents aged between 15 and 17 years who had been arrested in the previous five years indicating they had been arrested for theft. Other indigenous adults are far more likely to be arrested for non-violent, alcohol-related offences (Borland and Hunter 1999).
11. The exclusion of students can also be justified on the econometric grounds of possible endogeneity bias. A person may choose to be a student because they cannot find a job and, in fact, have given up looking (that is, are a discouraged worker). Alternatively, it may be hard to find a job because they are a student and hence they give up looking. This potential endogeneity is avoided by excluding students and focusing on the population who are not students. In principle, we would like to analyse the determinants of labour force status and, in particular, of being a discouraged worker for students. Unfortunately, the small sample size of the students in the NATSIS data makes it difficult to construct a valid statistical analysis.
12. A difficulty even acknowledged by the ILO (Husmanns, Mehran and Verma 1990).
13. Given that the coefficients are related to the log-odds ratio that is expressed relative to the probability of being NILF.
14. Ideally, the variable should capture the availability of any childcare, both formal and informal. Unfortunately, NATSIS only included information on the current usage of childcare in the family. It is unacceptable to include current usage as an explanatory variable given that it is clearly endogenous to the labour supply decision. That is, most women who use childcare do so because they either work or want to be available to work.
15. That is, it is unlikely that multicollinearity is a major issue in the regression results.
16. For the remainder of this paper, innovative variables refer to those factors not used in Borland and Hunter's (1999) analysis of the NATSIS.
17. Using the parsimonious rather than the full specification of labour force attachment only results in a significant change in the coefficients for the geographic variables. This indicates that the cultural and social environmental variables may be picking up unmeasured regional factors. For example, regional variation in unemployment and employment (that is, local demand factors) may be reflected in the labour force status of other household members. While employment and unemployment change substantially with a parsimonious specification, there is very little change in regional variation in the number of discouraged workers and labour supply behaviour in general.
18. The choice of the reference person is not without potential difficulties. Crawford, Pollack and Vella (1998) demonstrate that in the multinomial logit model the sign of a marginal effect of a particular variable can change sign for some of the labour force states depending upon the values of the explanatory variables chosen (x vector). This means

that the marginal effects presented in this paper should be interpreted as valid for the characteristics assumed for the base case individual but that some caution should be exercised when generalising these results for every possible set of values for the explanatory variables.

19. This validates their use of this variable in a two-stage estimation of the effect of arrest on non-CDEP scheme employment.
20. Whilst living in a remote area is controlled for in the regression analysis the control does not distinguish between very remote and other remote areas.
21. Note that it is very difficult to separate out the discouraged worker effect and the additional worker effect identified in the conventional economics literature using the NATSIS data. The main problem is that these effects are described in terms of changes over the business cycle. That is, we need to know how both the wages and employment prospects vary over the cycle.
22. While there is a sense in which voluntary work is 'endogenous' to the labour supply decision, there are countervailing factors which mean that voluntary work is not a simple substitute for market work for indigenous people. Unfortunately, it is not possible to develop a statistical model for NATSIS data that identifies whether voluntary work is indeed endogenous to labour supply. Notwithstanding, these results indicate that an elementary labour supply model is too simple and that voluntary work cannot be viewed as simply a use of time that would otherwise be spent on either market work or leisure.
23. See Miller and Volker (1987) and Miller (1989, 1997).
24. Note that the NATSIS data is cross-sectional and therefore does not capture variations in macroeconomic conditions. Therefore, it is not possible to use macroeconomic demand as an explanation of the results for indigenous labour supply and discouraged workers.