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Institutional factors underpinning Indigenous labour force participation: The role of the CDEP scheme and education

B.H. Hunter

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Boyd Hunter is a Fellow at the Centre for Aboriginal Economic Policy Research, The Australian National University.

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Abbreviations and acronyms

ABS	Australian Bureau of Statistics
AGPS	Australian Government Publishing Service
ANU	The Australian National University
ATSIC	Aboriginal and Torres Strait Islander Commission
CAEPR	Centre for Aboriginal Economic Policy Research
CGC	Commonwealth Grants Commission
CDEP	Community Development Employment Projects
NATSIS	National Aboriginal and Torres Strait Islander Survey (1994)
OLS	Ordinary Least Squares
VET	Vocational Education and Training

Summary

Labour force participation and attachment to the labour market is a key determinant of economic well being. It is surprising, therefore, how little analysis there is of Indigenous labour supply. In order to address this omission, data from the 1994 National Aboriginal and Torres Strait Islander Survey (NATSIS) and all the censuses 1981 and 1996 are used to highlight the role of the Community Development Employment Projects (CDEP) scheme in augmenting Indigenous labour supply.

From its humble beginnings in 1977, the CDEP scheme grew slowly at first, before expanding rapidly away from the original strongholds in remote Australia in the mid to late 1980s. Indeed, the scheme more than quadrupled in size between 1986 and 1991. A second, less obvious, internal expansion in the number of CDEP scheme *jobs* occurred as a result of the Spicer review in 1997. Despite this, the CDEP scheme still only provides a small proportion of Indigenous employment in major Australian cities.

Who is employed in the CDEP scheme?

The distinctive characteristics of CDEP workers as a group is driven by the fact that CDEP is a publicly funded employment program that is predominantly located in rural and remote areas. As a program designed in part to overcome labour market disadvantage and the lack of local employment options, the CDEP scheme is directed towards Indigenous people with poor employment prospects, especially low skilled workers, youth, and people who have difficulty in speaking English.

Indigenous underemployment and the CDEP scheme

Alongside the recent national growth in part-time employment, there has been an increase in the proportion of part-time employees who would prefer to work longer hours (the underemployed). Underemployment is particularly common among Indigenous employees, with 19.5 per cent of female workers and 25.3 per cent of male workers indicating they would prefer to work more hours. The extent of Indigenous underemployment is indicated by the fact that the Indigenous underemployed work about 11 hours less per week than Indigenous employees who are unconstrained in the number of hours they work. Not only do the underemployed have difficulty finding enough work, but they were also less likely to be working for continuous periods. These observations are consistent with the underemployed being more likely to be working in any available job—including casual or seasonal jobs—rather than being matched with their optimal job.

CDEP scheme workers are about twice as likely to be underemployed as other Indigenous workers, in both urban and non-urban settings. Nevertheless, many CDEP workers are happy with their part-time status of their employment.

The CDEP and participation rates: A NATSIS-based analysis

A recent Commonwealth Grants Commission Report into Indigenous Funding claimed that the CDEP scheme directly lifts the labour force participation rates in certain remote Aboriginal and Torres Strait Islander Commission (ATSIC) regions to well above the national Indigenous average, with correspondingly lower levels of unemployment. A multivariate analysis of 36 ATSIC regions indicates that the effect of CDEP on participation rates is not as simple as previously thought, with a significant interaction between CDEP and post-secondary qualifications.

The rise of the CDEP scheme and changes in Indigenous labour supply: A census-based analysis

A multivariate analysis of Indigenous and non-Indigenous participation rates in major urban, other urban and rural/remote areas was conducted for males and females in the four censuses between 1981 and 1996, with the following results.

- The changes in Indigenous labour force participation rates are larger than could be explained by the changes in labour supply in the rest of the population. The main changes in Indigenous participation occur in areas where the CDEP scheme has expanded dramatically.

- The numbers of people who stayed at school increased for both Indigenous and non-Indigenous populations between 1981 and 1996, with most of the change arising from a decline in the number who left school before 14 years of age.
- Outside the major metropolitan areas, the effect of the growth of the CDEP scheme on Indigenous labour supply is prominent, especially in the education variables. The effect of early school leaving on participation has converged for the Indigenous and non-Indigenous populations—probably as a direct result of the CDEP scheme enhancing the engagement of previously excluded groups, such as those with low skill levels.

Concluding remarks

This analysis supports the hypothesis that the CDEP scheme enhances Indigenous labour force participation. The interaction between education and overall labour supply is one of the main factors underlying the significant increase in the Indigenous participation rates relative to those for other Australians. The CDEP scheme appears to overcome established barriers to Indigenous labour force participation by providing work managed by, and on behalf of, the local community.

A second order implication of the above analysis is that the CDEP scheme tends to hide a high level of underemployment among Indigenous Australians. However, while the CDEP scheme is reducing the incidence of exclusion from the labour force, it is limited in the extent to which this can be achieved by expanding the scheme. That is, the CDEP scheme does not, and probably cannot, provide the number of hours work desired by all participants. In order to achieve this, the CDEP scheme guidelines, rules and funding would need to be more flexible. For example, if CDEP schemes engaged in entrepreneurial activities that top-up funds, they would be able to employ more productive workers for longer hours.

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Introduction

It is widely accepted that labour force participation and attachment to the labour market is a key determinant of economic well being. It is surprising, therefore, how little analysis there is of Indigenous labour supply. One of the main constraints is the complexities of the institutional background (including the Community Development Employment Projects (CDEP) scheme) and the lack of adequate data to identify the main issues involved.[1] A comprehensive account of the labour force status of Indigenous people is reported only every five years under the Australian Bureau of Statistics' (ABS) Census of Population and Housing. Periodic ABS surveys also add to the series of data available, for example the 1994 National Aboriginal and Torres Strait Islander Survey (NATSIS).

One of the first empirical studies of Indigenous Australian labour force status was conducted by Daly (1995). She 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 (2000) 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. Borland and Hunter conclude that the general significance of these socio-cultural indicators means that labour economists should consider controlling for such factors where possible.

Hunter and Gray (2001b) augments the earlier research with a renewed focus on the family and social factors underlying Indigenous attachment to the labour market using NATSIS data. The effect of social environmental factors on labour supply is indicated primarily through the presence of other adults who are either employed or unemployed. Cultural factors are again found to be particularly important in determining Indigenous labour supply with the variables that capture access to traditional lifestyles (e.g. whether a respondent speaks an Indigenous language or engages in hunting and gathering) being 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. Of particular interest in the context of the current paper is that Indigenous 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. This offsets the greater non-CDEP scheme labour market opportunities in other urban and major urban areas.

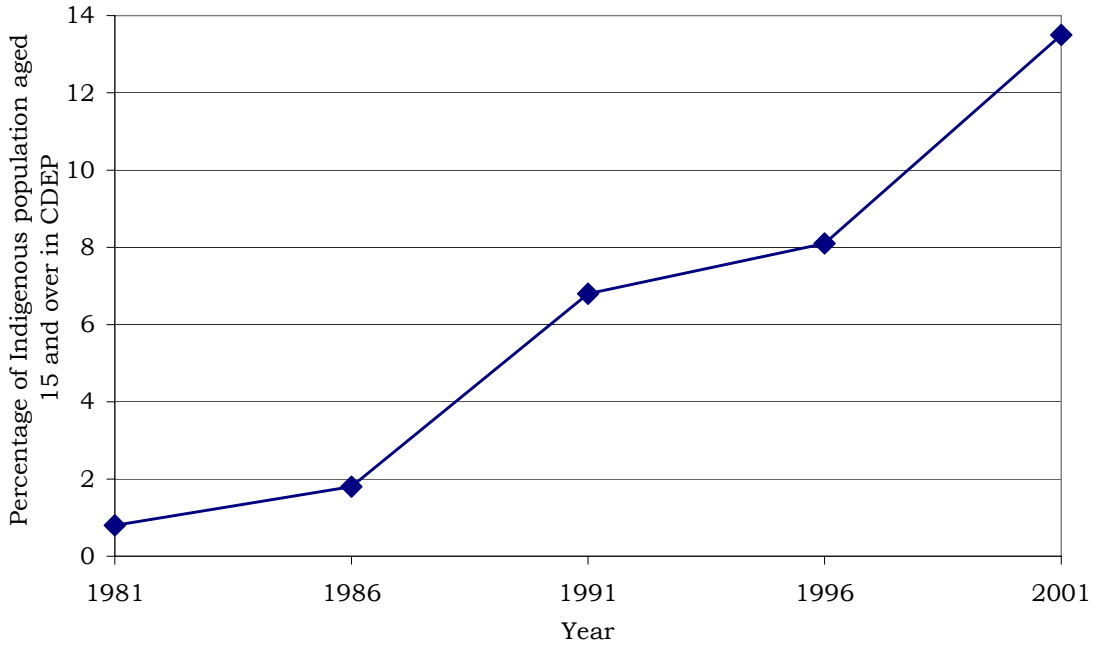
The recent Commonwealth Grants Commission (CGC) Report into Indigenous Funding claimed that, in the remote Aboriginal and Torres Strait Islander Commission (ATSIC) regions of Cooktown, Kununurra, Derby and Ceduna, the CDEP scheme lifts the labour force participation rates to well above the national Indigenous average, with correspondingly lower levels of unemployment (CGC 2001b: 335). Unfortunately, while this is a reasonable proposition, it has yet to be formally tested.

This paper seeks to redress this omission in the literature firstly, by using NATSIS data to explore some subtle attitudinal dimensions of labour supply, and secondly, by exploiting the differential nature of the expansion of the scheme to indirectly identify how this affects Indigenous labour supply in non-urban areas. While this mode of analysis is somewhat indirect, there is no alternative as the CDEP scheme is, by definition (i.e. the official definition), employment, and hence is an indication that a person is supplying their labour. An alternative regional analysis is also conducted in order to identify whether the CGC observation that CDEP increases participation rates in certain ATSIC regions is valid. Obviously other things differ between areas, but we should still expect a gradation of effects between remote areas and cities with the effect being most pronounced in areas where the CDEP scheme provides an effective substitute for deficiencies in the mainstream local labour market.

The rise of the CDEP scheme

The CDEP scheme was introduced on a small pilot scale by the Fraser Coalition Government in 1977 in response to the spread of Unemployment Benefit payments into remote Indigenous communities (Sanders 1997). In the early 1980s, the 'teething' problems with the scheme were, to some extent, addressed and the scheme began expanding quite rapidly (see Fig. 1).[2] By 2000–01, the scheme expanded to 35,400 participants and now accounts for 38.3 per cent of the ATSIC budget.

Fig. 1. The rise and rise of the CDEP scheme



Source: Hunter (2002).

From its humble beginnings in 1977, the CDEP scheme grew slowly at first, before expanding rapidly in the mid to late 1980s away from the original strongholds in remote Australia (Sanders 1997). Indeed, the scheme more than quadrupled in size between 1986 and 1991. The second major expansion in the number of CDEP scheme jobs occurred as a result of the Spicer review in 1997. This second phase of growth has been characterised as an 'internal expansion' whereby scheme participants were increasingly expected to work for their benefit entitlement (Sanders 2001a).

One of the motivations of this paper is to explore the factors underlying Indigenous labour force participation rates using the fact that the expansion of the CDEP scheme has been uneven throughout Australia, with urban areas having relatively few participants until recently. The most recent ATSIC data shows that there are still only just over 1,000 CDEP participants in major urban areas (defined as either capital cities or other urban area with more than 100,000 residents). However, about half of these work in the Perth CDEP scheme, PEEDAC Pty Ltd, which was established on 6 July 1997—almost a year after the 1996 census was collected (Humphries 2001: 227–9).

In order to simplify the interpretation of results in major urban areas, it is reasonable to assume that the CDEP scheme will not affect the census analysis of the factors underlying Indigenous participation rates in such areas between 1981 and 1996. However, before focusing on census data, it would be useful to reflect on how the CDEP scheme might affect the factors underlying Indigenous labour force participation. The 1994 NATSIS provides the best data for this as it is the only individual level data that accurately distinguishes those employed in the CDEP scheme from other workers.

Method and data

In order to understand the effect of the expansion of the CDEP scheme, it is necessary to analyse who is employed in the scheme. The next section uses unit record data from the 1994 NATSIS to determine the characteristics associated with the scheme.[3] As indicated above, the NATSIS is a rich data set that permits insights into subtle aspects of Indigenous labour supply, such as the attitudes of various Indigenous workers to their employment. The next section presents a brief overview of Hunter's (2002) description of the average CDEP scheme participant, because the reference person for the calculated marginal effects is a hypothetical Indigenous person whose characteristics are equal to the population average. This is followed by some qualitative analysis of Indigenous underemployment (especially that associated to the CDEP scheme), and a regional analysis of the effect of CDEP scheme employment on labour force participation in ATSIC regions.

The analysis of ATSIC regions allows us to construct a direct measure of effect of CDEP on participation rates. Unfortunately, the relatively small number of ATSIC regions reduces the effectiveness of the analysis. Consequently, this NATSIS-based regional analysis is supplemented by census analysis of individual labour force participation. The census-based analysis uses the full counts from the 1981, 1986, 1991 and 1996 Censuses to identify the factors underlying the labour force participation by section-of-state for Indigenous and non-Indigenous males and females. The non-Indigenous results are provided as a benchmark for what happened in the rest of the respective labour markets. While the individual level analysis has the advantage that it is based on a large amount of data, it can only be used to indirectly examine the role of the CDEP scheme because of incomplete information about the scheme on the census files. In spite of these limitations, if the results of the NATSIS and census analysis are taken together, they provide convincing evidence of the interaction between education and the scheme in enhancing Indigenous participation rates.

The ABS provided the census data in a series of detailed, confidentialised cross-tabulations, which were used to construct a multivariate analysis of the determinants of participation rates. The grouped nature of data means that the dependent variables are a proportion of a group that participate in the labour market. Given that the dependent variables are bounded between the values of zero and one, the standard Ordinary Least Squares (OLS) estimation is also inappropriate. The solution adopted in this paper is to transform the dependent variables using a logistic transformation, and then perform a weighted OLS analysis on the transformed data. Details of the estimation method are presented in Appendix A.

The validity of intercensal comparisons of Indigenous labour market outcomes depend, in part, upon who identified as Indigenous in the 1996 Census, but did not in previous censuses. If the people who currently identify as Indigenous but did not do so in past censuses are radically different from those who have continuously identified, then we must question the validity of census-based comparisons of changes in the socioeconomic status of Indigenous Australians. However, Hunter (1998) has shown that the demographic characteristics of the Indigenous population (and cohorts) have not changed significantly over time and, therefore, it is possible to dismiss false claims about identification by non-Indigenous people as a major factor underlying the apparent large non-biological increases in the Indigenous population. While the evidence needs to be revisited following the substantial increase in the Indigenous population between the last two censuses, the extant analysis points to Indigenous people becoming increasingly willing to identify themselves in census enumerations, and thus inter-censal comparisons are valid.

The explanators of labour force status are similar to those used in other studies (Daly 1993; Hunter 2002; Miller 1989, 1991). The variables used in the empirical analysis include: having a post-secondary qualification; age left secondary school; English difficulty; being divorced, widowed or separated; being married (including de facto); and, of course, age (measured in broad ten-year age groups). Detailed descriptions of the construction of these variables can be found in Hunter and Gray (1998), Gray, Hunter and Schwab (2000) and Hunter and Gray (2001a). Summary statistics can be found in Hunter (2002).

One important determinant of labour supply, especially for females, is the presence of children in a family. Unfortunately, it was not possible to control for children because the process of confidentialising the data would make analysis rather intractable. Also, while data on children can be provided at a household or family level, it is not obvious how such data can easily be integrated into the cross-tabulations based on individual level data.

The analysis of the full census file at a sub-national level was facilitated by only using the broadest categories for the variables in the specification. This compromise was necessary, but reduced the possible insights from the following analysis. For example, the educational qualification variable is a crude measure which includes any post-secondary qualification. However, this may also be characterised as a strength in that the 'qualification inflation' of the late 1980s and early 1990s, sometimes associated with the Dawkins reforms, should not affect the results.

Another issue that may complicate the interpretation of the differences between Indigenous and non-Indigenous results is selective migration (i.e. the idea that people with particular characteristics are more likely to move than others). For example, it has been observed that the overall patterns of net migration in remote areas correlate highly with employment trends (Bell & Maher 1995). Also, youth are more likely to change locations between censuses than older Australians. By contrast, Indigenous people reside in remote areas in spite of their employment status (Taylor 1997). That is, the Indigenous results will correspond to a similar population in all four censuses, while the non-Indigenous may be more responsive to labour market conditions. The use of broad categories of areas will minimise possible distortions because many moves will be within a category. While there may be an effect arising from selective migration, it would probably be too subtle to identify in the following analysis.

Who is employed in the CDEP scheme?

A multivariate (logistic) regression analysis was conducted in Hunter (2002) to determine the characteristics associated with the scheme after controlling for other factors that economic theory suggests will determine labour force participation. Not surprisingly, the analysis revealed that the CDEP scheme is heavily concentrated in rural and remote areas. However, unlike other forms of employment, the scheme is only weakly, or even negatively, correlated with the standard factors used to explain labour force status. Indeed, having a post-secondary qualification actually reduces the probability of Indigenous males being employed in the CDEP scheme by 5.3 percentage points. In contrast, people with qualifications are about 20 percentage point more likely to be in other types of employment. Similarly, leaving school before age 14 is not significantly related to having a CDEP scheme job, but is strongly negatively associated with other Indigenous employment.

The distinct nature of CDEP work is driven by the fact that it is a publicly funded employment program that is predominantly located in rural and remote areas. Consequently, it should not be surprising that difficulty in speaking English is positively associated with CDEP scheme employment. This observation is no doubt explained by the fact that a lack of proficiency in speaking English is more likely to be associated with remote Indigenous communities. As a program designed in part to overcome labour market disadvantage and the lack of local employment options, the CDEP scheme is directed towards people with poor employment prospects.

It is particularly noteworthy that the age profile of CDEP scheme workers is flatter than the profile of other Indigenous workers. Indigenous youth are much more likely to be employed in the scheme than in the mainstream labour market. While the positive side of this is that it directly addresses the historical fact of the social exclusion of Indigenous people from the labour market, it is possible that the CDEP scheme is being used as a preferable option to completing school. This has important policy implications which are explored in detail in Hunter (2002). The concluding section will revisit this debate.

Indigenous underemployment and the CDEP scheme

In aggregate, there has been strong and steady growth in part-time employment for both men and women in Australia since the mid 1960s (McClure 2000). Alongside the growth in part-time employment, there has been an increase in the proportion of part-time employees who would prefer to work longer hours (the 'underemployed'). This proportion increased over the 1980s and 1990s, particularly for men.

One important cost of the high and persistent Indigenous unemployment rate has been the widespread incidence of underemployment in the Indigenous workforce (Hunter & Taylor 2002). Table 1 shows that underemployment is common among Indigenous employees, with 19.5 per cent of female workers and 25.3 per cent of male workers indicating they would prefer to work more hours. The extent of Indigenous underemployment is indicated by the fact that the Indigenous underemployed work about 11 hours per week less than Indigenous employees who are unconstrained in the number of hours they work. Further evidence of the weak demand for Indigenous workers is that the Indigenous underemployed work about one month less per year on average than other Indigenous workers. That is, not only did the underemployed have difficulty finding enough work at the time of the survey but they were also less likely to be working for the whole 12 months. This observation is consistent with the underemployed being more likely to be working in any available job—including casual or seasonal jobs—rather than being matched with their optimal job.

Table 1. Intensity of Indigenous work by underemployment, 1994

	Not constrained in number of hours worked	Wants more hours work (i.e. underemployed)
Females		
Number of hours worked in previous week	31.0	19.5
Number of months worked in previous year	9.8	8.9
Total number of Indigenous workers	18,600	6,700
Males		
Number of hours worked in previous week	36.1	25.3
Number of months worked in previous year	10.3	9.6
Total number of Indigenous workers	28,500	11,300

Notes: Unpublished NATSIS data. Estimates are weighted to provide population estimates.
Source: Hunter and Taylor (2002).

Underemployment is less prevalent in the rest of the Australian workforce. For example, in September 1998, there were around half a million underemployed Australians, out of a total workforce of approximately 8.6 million. Between them, the underemployed were willing to supply an estimated 7.6 million hours of additional labour each week (ABS 1998). That is, on average, Australian underemployed workers each want more than 15 hours extra work per week.

Unlike the Labour Force Survey, the NATSIS does not provide any information on the number of extra hours that the Indigenous underemployed want to work.[4] However, given that the difference between the actual number of hours worked by such workers and hours worked by other Indigenous workers is less than 15 hours per week (i.e. the estimated intensity of underemployment in ABS 1998), the above estimate of Indigenous underemployment appears to provide a conservative calculation of the number of work hours lost.

Underemployment is not only about the limited number of hours worked. It also involves financial stress (i.e. arising from low wages and poor access to jobs). Preferences to supply extra labour are derived from the need to greater financial security. The wages per hour are similar for both groups of workers, but the number of months worked per annum combines with the weekly hours worked to result in an annual wage income not much higher than welfare income (Hunter & Taylor 2002). One reason for this may be that the underemployed

are all in the CDEP scheme. However, while it is true that CDEP scheme workers are more than two times as likely to be underemployed (50.0% as opposed to 19.7%), there are still substantial numbers of underemployed outside the scheme.

Table 2. Indigenous underemployment by CDEP status, 1994

	CDEP (% underemployed)	Non-CDEP (% underemployed)
Sex		
Females	41.9	22.2
Males	53.7	18.0
Geography		
Urban	53.1	19.5
Rural/remote	48.6	20.4
Total workforce	50.0	19.7

Source: Unpublished NATSIS cross-tabulations.

While females in the CDEP scheme are clearly more likely to be underemployed than other female Indigenous workers (41.9% and 22.2% respectively), they were also over 50 per cent more likely to be employed part-time. Many CDEP workers are happy with the part-time status of their employment: 43.1 per cent of part-time workers employed in the scheme indicate they do not want to work longer hours.

For males employed in the scheme, underemployment was more pronounced than for other Indigenous male workers (53.7% and 18.0% respectively). The observation that people employed in the CDEP scheme are about twice as likely to be underemployed as other Indigenous workers is valid in both urban and non-urban settings. Consequently, it is safe to assume that this observation is not dependant upon local labour market conditions.

A greater insight into the extent of the constraint on Indigenous labour supply is provided in Table 3, which describes the number of hours worked and months worked by CDEP and underemployment status. While the previous table shows the incidence of underemployment in the CDEP, the extent of the problems can be better illustrated by analysing the actual number of hours worked last week and number of months worked in the last year.

Table 3. Intensity of Indigenous work by CDEP and underemployment status, 1994

	CDEP		Non-CDEP	
	Not constrained in number of hours worked	Wants more hours work (i.e. underemployed)	Not constrained in number of hours worked	Wants more hours work (i.e. underemployed)
Female				
Hours worked	24.0	22.3	32.4	18.1
Number of months worked in previous year	9.9	9.8	9.8	8.4
Number of workers	3,030	2,180	15,330	4,380
Male				
Hours worked	27.7	22.8	40.1	32.5
Number of months worked in previous year	10.4	9.7	10.2	9.1
Number of workers	5,300	6,170	22,680	4,980

Note: The estimates are population (weighted) estimates.
Source: Unpublished NATSIS cross-tabulations.

The extent of Indigenous female underemployment in non-CDEP female employment is indicated by the fact that they work about 14 hours per week less than females who are unconstrained in the number of hours they work. Further evidence of the weak demand for

Indigenous females is that the female underemployed work on average about one-and-a-half months less per year than other Indigenous workers, outside the CDEP scheme. Again, not only did the underemployed have difficulty finding enough work at the time of the survey but they were also less likely to be working for the whole 12 months. Similar observations can be made for males not working in the CDEP scheme, albeit smaller in magnitude than that of analogous females. Taken together these observations indicate that the underemployed are more likely to be working in any available job—including casual or seasonal jobs—rather than being matched with their optimal job.

The situation is somewhat different among CDEP scheme workers, who are largely limited in the number of hours worked by institutional factors. However, even among CDEP scheme workers there are differences in the number of hours and months worked between the underemployed and those who are unconstrained in their labour supply. For example, female CDEP scheme employees who are underemployed work a little over one-and-a-half hours more than other females employed in the scheme. In contrast to the result for non-CDEP scheme workers, the difference in the number of hours worked between the underemployed males and other males employed in the CDEP scheme is greater than that for females in the scheme. The likely explanation for this is that the dissatisfaction of the underemployed is driven by the difference between hours worked and Indigenous community/societal norms. Therefore, given that underemployed male CDEP scheme workers work substantially fewer hours than other underemployed, and that underemployed female CDEP scheme employees work longer hours than other underemployed females, one might expect the males to be more disgruntled than females.

However, CDEP scheme workers are better off in terms of the number of months worked with underemployed female workers in the scheme actually working, on average, the same numbers of months as non-CDEP Indigenous female workers who do not indicate they are constrained in the number of hours worked per week.

If underemployment is a result of community norms, and the CDEP scheme dominates the local labour market for Indigenous people, then the extent of underemployment may be overstated by focusing only on the incidence of those who indicate they want to work more hours. It is clearly important to separately analyse the CDEP scheme when trying to understand the labour supply of Indigenous Australians.

The CDEP, education, and participation rates: A NATSIS-based analysis

As indicated above, the CGC's (2001b: 335) observation about the role of CDEP in lifting Indigenous labour force participation rates in the remote ATSIC regions is intuitively appealing, but has yet to be tested. This section constructs a simple empirical test of the proposition using data on the 36 ATSIC regions from the 1994 NATSIS and the 1996 Census (see Table 4). A multivariate regression technique (OLS) is used to model Indigenous participation rates because the pattern of statistical significance of CDEP is probably more subtle than indicated by the CGC. In addition to the proportion of the population employed in the CDEP scheme, a proxy for employment demand and the proportion of the adult population with post-secondary qualifications were included to control for the standard factors that underpin labour supply (Hunter & Gray 2001b). Employment demand, which is captured by the regional employment/population ratio, is derived for all adult residents of an ATSIC region (both Indigenous and non-Indigenous) from the 1996 Census. The other two regressors are based on the NATSIS data.

Interpretation is facilitated by couching the following discussion in terms of the per cent increase in participation arising from a 10 per cent increase in CDEP or other relevant variables (i.e. using the economic concept of elasticities). Given that this involves a transformation of the coefficients in Table 4, readers should mainly focus on the pattern of significance of the coefficients (denoted by an asterisk).

Table 4. The role of CDEP in augmenting Indigenous labour force participation rates, 1994

	Dependant variable: participation rates in ATSIC regions			
	Model (1)	Model (2)	Model (3)	Model (4)
CDEP employment/ population ratio	0.202 (0.092)*	0.204 (0.089)*	0.077 (0.095)	
Post-secondary qualification	0.471 (0.220)*	0.463 (0.215)*		0.312 (0.195)
Regional employment/ population ratio	0.160 (0.268)			
Constant	39.741 (18.036)*	48.595 (4.764)**	57.724 (1.462)**	53.058 (4.006)**
R-squared	0.212	0.200	0.017	0.104

Notes: These OLS regressions are based on weighted data for the 36 ATSIC regions from the 1994 NATSIS and the 1996 Census. Robust standard errors in parentheses because heteroscedasticity was identified as a significant issue in all regressions. * significant at 5% level; ** significant at 1% level.

The relatively small number of ATSIC regions makes it difficult to discern a significant relationship between the various factors. Indeed, neither the CDEP scheme nor educational qualifications has a significant effect on participation rates by themselves (see specifications 3 and 4 respectively). However, if the CDEP scheme increases labour supply in remote rural areas where educational attainment is low (Hunter 2002), then the absence of a relationship is to be expected as the respective factors off-set one another. Specifications 1 and 2, which combine these two variables, illustrate that both of these factors are in fact significant and have the sort of effect predicted by the CGC and others (Hunter 2000a; CGC 2001b: 335).

The first specification also includes a measure of the total number jobs in a regions (i.e. normalised by dividing by the overall population) to control for labour demand. While we have reason to believe that buoyant regional labour markets tend to augment Indigenous labour supply (Hunter 2000a), there is no significant evidence of its effect in this data. As indicated above, the relatively small number of ATSIC regions reduces the power of the analysis. A second reason is that the total number of jobs will be an inadequate measure of the demand for Indigenous workers if there is a mismatch of skill of such workers and the demands of local employers, or if Indigenous workers tend to be employed in different industries and occupations from other workers residing in the region (Taylor 1993; Taylor 1994).

If the second specification is examined to exclude insignificant variables, then the effect of CDEP is much smaller than the effect of educational attainment.[5] For example, a 10 per cent increase in the Indigenous adults employed in the scheme increases the participation rates by 0.3 per cent. In contrast, a 10 per cent increase in the proportion of Indigenous adults with a post-secondary qualification increases regional participation rates by about 1.4 per cent.

These findings show that the effect of CDEP on participation rates is not as simple as previous studies indicated (Altman, Gray & Sanders 2000; CGC 2001a). Such studies emphasise the direct movement of some CDEP participants from outside the labour market into the labour force. In contrast, the above result implies that CDEP jobs are a substitute for the poor job prospects of low skilled Indigenous workers in a region.

It is not difficult to reconcile the above analysis with previous studies. For example, Altman, Gray and Sanders (2000) use a partial framework which compares the participation rates of communities with the CDEP scheme to those in communities without the scheme. Therefore if CDEP schemes tend to be located in areas where educational attainment is particularly poor, all else being held equal, then there is plenty of scope for an interaction between post-secondary qualifications and overall scheme employment in enhancing Indigenous labour force participation. Alternatively, the minor dissonance between these studies is driven by the level of aggregation, with this study focusing on the average effect in ATSIC regions rather than the effect in remote communities.

In summary, variations in the location of CDEP employment are less likely to affect labour supply than are increases in educational qualifications of Indigenous people. However, it is much easier to augment employment through the CDEP scheme rather than raise the average level of educational qualifications. This point is underscored by the difficulty in improving Indigenous educational attainment relative to the rest of the Australian population (Gray, Hunter & Schwab 2000). Consequently, the CDEP scheme may be seen as a good short run option for ensuring Indigenous people fully participate in the Australian labour market. In the long run, such policy may be less effective, especially if it ignores the need for educational outcomes of Indigenous Australians to be addressed.

The rise of the CDEP scheme and changes in Indigenous labour force participation: A census-based analysis

We have good reason to suppose that the above results for ATSIC regions will be replicated when analysing individual data from 1996 major urban, other urban and rural/remote areas for the four censuses between 1981 and 1996. For example, Hunter (2002) demonstrates that employment and participation rates in major urban areas, which was largely untouched by the CDEP scheme in 1996, follow similar paths for Indigenous and non-Indigenous population. Irrespective of whether a person is Indigenous or not, males tend to participate less, and females experience an increase in 'labour supply' through time. However, in rural and remote areas where the expansion of the CDEP scheme has been most pronounced, participation rates of Indigenous males increased substantially between 1981 and 1996. This section explores this stylised fact by documenting the factors underlying Indigenous and non-Indigenous labour force participation using the same data and statistical models as in Hunter (2002). The only substantive difference between this paper and the previous paper is that the empirical focus is on explaining participation rates rather than employment probabilities. Consequently, the multivariate analysis is also based on the standard logistic regression model, which is estimated separately for males and females in major urban areas, other urban areas, and rural and remote areas. Note that the geographic classification is based on the standard ABS categories (section-of-state), and that the analysis is, of course, also conducted separately for the Indigenous and non-Indigenous populations.

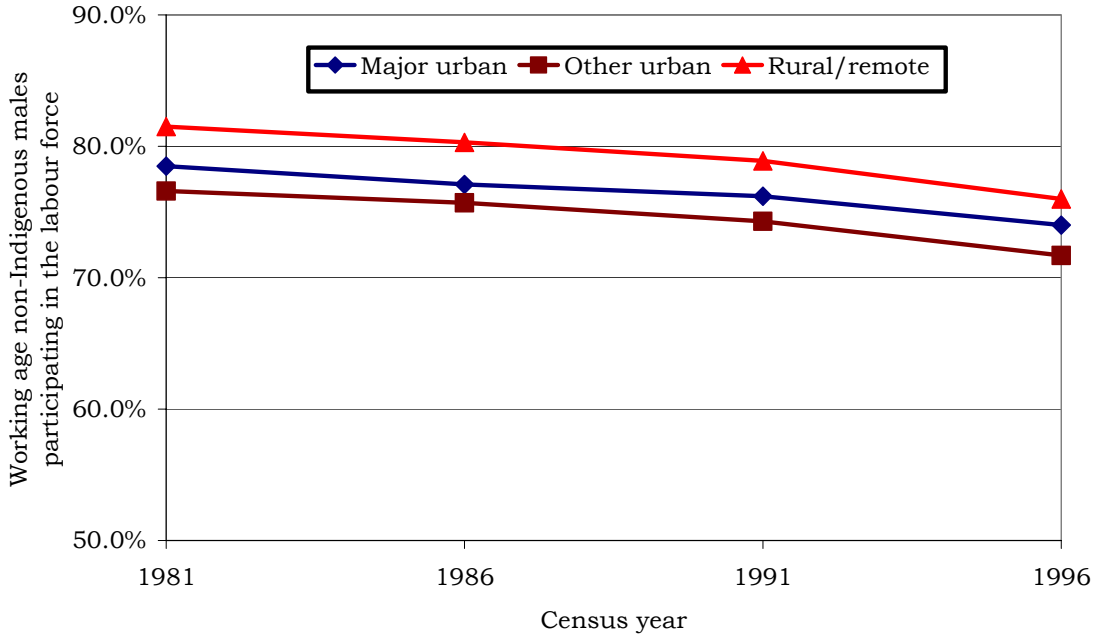
Trends in labour force participation by section-of-state

The overall trends in Indigenous and non-Indigenous participation rates show that any effect of the presence of a CDEP scheme on labour supply is not as direct as it was for Indigenous employment (which closely tracked the growth of the scheme—see Hunter 2002 detailed analysis). Overall the net trends in labour force participation are not dissimilar, with male rates tending to decline in the long run and female participation tending to rise (see Fig. 2 to Fig. 5). The obvious difference between the two populations is that Indigenous people are less likely to be participating in the labour market than their non-Indigenous counterparts.

The changes in Indigenous participation rates are higher than could be explained by the secular changes in labour supply in the rest of the population. While this observation is valid for major urban areas (albeit to a much lesser extent), the main differences occur in areas where the CDEP has expanded dramatically. For example, Indigenous male participation rates in rural and remote areas actually increased, especially with the initial expansion of the scheme between 1981 and 1986. Since 1986, the male participation has declined slightly, but still remains higher than the rate in 1981.

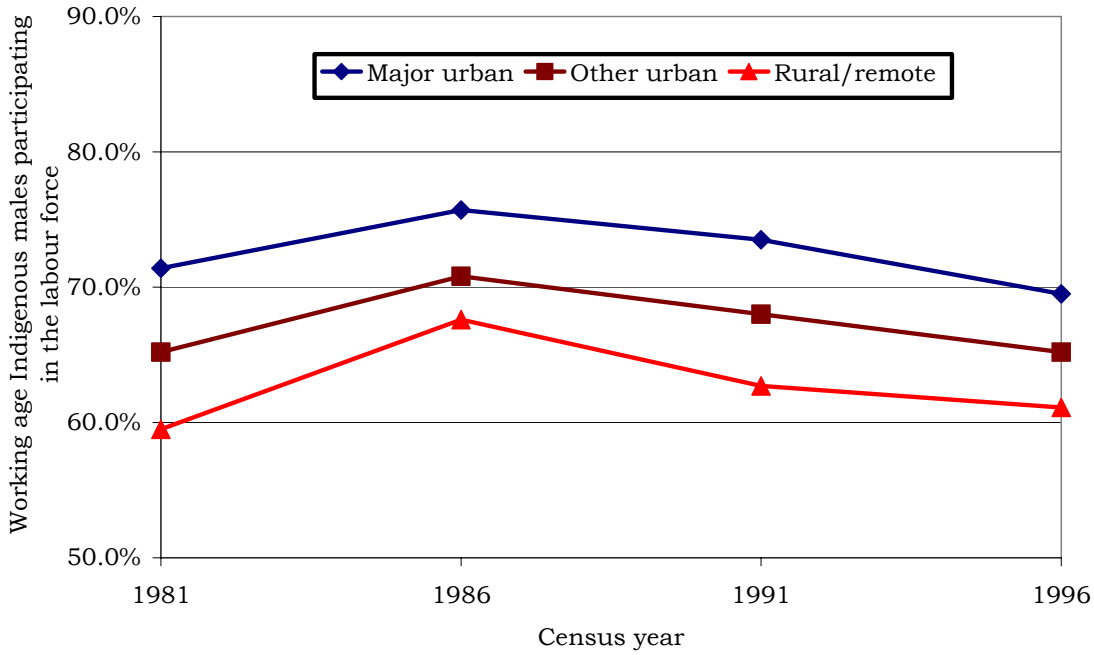
For females in rural and remote areas, the increase in labour force participation is much stronger for Indigenous females for whom the rates increased from 28.6 per cent to 40.3 per cent of the working-age population. While non-Indigenous females in such areas followed the national trends towards higher engagement with the labour market, driven largely by the growth in the number of part-time jobs and secular changes in family formation and attitudes of women to 'paid' work, the size of the increase was much smaller than that observed for Indigenous females.

Fig. 2. Non-Indigenous male participation rates by section-of-state, 1981–96



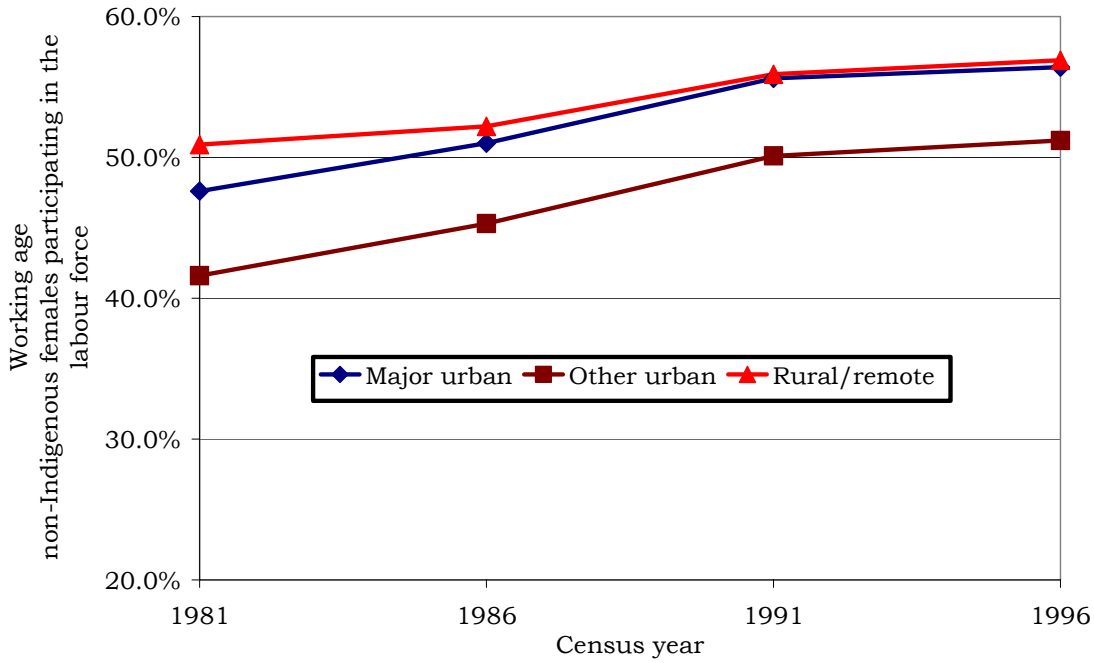
Source: Hunter (2002).

Fig. 3. Indigenous male participation rates by section-of-state, 1981–96



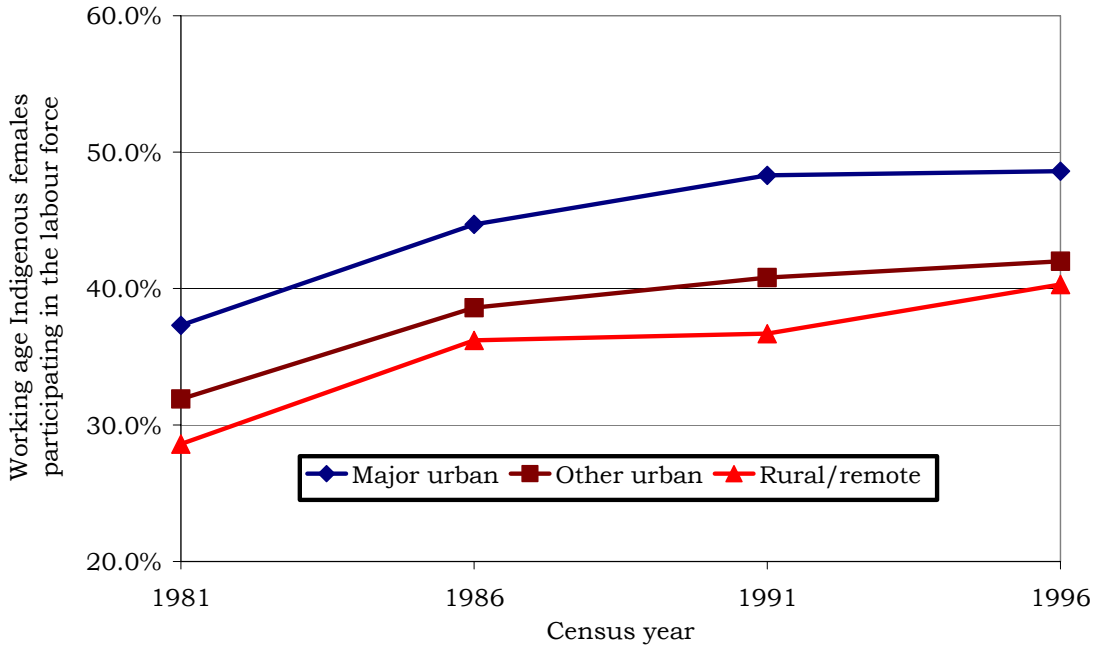
Source: Hunter (2002).

Fig. 4. Non-Indigenous female participation rates by section-of-state, 1981–96



Source: Hunter (2002).

Fig. 5. Indigenous female participation rates by section-of-state, 1981–96



Source: Hunter (2002).

The other observation about these figures is that Indigenous participation rates are relatively high in 1986 (especially compared to 1981), just before the CDEP scheme took off in rural/remote areas, and eventually other urban areas. The fact that this observation is replicated for all three types of areas means that these relatively high participation rates are not driven solely by the CDEP scheme's growth, which is concentrated outside Australian cities. One possible explanation for the 1986 results might be that macroeconomic conditions were relatively strong in that year. That is, because there are a disproportionate number of Indigenous people who are discouraged workers or otherwise marginally

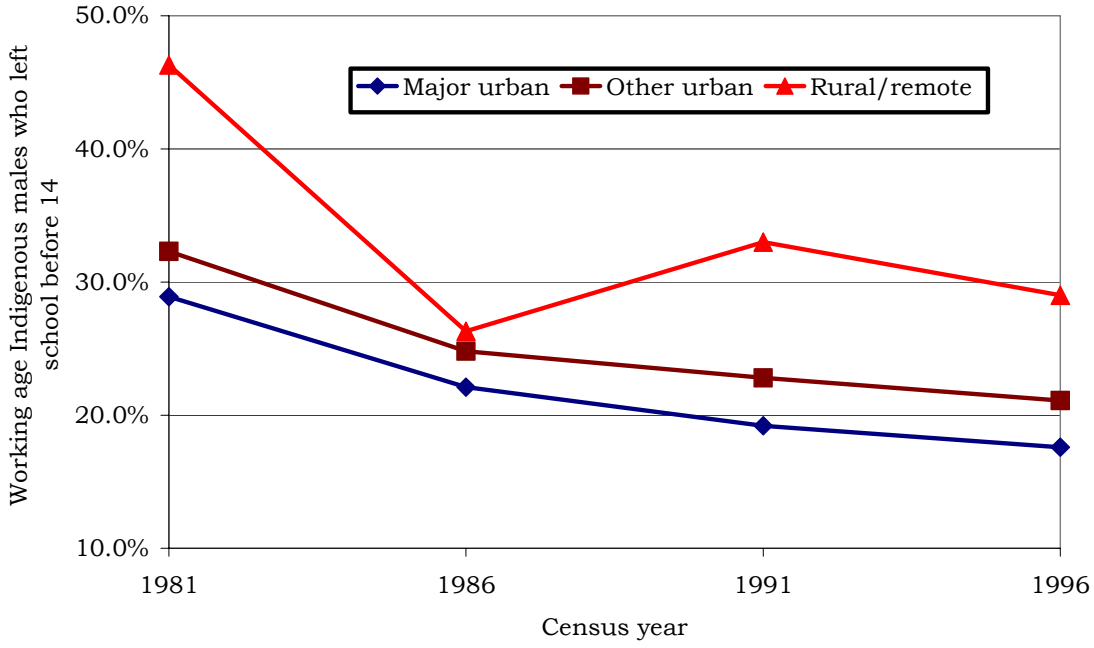
attached to the labour market, economic upturns are more likely to enhance Indigenous labour force participation rates (Hunter & Gray 2001b).

Taken together, these figures show that the effect of the presence of a CDEP scheme on Indigenous labour force participation is not direct, and is probably very subtle. The above analysis of ATSIC regions suggests that the CDEP scheme effect is an interaction between education and the Indigenous labour market. The following section summarises the main trend in educational attainment by section-of-state with reference to the change in the proportion of adults who left secondary school early.

Trends in educational attainment by section-of-state

The numbers of people who left school early fell for both Indigenous and non-Indigenous populations between 1981 and 1996, with most of the change being focused in the people who left school before 14 years of age. In major urban areas, the proportion of Indigenous working-age males who left before age 14 fell by 11.3 percentage points from 28.9 to 17.6 per cent. For non-Indigenous males in such areas, there was a similar decline from 23.9 to 13.5 per cent between 1981 and 1996. Given that similar changes were noted in the female statistics, the results are remarkably similar for Indigenous and non-Indigenous Australians. The proportion of females who left school at either 15 or 16 years of age in major urban areas also fell by a similar amount, albeit smaller in magnitude (about 5 percentage points). However, one difference was that the Indigenous population tended to be about 15 per cent more likely to have left school just before completing secondary schooling.

Fig. 6. Working-age Indigenous males who left school before 14 years of age by section-of-state, 1981–96

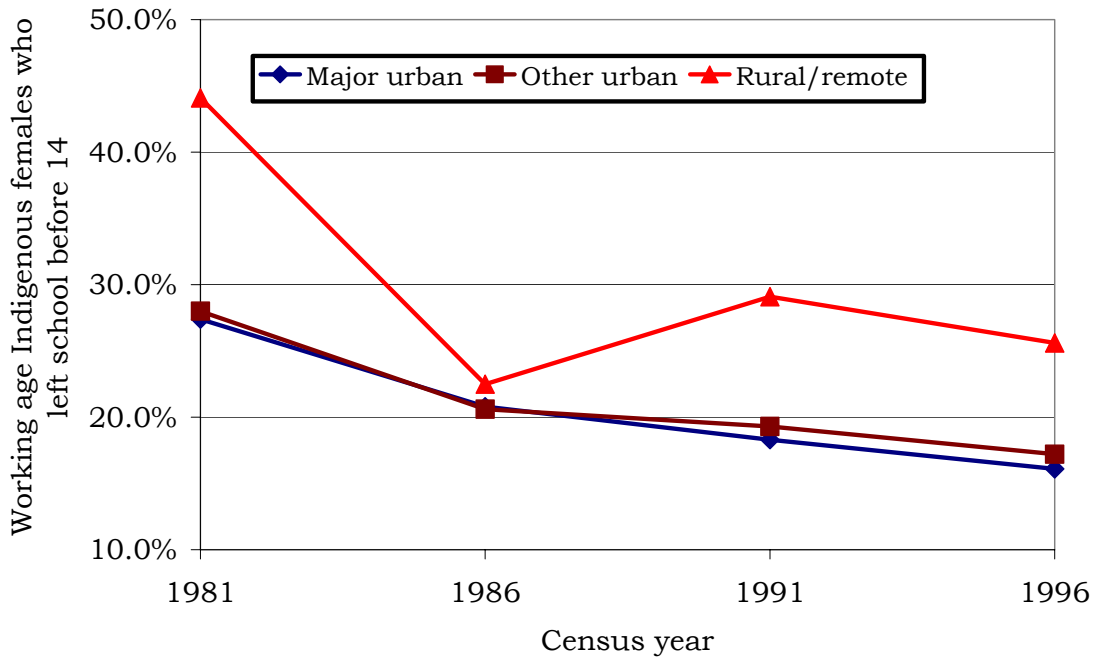


Source: Hunter (2002).

In rural and remote areas, the decline in the proportion who left school before age 14 fell by more for the Indigenous population, largely due to the high incidence of early school exits in 1981. Not surprisingly, the proportion of Indigenous people who left school at either 15 or 16 years of age increased by more than for non-Indigenous people, probably as a direct result of the concerted efforts of school authorities (e.g. Vocational Education and Training (VET) programs increasingly implemented within the school system). This effect was particularly evident between 1981 and 1986, where the proportion who left school just before completing secondary education increased by over 15 percentage points in rural and

remote areas. For Indigenous males resident in such areas, the proportion who left school at 15 or 16 years of age increased from 44.2 to 60.1 per cent in this inter-censal period. Among non-Indigenous residents of rural and remote areas, the proportion who left school at this age was relatively stable at around or just below 50 per cent. Note that this stability is driven in part by the fact that non-Indigenous residents of these areas are on average older and, at least for many, their school days may be well behind them.

Fig. 7. Working-aged Indigenous females who left school before 14 years of age by section-of-state, 1981–96



Source: Hunter (2002).

Fig. 6 and Fig. 7 illustrate there was a similar pattern of early school leaving for Indigenous males and females. The kink in Indigenous decline in rural/remote areas around 1986 is reminiscent of the analysis of the 'proficiency in speaking English' variable. The coincidence of these post-1986 changes with the rapid expansion of the CDEP scheme in such areas underscores the importance of identifying whether there is an adverse interaction between the scheme and the educational system.

Census-based regressions of labour force participation

The following multivariate (logistic) analysis is based on earlier modelling Indigenous and non-Indigenous labour force status in major urban, other urban and rural/remote areas for males and females (Hunter 2002, also see Appendix A). Rather than duplicate the technical discussion of that earlier paper, the following only describes what is necessary to interpret the results (N.B. the coefficients and diagnostic statistics are reported in Appendix B).

The coefficients of a logistic regression are informative but are notoriously difficult to interpret. One statistic that is relatively easy to interpret is the 'marginal effect' of each explanatory variable. This involves estimating the change in the predicted probability of employment arising from a given change in a variable, holding the value of the other variables constant. Since the effect of changes in the explanatory variables on the probability of being arrested varies with the value of all the explanatory variables in the model, it is essential that marginal effects are measured at values which are representative of a significant proportion of the population. Therefore, the reference person for the calculated marginal effects is a hypothetical Indigenous person whose characteristics are equal to the population average. In each case the marginal effect is calculated as the difference in probability of employment for a person with and without the specified

characteristic, with all other characteristics fixed at average values. While no single person necessarily embodies the 'average', this change means that the estimated marginal effects are more relevant to a greater number of people. The marginal effects of the census analyses are calculated in an analogous manner and reported in Tables 5 to 7 (Indigenous results) and Appendix B (non-Indigenous results). Note that the omitted categories for the regression analysis, which define what marginal effects are being measured against, are: living outside a major urban area, marital status (single, divorced or separated), left school after age 17 , and aged between 15 and 24 years.

Table 5 illustrates what happens to Indigenous participation rates in major urban areas, where the influence of the CDEP is still relatively minor. The marginal effects of the demographic variables show that participation rates have increased slightly for older age groups, relative to Indigenous youths. Given the small increases in Indigenous attendance at later secondary school and tertiary educational institutes, this change is to be expected.

This hypothesis is consistent with the changes in non-Indigenous marginal effects arising from the overall increases in educational participation between 1981 and 1996 (Appendix Table C1). Indeed, the marginal effect of being in older age groups, as opposed to being aged between 15 and 24 years old, became significantly larger (or less negative) for both non-Indigenous males and females. Furthermore, the changes in the age profile of non-Indigenous participation was much larger than the corresponding change in the Indigenous participation rates. This is consistent with the net changes in educational attainment of Indigenous population vis-à-vis other Australians (Gray, Hunter & Schwab 2000).

As would be expected, the effect on participation of not speaking English proficiently is generally negative, although the estimates are not very reliable. The lack of reliability is a direct result of the very small number of Indigenous or non-Indigenous people in major urban areas who indicate they have a problem speaking English (Hunter 2002). Notwithstanding this generalisation, difficulty in speaking English does have a large significant negative effect for non-Indigenous males and females in 1996 (about 20 percentage points for both). The labour market in major urban areas appears to be placing greater emphasis on English proficiency in the more recent statistics.

The other educational variables have the anticipated effect. Having a post-secondary qualification increases the probability of participating in the labour force by about 17 and 28 percentage points respectively for Indigenous males and females in major urban areas. The effect of qualifications on non-Indigenous participation are reasonably similar, although the effect is somewhat smaller for non-Indigenous females than their Indigenous counterparts. Interestingly, the effect of qualifications is stable over the period examined for all four groups.

Leaving secondary school before 14 years of age has a negative effect on participation for both the Indigenous and non-Indigenous population in major urban areas. Overall, the pattern of marginal effects for leaving school before age 14 are remarkably similar for Indigenous and non-Indigenous populations. Indeed, in 1996 there was no significant difference between the groups. One noteworthy observation is that, in contrast to the other groups, the effect of this variable did not change much for Indigenous females between censuses. For the other groups, there was a significant increase in the absolute size of the effect on labour force participation, especially in the 1991–96 inter-censal period.

In terms of the effect of the martial status variables in major urban areas, they are reasonably stable over time for the non-Indigenous population. However, there is more variation in the Indigenous estimates, with the effect of marriage declining somewhat for Indigenous males and increasing slightly for Indigenous females. Even with this convergence, the marginal effects for Indigenous males are larger than those for Indigenous females, at around 15 and 5 percentage points respectively (in 1996). Marriage tends to have a negative effect on participation for both males and females in the non-Indigenous population, although it is a significantly larger negative effect for females.

Table 6 (and Appendix Table C2) report the effect of the various factors in other urban areas. For Indigenous people, there was little change in the measured effect. However, non-

Indigenous residents in other urban areas were more likely to experience a change in the way those factors affected participation rates, especially the education variables. That is, while the direction of effects on labour supply for non-Indigenous residents were similar to that for Indigenous residents of major urban areas, there was virtually no change in the size of most marginal effects between censuses for Indigenous people in other urban areas.

Table 5. Marginal effects of variables on Indigenous participation rates in major urban areas, 1981–86

	1981	1986	1991	1996
	Change in the probability of participation arising from having a characteristic (%)			
Indigenous males				
Aged 25–34	7.2	10.5	14.3	13.4
	(1.7)	(2.1)	(2.1)	(1.7)
Aged 35–44	6.4	5.4	8.3	9.3
	(2.3)	(3.0)	(2.6)	(2.2)
Aged 45–54	-10.4	-5.0	0.0	2.8
	(3.2)	(4.2)	(3.7)	(2.9)
Aged 55–64	-29.3	-22.5	-18.4	-19.2
	(4.3)	(6.2)	(5.8)	(4.4)
English difficulty	-20.1	-1.0	-22.8	-14.4
	(16.0)	(17.2)	(21.2)	(13.1)
Post-secondary qualification	10.5	11.9	14.2	17.1
	(2.6)	(2.8)	(2.6)	(2.0)
Divorced	4.6	0.9	3.3	2.6
	(2.4)	(3.4)	(3.1)	(2.6)
Married	20.3	11.5	14.4	13.6
	(1.8)	(2.5)	(2.3)	(2.1)
Age left school 14	-9.2	-9.7	-9.6	-20.2
	(2.5)	(3.5)	(3.2)	(2.6)
Age left school 15–16	-1.8	-3.8	-1.6	-9.3
	(2.2)	(2.8)	(2.2)	(1.9)
Indigenous females				
Aged 25–34	-5.3	-9.5	0.0	0.1
	(2.5)	(2.0)	(1.9)	(2.0)
Aged 35–44	1.4	-0.8	8.2	6.0
	(3.3)	(2.6)	(2.3)	(2.4)
Aged 45–54	-0.5	-9.6	5.9	7.4
	(4.0)	(3.3)	(2.9)	(2.9)
Aged 55–64	-7.6	-24.1	-25.9	-20.3
	(5.5)	(4.1)	(4.0)	(4.0)
English difficulty	3.4	16.6	-22.9	-1.7
	(18.5)	(20.5)	(26.4)	(11.7)
Post-secondary qualification	24.7	27.4	29.0	27.9
	(4.0)	(2.5)	(2.2)	(2.0)
Divorced	-16.5	-7.4	-3.9	-0.3
	(2.7)	(2.5)	(2.3)	(2.4)
Married	-5.2	1.3	4.1	5.7
	(2.4)	(2.1)	(1.9)	(2.1)
Age left school 14	-16.9	-20.8	-21.2	-26.2
	(3.2)	(2.7)	(2.4)	(2.4)
Age left school 15–16	-10.8	-11.9	-11.3	-13.7
	(2.8)	(2.1)	(1.7)	(1.7)

Note: Standard errors are presented in brackets. Calculated from coefficients reported in Appendix B.

Table 6. Marginal effects of variables on Indigenous participation rates in other urban areas, 1981–86

	1981	1986	1991	1996
	Change in the probability of participation arising from having a characteristic (%)			
Indigenous males				
Aged 25–34	13.0	15.0	16.3	14.4
	(2.6)	(2.0)	(2.2)	(1.9)
Aged 35–44	6.5	7.6	11.9	11.7
	(3.4)	(2.6)	(2.6)	(2.3)
Aged 45–54	-1.6	-1.3	1.0	1.9
	(4.2)	(3.4)	(3.5)	(3.0)
Aged 55–64	-22.7	-24.1	-17.0	-20.6
	(5.8)	(5.2)	(5.2)	(4.4)
English difficulty	-14.8	-29.3	-44.6	-21.2
	(10.7)	(11.4)	(11.3)	(8.7)
Post-secondary qualification	22.7	14.0	19.0	23.3
	(4.9)	(3.3)	(3.3)	(2.4)
Divorced	-1.1	-0.3	-0.5	-2.1
	(4.2)	(3.3)	(3.7)	(3.1)
Married	17.3	14.5	9.5	9.3
	(2.7)	(2.3)	(2.4)	(2.1)
Age left school 14	-12.0	-7.3	-12.5	-14.5
	(4.1)	(3.0)	(3.1)	(2.7)
Age left school 15–16	-6.0	-2.3	-2.4	-5.0
	(3.7)	(2.5)	(2.5)	(2.1)
Indigenous females				
Aged 25–34	-2.0	-5.8	2.8	1.1
	(2.0)	(1.8)	(1.7)	(1.8)
Aged 35–44	2.2	0.8	10.6	10.0
	(2.6)	(2.4)	(2.1)	(2.1)
Aged 45–54	-4.4	-5.7	0.7	6.0
	(3.0)	(3.0)	(2.7)	(2.7)
Aged 55–64	-18.4	-24.9	-21.0	-19.3
	(3.5)	(3.6)	(3.5)	(3.5)
English difficulty	2.2	7.8	-12.4	-7.5
	(7.3)	(12.9)	(11.3)	(12.1)
Post-secondary qualification	25.1	30.3	34.2	29.9
	(4.2)	(2.8)	(2.5)	(2.2)
Divorced	-9.1	-5.8	-5.9	-1.7
	(2.5)	(2.4)	(2.2)	(2.2)
Married	-3.7	0.0	1.6	4.1
	(1.9)	(1.9)	(1.7)	(1.8)
Age left school 14	-15.3	-15.4	-16.0	-19.9
	(2.4)	(2.5)	(2.2)	(2.2)
Age left school 15–16	-10.0	-10.1	-8.1	-10.9
	(2.1)	(1.9)	(1.6)	(1.5)

Note: Standard errors are presented in brackets. Calculated from coefficients reported in Appendix B.

Table 7. Marginal effects of variables on Indigenous participation rates in rural/remote areas, 1981–86

	1981	1986	1991	1996
	Change in the probability of participation arising from having a characteristic (%)			
Indigenous males				
Aged 25–34	14.9	15.1	16.4	17.1
	(2.8)	(2.0)	(2.0)	(1.7)
Aged 35–44	14.3	14.4	19.6	17.0
	(3.3)	(2.5)	(2.3)	(2.0)
Aged 45–54	8.9	9.2	11.8	12.3
	(3.7)	(3.2)	(2.8)	(2.4)
Aged 55–64	-7.9	-12.1	-4.1	-6.9
	(4.9)	(4.8)	(3.7)	(3.4)
English difficulty	-13.3	-12.6	-22.0	-18.5
	(3.2)	(4.0)	(2.9)	(2.9)
Post-secondary qualification	12.2	20.2	23.5	21.7
	(10.1)	(5.1)	(4.4)	(2.8)
Divorced	-6.4	-3.3	-7.2	-10.2
	(4.7)	(3.9)	(3.6)	(3.0)
Married	5.4	5.9	-1.1	-1.3
	(2.8)	(2.2)	(2.0)	(1.8)
Age left school 14	-10.4	-3.0	-13.8	-12.7
	(4.3)	(3.1)	(2.7)	(2.3)
Age left school 15–16	-2.1	1.3	-1.7	-3.3
	(4.1)	(2.8)	(2.5)	(2.0)
Indigenous females				
Aged 25–34	-0.1	-0.6	6.0	7.7
	(1.8)	(1.7)	(1.8)	(1.6)
Aged 35–44	2.1	3.4	9.8	13.6
	(2.2)	(2.2)	(2.1)	(1.8)
Aged 45–54	-1.0	-5.3	2.7	9.3
	(2.5)	(2.7)	(2.6)	(2.2)
Aged 55–64	-13.3	-20.3	-23.2	-15.0
	(2.8)	(3.3)	(2.9)	(2.8)
English difficulty	-2.1	7.2	-10.8	-8.9
	(1.9)	(2.8)	(2.4)	(2.3)
Post-secondary qualification	21.7	33.8	34.6	30.9
	(6.9)	(3.5)	(3.9)	(2.7)
Divorced	-7.2	-1.2	-5.9	-7.7
	(2.3)	(2.5)	(2.4)	(2.0)
Married	-2.4	0.2	1.5	0.1
	(1.7)	(1.6)	(1.6)	(1.4)
Age left school 14	-12.6	-10.5	-16.1	-17.6
	(2.4)	(2.3)	(2.0)	(1.8)
Age left school 15–16	-8.1	-6.8	-6.5	-8.9
	(2.1)	(1.9)	(1.7)	(1.5)

Note: Standard errors are presented in brackets. Calculated from coefficients reported in Appendix B.

In contrast to Indigenous people in other urban areas, the labour supply of non-Indigenous people in such areas tends to be more affected by changes in the demand for educated workers. The decline in the number of unskilled jobs appears to have increased the disadvantage of leaving school before age 14 from just below one-tenth to around one-quarter (-8.8 to -25.3 percentage points and -8.7 to -24.1 percentage points respectively for non-Indigenous males and females). Note there is an element of convergence in the results for effect of leaving school well before completing high school for the non-Indigenous and Indigenous population in 1996. While the marginal effect for non-Indigenous people actually overtook the effect for Indigenous people, the difference in the magnitude of the respective effects was not significant.

The expansion of the CDEP scheme in other urban areas appears to be reducing the effect of the decline in the number of unskilled jobs since 1981. However, given the element of convergence between the Indigenous and non-Indigenous populations, this could be a positive development in that the social exclusion sometimes associated with not participating in the labour market has in some sense been averted.[6]

There has also been little change in the effect of post-secondary qualifications on Indigenous people in other urban areas. People with qualifications are between 20 and 30 percentage points more likely to be participating in the labour market than other Indigenous people. While the effect of qualifications is similar for non-Indigenous females, it is significantly smaller for non-Indigenous males where those with qualifications are less than 10 percentage points more likely to be participating in the labour force than other analogous males. This is probably driven by the fact that there are many more non-Indigenous males with qualifications, as education is less unusual in the non-Indigenous population. That is, non-Indigenous males with qualifications are closer to the population average, as are their labour force participation rates. However, this cannot be the whole story since the effect of qualifications among non-Indigenous females is similar to their Indigenous counterparts. An alternative explanation is that these sub-populations are in a different segment of the labour market where educational qualifications are more highly valued, and hence they have more employment options than other groups.

As in the major urban areas, there are some differences in the effect of other factors underlying Indigenous and non-Indigenous labour force participation in other urban areas. While a significant increase was observed in the probability of married women participating in the labour market, for both Indigenous and non-Indigenous females, there was no corresponding change among non-Indigenous males. In contrast, the positive effect of marriage among Indigenous males on labour supply declined from 17.3 per cent to 9.3 per cent. This is again consistent with the spread of the CDEP scheme, which provides employment to both single and married men. Given that married men were already more likely to have been in the labour force, the ease of access to the CDEP scheme will more than likely reduce their rate of participation relative to single men. The changes in the effect of the demographic factors in other urban areas appears to mirror those observed in major urban areas.

In rural and remote areas, the effect of the growth of the CDEP scheme on Indigenous labour supply is also apparent, especially in the education variables. Again the most salient features of Table 7 (and Appendix Table C3) is the lack of any significant change in the marginal effects for Indigenous people, and particularly Indigenous males. For example, the effect of leaving school at or before 14 years of age remains at around 10 percentage points in the period examined. In contrast, it appears that the decline in the numbers of low-skilled jobs has increased the negative association of this variable, with non-Indigenous participation decreasing from -6.1 per cent to -18.8 per cent. As in other urban areas, the effect of early school leaving on participation has converged for the Indigenous and non-Indigenous populations—probably as a direct result of the CDEP scheme enhancing the engagement of previously excluded groups such as the low skilled.

As in other areas, those with post-secondary qualifications tend to be significantly more likely to be participating in the labour market. With the exception of Indigenous females there was no change in the effect of qualifications on participation in rural/remote areas.[7]

This observation might be seen to contradict the alleged effect of the rise of CDEP scheme employment, which is not contingent upon whether a person has a qualification. However, as argued for major and other urban areas, Indigenous females who have a qualification may be in more demand given that they are relatively rare.

The other education variable is whether a person has difficulty in speaking English. The failure to speak English proficiently has a similar effect on participation for both the Indigenous and non-Indigenous population. Consequently, the effect of the rise of the CDEP scheme is most apparent in the convergence of the effect of the age left school variables for Indigenous and other Australians.

One interesting feature of rural and remote labour markets is that there has been relatively little change in the age profile of the male workforce. That is, there was no significant change in the effect of various demographic variables between 1981 and 1996 for either Indigenous or non-Indigenous populations. However, the explanation for this observation probably varies between the populations. Increased retention rates do not affect the age composition of the non-Indigenous male workforce because non-Indigenous youth from rural and remote areas have always tended to go to boarding schools and universities in the cities. For Indigenous male youth from rural and remote areas, the increases in retention rates have not translated into the improved rates of high school completion that policy makers targeted in the 1990s (Gray, Hunter & Schwab 2000; Schwab 2001). Hunter (2002) speculates that the CDEP scheme has provided an extra exit option that may adversely affect educational participation, while boosting employment and labour market participation. The marginal effects of the age variables in such areas increased for both Indigenous and non-Indigenous females. This probably reflects changes in local community attitudes towards girls and education, and the impact of the growth of the CDEP scheme.

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. Hunter and Gray (2001b) confirm the importance of labour supply factors, but also emphasise 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.

This paper supports Hunter and Gray's (2001b) hypothesis. providing evidence that the CDEP scheme enhances Indigenous labour force participation, especially outside major urban areas. However, it also demonstrates that the interaction between education and overall labour supply is a main factor underlying the significant increase in Indigenous participation rates relative to those for non-Indigenous Australians. For example, the NATSIS-based analysis of ATSIC regions indicates significant increases in labour force participation in areas where the CDEP scheme is increasing, after controlling for educational factors. The census analysis goes further by showing that the CDEP scheme is providing employment opportunities for low skilled workers, even when the number of mainstream jobs available for these workers is in decline.

The expansion of the CDEP scheme may have a bad side as well as a good side. The good side is that it reduces the high level of social exclusion among Indigenous people by increasing opportunities to participate in the labour market. The potentially bad side is that it may adversely affect human capital accumulation if Indigenous youth consider the CDEP scheme as an 'easy' option for prematurely exiting the education system. Hunter (2002) provides a detailed description of the policy implications of this potentially adverse effect. The main implication of this paper is that, if steps are taken to minimise the potentially adverse impact of CDEP on education, the CDEP scheme enhance economic engagement of Indigenous communities. Notwithstanding, the recent welfare reform debate suggests that a better form of economic engagement may be a direct linkage with what Noel Pearson calls the 'real economy' without any welfare safety net (Pearson 2000).

A second order implication of the above analysis is that the CDEP scheme tends to hide a high level of underemployment among Indigenous Australians. However, while the CDEP scheme is reducing the incidence of exclusion, it is limited in the extent to which this can be achieved by expanding the scheme. That is, the CDEP does not, and probably cannot, provide the number of hours work required for all participants. In order to achieve this, the CDEP scheme guidelines and rules would need to be more flexible and schemes would require more generous funding. Some CDEP schemes engage in entrepreneurial activities that top-up funds, and hence allow productive workers to be employed for more hours. For example, the Bungala scheme in Port Augusta has secured competitive contracts to supply goods and services to the mainstream community (Gray & Thacker 2000). CDEP schemes in remote areas tend to have fewer opportunities to top-up their funds, but there are several instances of schemes in more isolated areas providing services normally associated with the public sector or government (Sanders 2001b).

Finally, the issue of the high level of underemployment within the scheme underscores the importance of facilitating the completion of secondary school. Given that the mainstream labour market appears to demand highly skilled (and acculturated) workers, it is unlikely that Indigenous people will be able to work as much as they want unless they have the required level of education. This means not only improving Indigenous retention rates at secondary school, but ensuring that Indigenous youth obtain suitable qualifications in the growth sectors of the economy.

Notes

1. The CDEP scheme is a federal government program in which unemployed Indigenous people forgo their entitlements to Newstart Allowance payments but receive the equivalent from a local community organisation in return for work. It is distinguished from the Work-for-the-Dole Scheme in having a much longer history (since 1977), in being specific to Indigenous communities, and having a broader community-development component.
2. The CDEP scheme proved immediately popular, but was initially beset by a number of budgetary and administrative problems which inhibited its expansion.
3. The sample design for the NATSIS was a multi-stage stratified random sample based on Census Collection Districts. The survey covered a total of 4,205 households, which yielded 15,726 Indigenous respondents, 3,076 non-Indigenous persons living in the same household as an Indigenous person, and 158 prisoners (ABS 1996).
4. Notwithstanding recent attempts to augment the Indigenous component of the Labour Force Survey, there are too few relevant responses to construct a meaningful measure of Indigenous underemployment using that survey (see ABS 2000; Hunter & Taylor 2001).
5. This is sometimes referred to as the econometric 'parsimony' principle.
6. See Hunter (2000b, 2001) for discussion of social exclusion among Indigenous Australians, and the complex relationship between social capital and Indigenous welfare.
7. There was substantial increase in the effect of qualification on Indigenous male participation (in the vicinity of 10 percentage points), however this was not significant because of the unreliability of the 1981 estimate (i.e. the high standard error).

Appendix A. Formal presentation of the estimation model

The model estimated can be formally expressed as follows in Equation (A1):

$$\frac{1}{n_j}\sum_j Y_i = \frac{1}{n_j}\sum_j F(X_j\beta) = F(X_j\beta) = P_j \qquad \text{(A1)}$$

where $\frac{1}{n_j}\sum_j y_i$ represents the proportion of 1's in the jth class and $n_1,\ldots..,n_J$ are the number of observation in each group, X represents a vector of characteristics, β a vector of coefficients and F is the logistic function. To simplify notation $\frac{1}{n_j}\sum_j y_i$ can be represented as P_j.

Applying the logistic function the model becomes:

$$p_j = \frac{\exp(X_j\beta)}{1+\exp(X_i\beta)} \qquad \text{(A2)}$$

with the dependent variable, being given in Equation (A3):

$$\log\left(\frac{p_j}{1-p_j}\right). \qquad \text{(A3)}$$

The variance being given in Equation (A4):

$$\frac{1}{n_j p_j (1-p_j)} \qquad \text{(A4)}$$

This model can be estimated using weighted OLS where the weights are given by inverse of the square root of this estimated variance.

The construction of the data set on which the estimation is based involves two major steps. The first step involves calculating the proportion participating in the labour market for every possible combination of explanatory variables. These groups are constructing using the full census data. For example, the probability of participation in the labour market is estimated for all males in 1986 who were aged between 25 and 34 years in that year, with a post-secondary qualification living in major urban areas and so on. In the second step the logistic transformation is applied to these proportions. In the event that the probability is exactly 0 or 1, it is necessary to perturb the estimated probability by a very small number so that information about that cohort of individuals can be used. We follow the recommendation of Greene (2000: 837) and use a perturbation if 0.001.

The maximum possible number of possible combinations of explanatory variable is 10,396. However, for some of these combinations, in the census data, there are no individuals with that combination of characteristic. When these null combinations are excluded there remains 7,997 combinations of explanatory variables which have at least one individual with that combination. This is the unit of observation which is used in the estimation.

It is necessary to calculate the proportion participating in the labour force for every possible combination of explanatory variables because of the fact that for any non-linear function such as the logistic function:

$$\sum_J F(X_i) \neq F(\sum_J X_i) \qquad \text{(A5)}$$

The procedure of estimating P_j for each group or cell for every possible combination of explanatory variables means that the probability of employment and participation is constant for explanatory variables defined separately for every combination of explanatory variables, thus avoiding the aggregation problem described in Equation A5.

Appendix B. Regression analysis of participation rates

Table B1. Logistic regression of Indigenous male labour force participation in major urban areas, 1981–96

	1981	1986	1991	1996
Aged 25–34	0.376	0.673	0.954	0.736
	(0.095)**	(0.146)**	(0.139)**	(0.099)**
Aged 35–44	0.330	0.329	0.511	0.492
	(0.128)*	(0.190)	(0.169)**	(0.121)**
Aged 45–54	-0.486	-0.275	0.002	0.140
	(0.140)**	(0.220)	(0.209)	(0.146)
Aged 55–64	-1.286	-1.086	-0.890	-0.857
	(0.174)**	(0.263)**	(0.257)**	(0.184)**
English difficulty	-0.873	-0.055	-1.048	-0.648
	(0.640)	(0.961)	(0.856)	(0.543)
Post-secondary qualification	0.558	0.727	0.854	0.885
	(0.156)**	(0.203)**	(0.188)**	(0.117)**
Divorced	0.231	0.052	0.187	0.128
	(0.128)	(0.199)	(0.186)	(0.133)
Married	1.094	0.705	0.884	0.707
	(0.106)**	(0.166)**	(0.161)**	(0.117)**
Age left school 14	-0.449	-0.531	-0.516	-0.950
	(0.122)**	(0.188)**	(0.163)**	(0.115)**
Age left school 15–16	-0.089	-0.217	-0.089	-0.449
	(0.106)	(0.156)	(0.125)	(0.088)**
Constant	0.740	1.009	0.611	0.724
	(0.099)**	(0.148)**	(0.111)**	(0.079)**
Number of cells	54	74	85	100
R-squared	0.875	0.657	0.707	0.789

Notes: Robust standard errors in parentheses. * significant at 5% level; ** significant at 1% level

Table B2. Logistic regression of Indigenous female labour force participation in major urban areas, 1981–96

	1981	1986	1991	1996
Aged 25–34	-0.224	-0.384	0.000	0.002
	(0.105)*	(0.082)**	(0.075)	(0.081)
Aged 35–44	0.059	-0.030	0.334	0.245
	(0.136)	(0.106)	(0.094)**	(0.099)*
Aged 45–54	-0.020	-0.385	0.243	0.304
	(0.169)	(0.135)**	(0.120)*	(0.122)*
Aged 55–64	-0.327	-1.016	-1.069	-0.825
	(0.244)	(0.192)**	(0.177)**	(0.169)**
English difficulty	0.139	0.693	-0.948	-0.070
	(0.751)	(0.928)	(1.209)	(0.471)
Post-secondary qualification	1.016	1.136	1.223	1.170
	(0.166)**	(0.113)**	(0.104)**	(0.094)**
Divorced	-0.712	-0.298	-0.158	-0.013
	(0.128)**	(0.102)**	(0.092)	(0.097)
Married	-0.216	0.053	0.164	0.233
	(0.103)*	(0.083)	(0.077)*	(0.084)**
Age left school 14	-0.728	-0.847	-0.860	-1.073
	(0.145)**	(0.113)**	(0.099)**	(0.106)**
Age left school 15–16	-0.453	-0.478	-0.458	-0.552
	(0.119)**	(0.085)**	(0.070)**	(0.070)**
Constant	0.165	0.401	0.202	0.187
	(0.115)	(0.082)**	(0.064)**	(0.066)**
Number of cells	60	74	83	108
R-squared	0.753	0.823	0.832	0.799

Notes: Robust standard errors in parentheses. * significant at 5% level; ** significant at 1% level

Table B3. Logistic regression of non-Indigenous male labour force participation in major urban areas, 1981–96

	1981	1986	1991	1996
Aged 25–34	2.843	2.920	2.719	2.338
	(0.247)**	(0.246)**	(0.224)**	(0.188)**
Aged 35–44	3.106	3.156	2.914	2.537
	(0.286)**	(0.270)**	(0.248)**	(0.205)**
Aged 45–54	2.780	2.748	2.587	2.389
	(0.264)**	(0.264)**	(0.246)**	(0.207)**
Aged 55–64	1.420	1.239	1.190	1.061
	(0.217)**	(0.219)**	(0.215)**	(0.195)**
English difficulty	-0.369	-0.437	-0.594	-0.986
	(0.324)	(0.316)	(0.287)*	(0.264)**
Post-secondary qualification	0.447	0.391	0.401	0.452
	(0.175)*	(0.165)*	(0.161)*	(0.134)**
Divorced	-1.179	-1.063	-0.876	-0.882
	(0.280)**	(0.275)**	(0.262)**	(0.220)**
Married	-0.587	-0.616	-0.452	-0.457
	(0.193)**	(0.195)**	(0.184)*	(0.160)**
Age left school 14	-0.460	-0.620	-0.805	-0.991
	(0.204)*	(0.205)**	(0.203)**	(0.183)**
Age left school 15–16	0.392	0.225	0.027	-0.230
	(0.184)*	(0.176)	(0.165)	(0.139)
Constant	0.114	0.117	0.147	0.241
	(0.116)	(0.115)	(0.104)	(0.100)*
Number of cells	210	211	210	214
R-squared	0.609	0.617	0.627	0.645

Notes: Robust standard errors in parentheses. * significant at 5% level; ** significant at 1% level

Table B4. Logistic regression of non-Indigenous female labour force participation in major urban areas, 1981–96

	1981	1986	1991	1996
Aged 25–34	0.633	0.799	1.101	1.132
	(0.154)**	(0.156)**	(0.147)**	(0.128)**
Aged 35–44	1.018	1.143	1.484	1.452
	(0.167)**	(0.167)**	(0.159)**	(0.139)**
Aged 45–54	0.803	0.877	1.339	1.572
	(0.173)**	(0.179)**	(0.171)**	(0.149)**
Aged 55–64	-0.339	-0.519	-0.219	0.091
	(0.188)	(0.192)**	(0.185)	(0.163)
English difficulty	-0.015	-0.174	-0.477	-0.962
	(0.235)	(0.235)	(0.206)*	(0.186)**
Post-secondary qualification	0.742	0.723	0.745	0.731
	(0.127)**	(0.116)**	(0.113)**	(0.093)**
Divorced	-1.293	-1.172	-1.071	-1.030
	(0.188)**	(0.185)**	(0.171)**	(0.144)**
Married	-1.173	-1.084	-0.979	-0.994
	(0.153)**	(0.148)**	(0.136)**	(0.115)**
Age left school 14	-0.330	-0.499	-0.686	-0.910
	(0.148)*	(0.152)**	(0.152)**	(0.139)**
Age left school 15–16	0.174	0.073	-0.026	-0.234
	(0.117)	(0.108)	(0.101)	(0.088)**
Constant	0.372	0.440	0.347	0.391
	(0.109)**	(0.103)**	(0.089)**	(0.081)**
Number of cells	203	204	206	209
R-squared	0.514	0.572	0.633	0.699

Notes: Robust standard errors in parentheses. * significant at 5% level; ** significant at 1% level

Table B5. Logistic regression of Indigenous male labour force participation in other urban areas, 1981–96

	1981	1986	1991	1996
Aged 25–34	0.638	0.822	0.843	0.691
	(0.137)**	(0.114)**	(0.118)**	(0.096)**
Aged 35–44	0.307	0.395	0.597	0.549
	(0.165)	(0.141)**	(0.141)**	(0.111)**
Aged 45–54	-0.071	-0.064	0.047	0.084
	(0.190)	(0.166)	(0.166)	(0.135)
Aged 55–64	-0.954	-1.052	-0.739	-0.862
	(0.238)**	(0.210)**	(0.212)**	(0.180)**
English difficulty	-0.636	-1.273	-1.920	-0.891
	(0.434)	(0.459)**	(0.548)**	(0.350)*
Post-secondary qualification	1.256	0.747	0.946	1.128
	(0.383)**	(0.206)**	(0.202)**	(0.142)**
Divorced	-0.049	-0.016	-0.023	-0.091
	(0.191)	(0.160)	(0.173)	(0.134)
Married	0.824	0.745	0.453	0.420
	(0.134)**	(0.123)**	(0.117)**	(0.099)**
Age left school 14	-0.538	-0.352	-0.569	-0.626
	(0.185)**	(0.146)*	(0.141)**	(0.115)**
Age left school 15–16	-0.270	-0.111	-0.113	-0.221
	(0.165)	(0.122)	(0.114)	(0.090)*
Constant	0.599	0.659	0.553	0.485
	(0.157)**	(0.115)**	(0.105)**	(0.084)**
Number of cells	72	83	94	111
R-squared	0.691	0.740	0.699	0.746

Notes: Robust standard errors in parentheses. * significant at 5% level; ** significant at 1% level

Table B6. Logistic regression of Indigenous female labour force participation in other urban areas, 1981–96

	1981	1986	1991	1996
Aged 25–34	-0.088	-0.236	0.113	0.045
	(0.087)	(0.075)**	(0.067)	(0.071)
Aged 35–44	0.094	0.033	0.425	0.403
	(0.109)	(0.096)	(0.084)**	(0.085)**
Aged 45–54	-0.196	-0.233	0.027	0.242
	(0.133)	(0.122)	(0.110)	(0.107)*
Aged 55–64	-0.909	-1.112	-0.890	-0.808
	(0.212)**	(0.193)**	(0.162)**	(0.159)**
English difficulty	0.093	0.312	-0.511	-0.302
	(0.309)	(0.519)	(0.486)	(0.501)
Post-secondary qualification	1.051	1.251	1.433	1.235
	(0.170)**	(0.124)**	(0.121)**	(0.100)**
Divorced	-0.402	-0.236	-0.235	-0.067
	(0.112)**	(0.099)*	(0.089)**	(0.089)
Married	-0.161	0.001	0.065	0.165
	(0.084)	(0.075)	(0.067)	(0.071)*
Age left school 14	-0.692	-0.632	-0.654	-0.817
	(0.112)**	(0.105)**	(0.092)**	(0.096)**
Age left school 15–16	-0.437	-0.410	-0.326	-0.441
	(0.091)**	(0.079)**	(0.064)**	(0.063)**
Constant	-0.124	0.040	-0.151	-0.123
	(0.088)	(0.076)	(0.061)*	(0.061)*
Number of cells	73	85	86	101
R-squared	0.729	0.764	0.815	0.803

Notes: Robust standard errors in parentheses. * significant at 5% level; ** significant at 1% level

Table B7. Logistic regression of non-Indigenous male labour force participation in other urban areas, 1981–96

	1981	1986	1991	1996
Aged 25–34	2.924	3.070	2.931	2.546
	(0.314)**	(0.311)**	(0.280)**	(0.246)**
Aged 35–44	3.017	3.144	2.953	2.604
	(0.343)**	(0.325)**	(0.285)**	(0.246)**
Aged 45–54	2.581	2.621	2.541	2.347
	(0.303)**	(0.308)**	(0.279)**	(0.242)**
Aged 55–64	1.087	1.031	1.044	0.912
	(0.252)**	(0.258)**	(0.243)**	(0.228)**
English difficulty	-0.408	-0.469	-0.784	-0.870
	(0.876)	(0.890)	(0.807)	(0.841)
Post-secondary qualification	0.447	0.355	0.371	0.430
	(0.217)*	(0.203)	(0.191)	(0.166)*
Divorced	-1.231	-1.104	-0.922	-0.996
	(0.333)**	(0.323)**	(0.293)**	(0.252)**
Married	-0.623	-0.598	-0.498	-0.551
	(0.230)**	(0.234)*	(0.215)*	(0.194)**
Age left school 14	-0.486	-0.502	-0.792	-1.084
	(0.254)	(0.251)*	(0.234)**	(0.219)**
Age left school 15–16	0.506	0.441	0.094	-0.253
	(0.235)*	(0.223)	(0.201)	(0.175)
Constant	0.071	-0.044	0.048	0.275
	(0.162)	(0.154)	(0.135)	(0.132)*
Number of cells	179	175	181	181
R-squared	0.571	0.601	0.610	0.612

Notes: Robust standard errors in parentheses. * significant at 5% level; ** significant at 1% level

Table B8. Logistic regression of non-Indigenous female labour force participation in other urban areas, 1981–96

	1981	1986	1991	1996
Aged 25–34	0.392	0.451	0.753	0.821
	(0.154)*	(0.157)**	(0.155)**	(0.142)**
Aged 35–44	0.888	0.908	1.302	1.337
	(0.169)**	(0.171)**	(0.170)**	(0.156)**
Aged 45–54	0.630	0.563	1.019	1.309
	(0.179)**	(0.186)**	(0.183)**	(0.167)**
Aged 55–64	-0.541	-0.836	-0.549	-0.284
	(0.202)**	(0.209)**	(0.202)**	(0.183)
English difficulty	-0.219	-0.381	-0.511	-0.751
	(0.633)	(0.662)	(0.622)	(0.619)
Post-secondary qualification	0.842	0.834	0.829	0.798
	(0.140)**	(0.130)**	(0.130)**	(0.112)**
Divorced	-1.454	-1.160	-1.000	-0.923
	(0.206)**	(0.200)**	(0.183)**	(0.159)**
Married	-1.204	-0.978	-0.822	-0.809
	(0.160)**	(0.156)**	(0.146)**	(0.129)**
Age left school 14	-0.350	-0.450	-0.726	-0.998
	(0.167)*	(0.171)**	(0.172)**	(0.163)**
Age left school 15–16	0.233	0.166	-0.006	-0.274
	(0.130)	(0.120)	(0.112)	(0.099)**
Constant	0.296	0.329	0.258	0.349
	(0.127)*	(0.118)**	(0.105)*	(0.096)**
Number of cells	161	168	169	175
R-squared	0.574	0.583	0.627	0.671

Notes: Robust standard errors in parentheses. * significant at 5% level; ** significant at 1% level

Table B9. Logistic regression of Indigenous male labour force participation in rural/remote areas, 1981–96

	1981	1986	1991	1996
Aged 25–34	0.649	0.745	0.729	0.775
	(0.131)**	(0.107)**	(0.097)**	(0.084)**
Aged 35–44	0.629	0.702	0.888	0.764
	(0.154)**	(0.134)**	(0.113)**	(0.096)**
Aged 45–54	0.382	0.440	0.515	0.541
	(0.167)*	(0.163)**	(0.130)**	(0.110)**
Aged 55–64	-0.324	-0.521	-0.170	-0.286
	(0.198)	(0.195)**	(0.152)	(0.138)*
English difficulty	-0.548	-0.555	-0.908	-0.764
	(0.130)**	(0.163)**	(0.118)**	(0.117)**
Post-secondary qualification	0.532	1.081	1.108	0.985
	(0.483)	(0.362)**	(0.262)**	(0.152)**
Divorced	-0.265	-0.148	-0.297	-0.421
	(0.192)	(0.169)	(0.145)*	(0.123)**
Married	0.223	0.267	-0.046	-0.053
	(0.117)	(0.102)*	(0.085)	(0.074)
Age left school 14	-0.432	-0.136	-0.573	-0.528
	(0.178)*	(0.141)	(0.115)**	(0.097)**
Age left school 15–16	-0.088	0.061	-0.070	-0.137
	(0.171)	(0.124)	(0.104)	(0.085)
Constant	0.438	0.361	0.507	0.397
	(0.163)**	(0.120)**	(0.100)**	(0.083)**
Number of cells	86	84	105	119
R-squared	0.583	0.667	0.751	0.752

Notes: Robust standard errors in parentheses. * significant at 5% level; ** significant at 1% level

Table B10. Logistic regression of Indigenous female labour force participation in rural/remote areas, 1981–96

	1981	1986	1991	1996
Aged 25–34	-0.006	-0.023	0.249	0.310
	(0.085)	(0.071)	(0.072)**	(0.064)**
Aged 35–44	0.097	0.140	0.405	0.549
	(0.102)	(0.091)	(0.084)**	(0.073)**
Aged 45–54	-0.047	-0.224	0.114	0.375
	(0.116)	(0.117)	(0.107)	(0.088)**
Aged 55–64	-0.704	-0.933	-1.137	-0.646
	(0.170)**	(0.183)**	(0.182)**	(0.131)**
English difficulty	-0.099	0.297	-0.466	-0.369
	(0.089)	(0.114)*	(0.108)**	(0.098)**
Post-secondary qualification	0.929	1.412	1.445	1.279
	(0.276)**	(0.162)**	(0.178)**	(0.117)**
Divorced	-0.347	-0.049	-0.251	-0.317
	(0.116)**	(0.106)	(0.104)*	(0.086)**
Married	-0.114	0.010	0.064	0.005
	(0.080)	(0.067)	(0.066)	(0.057)
Age left school 14	-0.608	-0.444	-0.701	-0.743
	(0.114)**	(0.097)**	(0.091)**	(0.078)**
Age left school 15–16	-0.390	-0.285	-0.274	-0.369
	(0.103)**	(0.078)**	(0.072)**	(0.060)**
Constant	-0.287	-0.292	-0.263	-0.180
	(0.101)**	(0.077)**	(0.071)**	(0.062)**
Number of cells	88	85	99	122
R-squared	0.601	0.685	0.786	0.802

Notes: Robust standard errors in parentheses. * significant at 5% level; ** significant at 1% level

Table B11. Logistic regression of non-Indigenous male labour force participation in rural/remote areas, 1981–96

	1981	1986	1991	1996
Aged 25–34	2.371	2.738	2.717	2.466
	(0.236)**	(0.242)**	(0.231)**	(0.202)**
Aged 35–44	2.575	2.880	2.721	2.437
	(0.259)**	(0.247)**	(0.220)**	(0.182)**
Aged 45–54	2.199	2.431	2.316	2.205
	(0.235)**	(0.236)**	(0.210)**	(0.173)**
Aged 55–64	0.976	1.078	1.069	1.015
	(0.194)**	(0.191)**	(0.183)**	(0.161)**
English difficulty	-1.100	-1.216	-0.797	-0.950
	(0.584)	(0.620)	(0.689)	(0.666)
Post-secondary qualification	0.195	0.138	0.166	0.228
	(0.188)	(0.172)	(0.159)	(0.130)
Divorced	-1.042	-0.997	-0.823	-0.799
	(0.259)**	(0.257)**	(0.235)**	(0.194)**
Married	-0.201	-0.286	-0.190	-0.175
	(0.171)	(0.177)	(0.166)	(0.143)
Age left school 14	-0.317	-0.264	-0.509	-0.827
	(0.193)	(0.192)	(0.180)**	(0.159)**
Age left school 15–16	0.659	0.598	0.259	-0.123
	(0.183)**	(0.178)**	(0.162)	(0.137)
Constant	0.200	-0.038	0.024	0.144
	(0.133)	(0.130)	(0.118)	(0.110)
Number of cells	167	169	163	167
R-squared	0.654	0.691	0.711	0.731

Notes: Robust standard errors in parentheses. * significant at 5% level; ** significant at 1% level

Table B12. Logistic regression of non-Indigenous female labour force participation in rural/remote areas, 1981–96

	1981	1986	1991	1996
Aged 25–34	0.392	0.451	0.753	0.821
	(0.154)*	(0.157)**	(0.155)**	(0.142)**
Aged 35–44	0.888	0.908	1.302	1.337
	(0.169)**	(0.171)**	(0.170)**	(0.156)**
Aged 45–54	0.630	0.563	1.019	1.309
	(0.179)**	(0.186)**	(0.183)**	(0.167)**
Aged 55–64	-0.541	-0.836	-0.549	-0.284
	(0.202)**	(0.209)**	(0.202)**	(0.183)
English difficulty	-0.219	-0.381	-0.511	-0.751
	(0.633)	(0.662)	(0.622)	(0.619)
Post-secondary qualification	0.842	0.834	0.829	0.798
	(0.140)**	(0.130)**	(0.130)**	(0.112)**
Divorced	-1.454	-1.160	-1.000	-0.923
	(0.206)**	(0.200)**	(0.183)**	(0.159)**
Married	-1.204	-0.978	-0.822	-0.809
	(0.160)**	(0.156)**	(0.146)**	(0.129)**
Age left school 14	-0.350	-0.450	-0.726	-0.998
	(0.167)*	(0.171)**	(0.172)**	(0.163)**
Age left school 15–16	0.233	0.166	-0.006	-0.274
	(0.130)	(0.120)	(0.112)	(0.099)**
Constant	0.296	0.329	0.258	0.349
	(0.127)*	(0.118)**	(0.105)*	(0.096)**
Number of cells	161	168	169	175
R-squared	0.574	0.583	0.627	0.671

Notes: Robust standard errors in parentheses. * significant at 5% level; ** significant at 1% level

Appendix Table C1. Marginal effects of variables on non-Indigenous participation rates in major urban areas, 1981–96

	1981	1986	1991	1996
	Change in the probability of participation arising from having a characteristic (in %)			
Non-Indigenous males				
Aged 25–34	28.6	32.1	34.1	38.8
	(3.6)	(3.7)	(3.5)	(3.2)
Aged 35–44	30.1	33.5	35.2	40.8
	(3.8)	(3.9)	(3.6)	(3.4)
Aged 45–54	28.3	31.1	33.2	39.3
	(3.7)	(3.8)	(3.7)	(3.4)
Aged 55–64	18.3	18.3	19.5	21.7
	(3.0)	(3.3)	(3.4)	(3.7)
English difficulty	-6.3	-8.1	-11.9	-22.6
	(6.1)	(6.5)	(6.4)	(6.5)
Post-secondary qualification	7.6	7.2	8.0	10.5
	(2.8)	(2.9)	(3.1)	(3.0)
Divorced	-22.1	-21.3	-18.6	-21.0
	(6.3)	(6.3)	(6.1)	(5.4)
Married	-10.5	-12.0	-9.3	-10.8
	(3.6)	(3.9)	(3.9)	(3.8)
Age left school 14	-8.2	-12.1	-17.0	-23.5
	(3.8)	(4.3)	(4.7)	(4.4)
Age left school 15–16	6.4	4.1	0.5	-5.4
	(2.9)	(3.1)	(3.3)	(3.3)
Non-Indigenous females				
Aged 25–34	15.1	18.8	25.1	26.9
	(3.5)	(3.5)	(3.1)	(2.8)
Aged 35–44	23.4	25.9	32.2	33.4
	(3.4)	(3.4)	(3.0)	(2.8)
Aged 45–54	18.9	20.5	29.6	35.7
	(3.8)	(3.9)	(3.3)	(2.9)
Aged 55–64	-8.4	-12.9	-5.5	2.3
	(4.7)	(4.7)	(4.6)	(4.1)
English difficulty	-0.4	-4.3	-11.8	-23.6
	(5.8)	(5.9)	(5.1)	(4.3)
Post-secondary qualification	18.2	17.7	18.2	18.1
	(3.0)	(2.7)	(2.7)	(2.3)
Divorced	-31.2	-28.5	-26.2	-24.9
	(4.2)	(4.2)	(4.0)	(3.2)
Married	-28.5	-26.4	-24.0	-24.1
	(3.5)	(3.5)	(3.2)	(2.7)
Age left school 14	-8.2	-12.4	-17.0	-22.1
	(3.7)	(3.7)	(3.7)	(3.2)
Age left school 15–16	4.3	1.8	-0.6	-5.8
	(2.9)	(2.7)	(2.5)	(2.2)

Table C2. Marginal effects of variables on non-Indigenous participation rates in other urban areas, 1981–86

	1981	1986	1991	1996
	Change in the probability of participation arising from having a characteristic (in %)			
Non-Indigenous males				
Aged 25–34	30.5	33.0	37.8	38.8
	(7.3)	(7.5)	(7.4)	(6.9)
Aged 35–44	31.1	33.8	37.9	39.9
	(7.4)	(7.6)	(7.4)	(7.0)
Aged 45–54	28.1	31.0	34.8	37.5
	(6.9)	(7.2)	(7.0)	(6.7)
Aged 55–64	15.4	15.9	18.5	18.4
	(4.6)	(4.8)	(4.9)	(4.8)
English difficulty	-7.3	-8.9	-16.7	-20.0
	(17.4)	(18.7)	(19.3)	(20.9)
Post-secondary qualification	7.8	6.5	7.6	9.6
	(3.8)	(3.7)	(3.9)	(3.7)
Divorced	-24.3	-22.3	-20.2	-23.4
	(8.4)	(8.0)	(7.2)	(6.3)
Married	-11.4	-11.5	-10.7	-12.7
	(4.8)	(5.0)	(4.9)	(4.6)
Age left school 14	-8.8	-9.7	-17.3	-25.3
	(5.0)	(5.3)	(5.7)	(5.4)
Age left school 15–16	8.5	7.8	2.0	-5.8
	(4.2)	(4.1)	(4.2)	(4.1)
Non-Indigenous females				
Aged 25–34	9.8	11.2	18.2	20.0
	(3.8)	(3.9)	(3.6)	(3.3)
Aged 35–44	21.7	22.1	30.0	31.2
	(3.9)	(4.0)	(3.6)	(3.4)
Aged 45–54	15.6	14.0	24.1	30.7
	(4.3)	(4.5)	(4.0)	(3.6)
Aged 55–64	-13.1	-19.9	-13.6	-7.1
	(4.7)	(4.7)	(4.9)	(4.5)
English difficulty	-5.4	-9.5	-12.7	-18.5
	(15.5)	(16.1)	(15.3)	(14.5)
Post-secondary qualification	20.7	20.6	20.4	19.7
	(3.4)	(3.1)	(3.1)	(2.7)
Divorced	-33.6	-27.6	-24.4	-22.4
	(4.3)	(4.4)	(4.2)	(3.7)
Married	-28.8	-23.8	-20.3	-19.8
	(3.7)	(3.7)	(3.5)	(3.1)
Age left school 14	-8.7	-11.1	-17.9	-24.1
	(4.1)	(4.2)	(4.1)	(3.7)
Age left school 15–16	5.8	4.1	-0.1	-6.8
	(3.2)	(3.0)	(2.8)	(2.4)

Table C3. Marginal effects of variables on non-Indigenous participation rates in rural/remote areas, 1981–86

	1981	1986	1991	1996
	Change in the probability of participation arising from having a characteristic (in %)			
Non-Indigenous males				
Aged 25–34	30.1	35.8	33.2	37.2
	(4.4)	(5.0)	(5.0)	(4.9)
Aged 35–44	30.6	37.2	33.2	36.4
	(4.5)	(5.1)	(5.0)	(4.8)
Aged 45–54	27.6	33.2	30.7	34.7
	(4.2)	(4.8)	(4.7)	(4.6)
Aged 55–64	15.4	18.9	17.6	19.2
	(3.2)	(3.6)	(3.4)	(3.4)
English difficulty	-22.0	-26.4	-16.4	-21.5
	(14.0)	(15.4)	(16.3)	(16.6)
Post-secondary qualification	3.6	2.9	3.2	5.0
	(3.4)	(3.5)	(3.1)	(2.8)
Divorced	-21.5	-22.1	-17.4	-18.2
	(6.3)	(6.3)	(5.6)	(4.8)
Married	-3.8	-6.0	-3.8	-3.9
	(3.3)	(3.8)	(3.3)	(3.2)
Age left school 14	-6.1	-5.6	-10.4	-18.8
	(3.8)	(4.2)	(3.9)	(3.9)
Age left school 15–16	11.7	11.8	5.0	-2.7
	(3.4)	(3.5)	(3.1)	(3.1)
Non-Indigenous females				
Aged 25–34	12.8	16.2	21.6	24.1
	(3.0)	(3.2)	(2.9)	(2.6)
Aged 35–44	25.1	27.7	32.3	34.3
	(2.9)	(3.1)	(2.8)	(2.6)
Aged 45–54	22.9	24.8	29.7	35.3
	(3.1)	(3.4)	(3.0)	(2.7)
Aged 55–64	5.1	2.9	4.3	10.5
	(3.9)	(4.3)	(3.9)	(3.3)
English difficulty	-0.8	1.4	-7.8	-11.1
	(11.5)	(13.2)	(12.2)	(12.1)
Post-secondary qualification	18.0	18.4	18.3	18.4
	(2.7)	(2.6)	(2.5)	(2.1)
Divorced	-33.3	-30.6	-25.3	-25.7
	(3.9)	(4.3)	(3.8)	(3.2)
Married	-19.3	-18.6	-16.9	-18.4
	(3.3)	(3.5)	(3.1)	(2.6)
Age left school 14	-8.7	-11.3	-14.8	-21.1
	(3.3)	(3.6)	(3.3)	(3.0)
Age left school 15–16	3.5	2.4	-0.7	-6.1
	(2.6)	(2.6)	(2.3)	(2.0)

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