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**The interrelationships
between arrest and
employment: more evidence
on the social determinants of
indigenous employment**

B. Hunter and J. Borland

No. 136/1997

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The interrelationships between arrest and employment: more evidence on the social determinants of indigenous employment

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No. 136/1997

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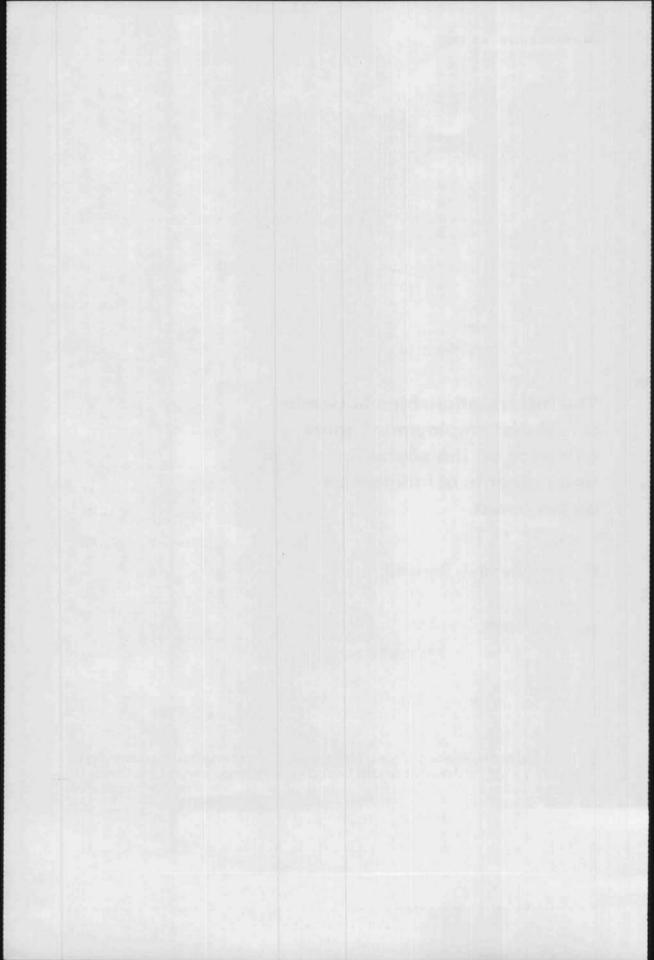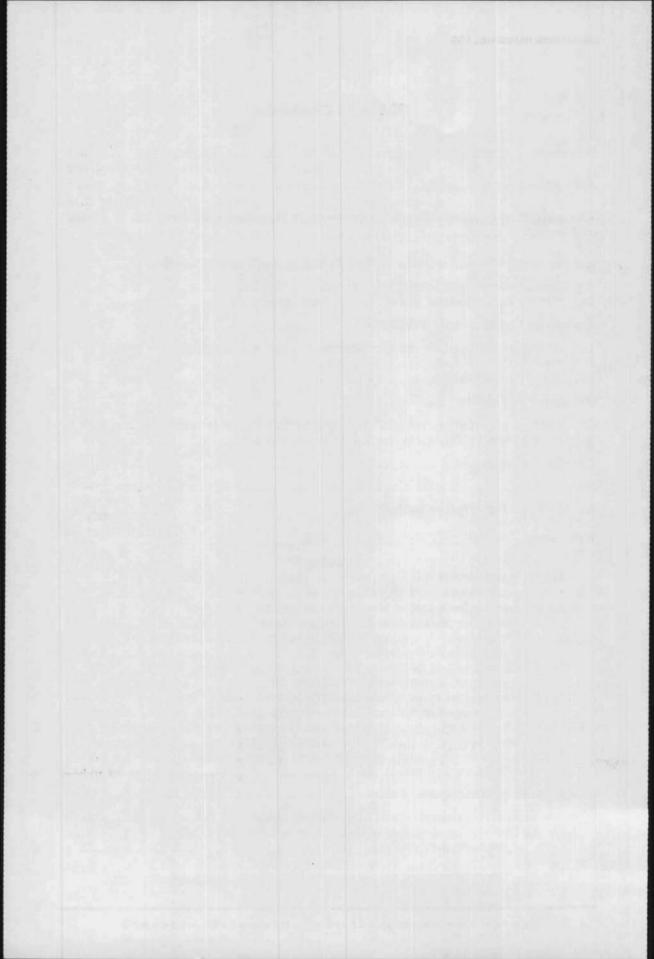
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Summary

Preliminary analysis of the 1994 National Aboriginal and Torres Strait Islander Survey (NATSIS) indicates that arrest is one of the major factors underlying the poor employment prospects of the indigenous population. Unfortunately, these early studies could not determine the direction of causality between arrest and employment. This paper addresses this problem by distinguishes the employment effect of the arrest from the effect of the unobservable characteristics of those arrested.

The experience of arrest among indigenous Australians reduces the probability of being in employment by between

- 13 to 20 per cent for males, and

- 7 to 13 per cent for females.

Differences in arrest rates between indigenous and non-indigenous Australians may explain over 20 per cent of the difference in employment/population ratios between those groups.

There are a number of reasons why arrest reduces employment prospects. If a person who has been arrested is stigmatised by employers, they are less likely to obtain employment Alternatively, employers may be deterred from locating in regions with high levels of criminal activity and hence there may be limited employment opportunities for persons living in those regions. On the supply side, contact with the criminal justice system may affect a person's motivation to work, or perceptions of the expected benefits from seeking employment. Unfortunately, it is not possible to distinguish between supply and demand side influences of arrest.

This paper illustrates the importance of social factors in determining indigenous employment. The significance of general socioeconomic indicators, such as whether a person voted in a recent election or whether they have a long-term health condition, means that labour economists should consider controlling for such factors, wherever possible.

This study also confirms that removal from family environment has an adverse impact on the final socioeconomic status of individuals with the experience of arrest being the mode of transmission of disadvantage. Being taken from one's natural family increases the probability of arrest, but does not directly influence the employment outcome. This result contradicts the claims of certain demagogues who believe that members of the 'stolen generation' benefited from being taken away from their families. The statistical evidence clearly indicates that the average member of this generation has not experienced improved economic outcomes through greater employment opportunities.

The effect of arrest on employment differs by reason for most recent arrest. Persons whose most recent arrest was for a drinking-related offence or on an

outstanding warrant appear to have lower employment probabilities than persons arrested for theft or assault.

The preponderance of alcohol-related offences in the indigenous population also emphasises the direct benefits of decriminalising drunkenness. With 12.4 per cent indigenous males having been arrested in the previous five years for public drunkenness and disorderly conduct, more than 10 per cent of the differential employment rates between the indigenous and non-indigenous population may be eliminated by changing the law(s) which fail to recognise cultural differences between indigenous and mainstream Australian societies.

The findings of this paper resonate with the recommendations of the Royal Commission into Aboriginal Deaths in Custody. In particular, ensuring that indigenous citizens stay out of jails should be a priority policy issue for governments who are concerned about indigenous employment outcomes.

The potential interrelationships between indigenous employment and arrest

One important issue in studies of employment outcomes for indigenous Australians has been the relation between arrest and employment status. Preliminary analysis of the 1994 National Aboriginal and Torres Strait Islander Survey (NATSIS) indicates that arrest is one of the major factors underlying the poor employment prospects of the indigenous population (Australian Bureau of Statistics/Centre for Aboriginal Economic Policy Research 1996; Hunter 1996). Unfortunately, these early studies could not determine the direction of causality between arrest and employment. This paper uses a statistical framework which can address this question.

The major finding of this paper is that the experience of arrest rather than any unobservable characteristics of those arrested are driving the relationship between arrest and employment. For example, our analysis indicates that it is not possible to claim that low marketable 'ability' among certain NATSIS respondents both circumscribed their employment prospects and explains their higher arrest rates.

This paper does not provide the definitive final word on the direction of causality between arrest and indigenous employment. Alternative analysis of time series or longitudinal data may yield different insights into the interrelationships between arrest and employment in the indigenous population. However, given the lack of quality historical data on either, there was no practical alternative to the analysis adopted in this paper.

The analysis in this paper provides a strong empirical and theoretical justification for the policy recommendations of the Royal Commission into Aboriginal Deaths in Custody (Commonwealth of Australia 1991). In particular, ensuring that indigenous citizens stay out of jails should be a priority policy issue for governments who are concerned about indigenous employment outcomes.

There are a number of reasons why linkages might exist between arrest or crime and employment. First, arrest may affect a person's employment outcome. On the demand side, a person who has been arrested and/or convicted of an offence may be stigmatised by employers and hence be less likely to obtain employment (Schwartz and Skolnick 1962; Dale 1976; Finn and Fontaine 1985; Freeman 1988). Alternatively, employers may be deterred from locating in regions with high levels of criminal activity and hence there may be limited employment opportunities for persons living in those regions. On the supply side, contact with the criminal justice system may affect a person's motivation to work, or perceptions of the expected benefits from seeking employment, and hence lower the probability of employment (Becker 1963; Thornberry and Christensen 1984). A second possibility is that a person's employment outcome will affect the likelihood of being arrested. For example, a response to being unable to obtain employment

may be to engage in drinking which increases the probability of being arrested for offences relating to drunkenness (Freeman 1988).

The potential effect of arrest on employment outcomes of indigenous Australians is of interest for a number of reasons. First, it may be important for understanding differences in employment outcomes between indigenous and other Australians. Arrest rates for indigenous Australians are significantly greater than for other Australians—for example, in 1994 indigenous Australians comprised 2.6 per cent of the population in Western Australia yet accounted for 20.2 per cent of total arrests (Broadhurst 1997: 426).[1] Hence, if having been arrested has a negative effect on a person's probability of employment, the disparity in arrest rates may explain part of the difference in employment outcomes between indigenous and other Australians. Second, understanding the relation between an individual's arrest record and employment outcome provides an insight into the social costs of contact with the criminal justice system for indigenous Australians. This seems particularly important where there is a possibility that much of this contact for indigenous Australians arises from differential treatment of indigenous and non-indigenous Australians rather than differences in behaviour.[2]

The objective of this paper is to seek to understand what factors explain employment outcomes for indigenous Australians, with a particular focus on the effects on employment outcomes of an individual's arrest record. A strength of the NATSIS is that it allows a rich set of controls for an individual's socioeconomic background as well as other demographic and skill characteristics to be included in a regression equation for employment status, and alternative representations of an individual's arrest record can be tested.[3] The analysis uses an estimation method which allows for the possibility that an individual's employment outcome and arrest record is simultaneously determined. This estimation method is the main contribution of this paper as it allows us to discern whether or not it is some unobservable characteristic of those arrested which drives the observed correlation between arrest and employment.

After presenting descriptive information on employment outcomes and arrests for indigenous Australians, this paper will provide an intuitive explanation of the model used to estimate the determinants of employment status. The technical details of the statistical models and the regression analysis are documented in Borland and Hunter (1997). The policy implications of the results are discussed in the concluding section of this paper.

Labour force characteristics and high indigenous arrest rates

A statistical overview of labour force status

The employment/population ratio of indigenous Australians has been consistently below the employment/population ratio for other Australians between 1971 and 1994 (Table 1). Indeed, there is some evidence that the relative position of indigenous Australians has in fact worsened over this period.

Table 1. Employment/population ratios, indigenous and total populations aged 15 years and over, 1971–94

Year	Males		Females		Persons	
	Total	Indigenous	Total	Indigenous	Total	Indigenous
1971	79.1	60.4	36.3	21.7	57.7	41.4
1976	76.1	56.2	41.6	25.1	58.7	40.7
1981	73.1	47.0	42.5	24.8	57.6	35.7
1986	66.9	40.4	42.3	22.7	54.4	31.3
1991	64.9	45.0	46.7	29.5	55.6	37.1
1994	66.3	46.5	47.6	28.5	56.8	37.3

Sources: 1971–91 Census of Population and Housing; Daly (1995, Table 1.3); 1994 indigenous: NATSIS unit record file (ABS 1996), and total: ABS (1994)

Descriptive information from the NATSIS undertaken in 1994 suggests that there may also be important interactions between arrest and employment outcomes for indigenous Australians. Using information on the number of times an individual had been arrested in the previous five years, Table 2 presents the relation between the labour force status of indigenous Australians and arrest record.[4] Persons who had been arrested in the past five years are shown to have lower employment than persons who had not been arrested over that period. While the number of arrests is also inversely related to employment, especially employment outside the Community Development Employment Projects (CDEP) scheme, the relationship is not a simple one for females. Indeed, females who were arrested five or more times had higher employment rates than those who were arrested between two and four times in the previous five years.

The other 'stylised' facts discernible from Table 2 are that people who have been arrested are much more likely to be unemployed and are less likely to be outside the labour force. Again there is no simple relationship between the number of arrests and being either unemployed or not in the labour force.

Table 2. Labour force status by number of arrests in the last five years, indigenous Australians, 1994

| Labour Force Status | No Arrest | One or More Arrests | | |
	Total	Total	One	Two–four	Five plus
Males					
Employed — total	55.5	40.9	47.0	38.3	33.6
CDEP	19.2	21.5	22.6	21.0	20.3
non-CDEP	36.3	19.4	24.4	17.3	13.3
Unemployed	23.0	39.4	34.1	45.3	13.4
Not in labour force	21.5	19.7	18.9	16.4	53.0
Total	100.0	100.0	100.0	100.0	100.0
Number	2,387	1,170	468	485	217
Females					
Employed — total	31.3	22.5	25.0	12.8	22.0
CDEP	9.6	10.9	11.9	7.9	16.0
non-CDEP	21.7	11.6	13.1	4.9	6.0
Unemployed	15.7	32.3	28.8	40.8	32.0
Not in labour force	53.0	45.2	46.2	46.4	46.0
Total	100.0	100.0	100.0	100.0	100.0
Number	3,827	474	260	164	50

Source: NATSIS, unit record file (ABS 1996)

Describing employment in the context of high arrest rates

This paper uses the NATSIS to examine the determinants of employment outcomes for indigenous Australians. The NATSIS was undertaken by the ABS in April to July 1994 in response to a recommendation by the Royal Commission into Aboriginal Deaths in Custody that extra statistical information on the indigenous population was required in order to better understand the range of factors contributing to deaths in custody (Commonwealth of Australia 1991). 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).

For this paper a restricted sample is selected from the NATSIS. First, only working-age members of the population who were not in full-time schooling (15–64 years) are included. Second, persons who were in jail at the time of the survey are excluded. This group represented 1.8 per cent of the total sample population.[5]

After imposing these restrictions a sample of 7,858 indigenous persons remains. The sample was further reduced to 6,185 persons after deleting observations which did not have a complete record of all the information required for the analysis.

Tables 2 and 3 present information on employment/population ratios for different sub-groups from the indigenous population. Information is reported on the aggregate employment/population ratio, and on the employment/population ratio for CDEP scheme employment and non-CDEP employment.[6]

Table 3. Employment/population ratio by selected characteristics, indigenous Australians, 1994

	Males			Females		
	Total	CDEP	Non-CDEP	Total	CDEP	Non-CDEP
Age						
15–24	47.1	24.3	22.8	28.7	12.7	16.0
25–44	55.8	19.9	35.9	33.1	9.4	23.7
45–64	43.0	15.1	27.9	24.2	6.2	18.0
Education						
Degree/diploma	70.1	14.9	55.2	60.1	7.8	52.3
Vocational qualification	67.9	10.0	57.9	40.8	3.4	37.4
Year 12	61.9	17.3	44.6	48.2	9.6	38.6
Years 10–11	57.4	20.4	37.0	34.2	9.3	24.9
Years 6–9	46.6	19.7	26.9	24.6	9.5	15.1
Below year 6	35.6	18.9	16.7	18.2	7.5	10.7
Region						
Capital city	49.1	3.6	45.5	25.1	0.9	24.2
Rural area	52.3	22.6	29.7	27.8	4.1	23.7
Other urban area	44.3	9.4	34.9	29.3	10.3	19.0
Remote area	61.7	45.4	16.3	38.4	26.0	12.4

Source: NATSIS unit record file (ABS 1996).

Table 2 shows that the employment/population ratio is lower for persons who had been arrested than for persons who had not been arrested in the last five years. It is also evident that this pattern in aggregate employment is solely due to the relationship between employment status and arrest record for persons in non-CDEP employment. That is, having been arrested does not affect the probability of being in CDEP employment. Table 3 shows that the aggregate

employment/population ratio for both males and females follows an inverted-U pattern with age, is positively related to level of educational attainment, and is slightly lower in other urban areas than in capital cities, rural or remote areas. Non-CDEP employment also exhibits an inverted U-shape relation with age, is positively related to level of educational attainment, and is higher in capital cities and other urban regions than in rural or remote areas. On the other hand, CDEP employment decreases with age, displays no strong pattern of variation with educational attainment, and is higher in rural and remote areas than in capital city or other urban regions.

Table 4. Arrests in last five years by selected characteristics, indigenous Australians, 1994

	Males		Females	
	Proportion arrested	Average number of arrests	Proportion arrested	Average number of arrests
Total	33.3	3.0	11.2	2.2
Age				
15–24	40.6	3.2	13.6	2.5
25–44	37.0	2.8	12.3	2.1
45–64	15.0	2.9	4.7	1.7
Education				
Degree/diploma	17.9	4.1	6.5	2.0
Vocational qualification	34.3	2.5	11.6	1.8
Year 12	20.3	2.1	7.9	2.5
Years 10–11	34.9	2.8	10.7	1.9
Years 6–9	36.1	3.2	13.3	2.3
Below year 6	23.4	2.9	6.5	2.8
Region				
Capital city	36.1	2.9	16.1	2.3
Other urban	35.4	3.1	11.9	2.1
Rural	27.5	2.8	7.5	2.3
Remote	32.4	2.9	9.8	2.3

Note: Average number of arrests is for the subset of persons arrested in the previous five years. Persons with 10 or more arrests were assumed to have 10 arrests.

Source: NATSIS unit record file (ABS 1996)

Tables 4 and 5 present information on proportions of the indigenous population arrested in the last five years. Table 4 shows that 32 per cent of males, and 10 per cent of females, had been arrested in the last five years. Of those arrested the average number of arrests is approximately 3.0 for males and 2.2 for females. Males in younger age groups and with lower levels of educational attainment have the highest incidence of arrest. There does not appear to be any pattern in the incidence of arrest for persons living in different regions.

Table 5 shows that the most common reasons for arrest relate to intoxication—23.1 per cent of males and 6.6 per cent of females had charges for drink driving or drinking in public in their most recent arrest in the previous five years.[7]

Table 5. Reasons for most recent arrest in last five years, indigenous Australians, 1994

	Males	Females
Percentage of population arrested in last five years for:		
Drinking in public	12.4	4.7
Drink driving	10.7	1.9
Assault	6.3	2.1
Outstanding warrant	6.2	1.5
Theft	4.9	1.0

Source: NATSIS unit record file (ABS 1996)

One issue which arises in analysing arrest data from a self-response survey is the possibility of under-reporting of arrest. For example, Freeman (1994: 16) notes that it is common to find under-reporting of crime in the United States by black youths. To examine potential under-reporting of arrest by indigenous Australians we are restricted to a comparison between NATSIS data and official police data for Western Australia as this is the only State which reports official police arrest data disaggregated between indigenous and non-indigenous persons. Estimates based on the official police data indicates that the proportion of indigenous persons arrested in Western Australia between 1990 and 1994 of 24.6 per cent.[8] The closeness of the estimates of the proportion of the indigenous population arrested for Western Australia from the NATSIS and official police data gives us some confidence that, at least at an aggregate level, under-reporting of arrest is not a serious problem.[9]

Models and explanatory variables

Controlling for the unobserved characteristics of people arrested in the last five years

This section is designed to give an intuitive explanation of the analysis underlying the findings on the effect of arrest on employment (see Borland and Hunter 1997). One problem with measuring this effect is that the observed relationship between arrest and employment may be driven by a third factor which is not adequately captured by the data.[10] For example, unmeasured regional

variations in outcomes, arising from the failure to include a state indicator in the NATSIS unit record data, may bias the estimated relationship between arrest and employment. Other factors which are intrinsically difficult to measure, such as 'ability', may also induce the appearance of a relationship.

The analysis uses a procedure which permits us to test whether the effect of arrest on employment is biased by extraneous factors. The separate regressions of arrest and employment enable us to estimate the systematic and unsystematic (or random) components of each. That is, given the observed economic and social characteristics of the sample, it is possible to calculate the probability that an individual will have been arrested between 1989 and 1994. The unsystematic component of the arrest equation, also known as the generalised residual, indicates the extent to which it is not possible to explain observed arrest experience using the observed characteristics of respondents. This generalised residual could be thought of loosely as indicating the unobserved characteristics of people arrested vis-à-vis other indigenous people.

In order to understand whether the systematic component of the arrest is driving this correlation between arrest and employment we need to include the generalised residual from the arrest equation in the employment equation. The significance of the generalised residual term is that it is a measure of whether the effect of arrest on employment is simply capturing extraneous factors. However, if this variable is not significant then it is important to omit it from the final analysis to ensure that the effect of arrest on employment is consistently estimated.

In this way it is possible to gain an appreciation of whether arrest is driving employment rather than some unobserved characteristics driving both arrest and employment. However, this technique is not valid if the arrest equation does not include certain variables which are not systematically related to employment. This condition, known in econometric terms as the identification of the arrest equation, is met through the omission of variables which are uncorrelated to employment in both theory and practice. For the purposes of this study, the arrest equation is identified by the inclusion of three variables: whether there are indigenous police aides/liaison officers in the community, whether the distance to the nearest police station is less than 50 kilometres and whether an individual was taken from their natural family. These variables have no significant systematic relationship with employment in any of the regressions tested. In the case of the last identifying variable, this observation has important implications in its own right and will be discussed more fully in the final section.

In all employment regressions analysed for this paper it was not possible to reject the hypothesis that there is no bias in the effect of arrest on employment arising from a third factor. Therefore the unobservable characteristics of people who have been arrested cannot explain the correlation between arrest and employment for either males and females. This provides clear evidence that it is the experience of arrest which adversely affects employment prospects for indigenous people.

Explanatory variables

In the estimation of the employment status equation one important issue is whether to include persons working under the CDEP scheme as employed or not employed. Our objective is to characterise the determinants of employment status in an environment where direct government intervention through job creation schemes is absent. Since employment under the CDEP scheme is generally regarded as a substitute for receipt of unemployment benefit payments, we classify persons employed under the CDEP scheme as not employed.[11]

Individuals' observed employment outcomes will depend on the interaction of labour demand and labour supply factors. Hence, in addition to the arrest record variable, we seek to include as explanatory variables in the employment equation a range of other factors which are likely to capture both effects of labour demand and labour supply on employment. These factors can be classified as four main types of variables: skill; location; family; and socioeconomic. To capture skill factors, variables for age (15–24, 25–44, and 45–64 years), for years completed at high school, for whether a respondent has a degree/diploma, vocational qualification, or other post-school qualification, for whether completed a training course in the previous year, and for whether have difficulty in speaking English, were included. Locational determinants of employment status are proxied for by variables for region of residence (capital city, other urban, rural or remote). Family-type variables included in the employment regression equation are variables for whether the respondent is married, is a sole parent, lives in a mixed family, and the number of children in the family. Possible socioeconomic or social influences on employment status are represented by variables for whether the respondent speaks an indigenous language, voted in any recent election, has a long-term health condition, spent time in hunting and gathering activities in the previous year, had ever drunk alcohol, and whether the respondent was a Torres Strait Islander. For example, the voted variable might proxy for the degree to which a person participates in mainstream indigenous society.

Previous studies of the determinants of employment outcomes for indigenous Australians have generally focused on the role of skill, location and family-type variables. These studies have found that educational attainment, employment history, number of dependent children, English-language ability, and location are the main explanatory factors for employment outcomes within the indigenous population (Ross 1993; Daly 1995; ABS/CAEPR 1996).

The arrest record variable represents a summary of arrest outcomes in previous time periods and hence it is a function of the lagged values of explanatory variables. Unfortunately, information on explanatory variables in previous time periods is not available from the NATSIS so that it is necessary to include explanatory variables from the current time period to proxy for effects from previous time periods. Explanatory variables included in the arrest equation are the set of variables from the employment equations plus legal variables. These include whether there are indigenous police aides or liaison officers in the community, and whether the nearest police station is less than 50 kilometres

distance—and a variable for whether the respondent was taken from their natural family. Members of the 'stolen generation' who were taken from their natural families have experienced social dislocation and alienation which anecdotal evidence suggests has significantly increased contact with the criminal justice system (Commonwealth of Australia 1997: 12–16).

For some variables which are relatively 'permanent', such as age, educational attainment, whether a person was taken from their natural family, and whether they drink alcohol, use of current period variables should not cause a significant loss of information. On the other hand, high rates of geographic mobility in the indigenous population are likely to mean that variables related to current location may be less accurate as proxies for previous location.[12] It should be noted though, that our primary objective is to control for unobserved characteristics of the NATSIS respondents, rather than to seek to interpret the coefficient estimates in that regression or to explain arrest outcomes. To undertake the latter task of explaining arrest outcomes it would be necessary to take proper account of the wide range of theoretical work on the determinants of criminal activity (Broadhurst 1997: 413–15). The variables used in the analysis are defined more fully in Appendix Table A1. Sample statistics for all variables used in the regression analysis are reported in Appendix Table A2.

Summary of results

Overall effect of arrest on indigenous people's employment prospects

This section presents the summary of the main findings on the marginal effect of arrest on the employment probabilities of indigenous Australians. Results for two alternative specifications of the arrest variable—as a variable for whether a person had been arrested in the last five years and as a series of variables for whether a person's most recent arrest involved charges for drinking offences, theft, assault, or an outstanding warrant—are obtained. Before focussing on the effect of arrest on the employment, we should consider the other factors which affect arrest and employment.

The overall probability of arrest for both males and females is found to decrease with age and years of high school, and to be lower for persons who had voted in a recent election, did not have difficulty in speaking English, were living in a racially mixed family, did not have a long-term health condition, had never drunk alcohol, lived in a remote region or in an urban area outside a capital city, or were Torres Strait Islanders. While the findings suggest that life-cycle and human capital factors are important for explaining arrest, the probability of arrest is also strongly related to a person's family and socioeconomic environment. The set of identifying variables for the arrest equation are significant for both males and females. The most important influences from this set of variables are whether the respondent was taken from their natural family and the distance to the nearest police station.

A wide range of factors are found to affect a person's employment outcome. Each set of explanatory variables—skill, location, family, and socioeconomic—are jointly significant for both males and females at the 1 per cent level. As well as establishing the existence of a significant negative relation between arrest and employment status, the probability of employment is found to be lower for younger and older age groups, for persons with low levels of educational attainment and training, with difficulty in speaking English or who had been arrested, and higher for persons who were married, had voted in a recent election, or were living in a mixed family.[13]

The findings are interesting because they also indicate which factors are not important determinants of employment. Hunting, fishing and gathering activities have no effect on the probability of employment. While this provides prima facie support for the conjecture that there is little substitution between these traditional activities and market work, concerns about the accuracy of the variable means that caution should be exercised in interpreting the results (Smith and Roach 1996). For example, the fact that the NATSIS questioned indigenous people about their hunting, fishing and gathering activities in the context of voluntary work means that respondents may have understated such activities if they did not perceive them to be 'voluntary' or indeed 'work'.

Whether an individual had ever drunk alcohol had no significant impact on employment prospects. This clearly indicates that alcohol consumption only affects employment prospects through its affect on arrest rather than any direct mechanism. Similarly, being taken from one's natural family increases the probability of arrest, but was found to have no significant impact on employment. Both variables are proxies, in some sense, for aspects of the alienation felt by many indigenous people from the institutions of mainstream society, especially the criminal justice system.

Two aspects of the findings from the employment status regressions merit particular comment. First, an original aspect of this study is the finding that socioeconomic background exerts a strong influence on the employment outcomes of indigenous Australians. Second, it is notable that even after controlling for socioeconomic factors there is a significant relation between a person's arrest record and employment status. This suggests that the effect of arrest on employment is not simply proxying for a wider set of social influences such as a person's health status or whether a person drinks alcohol.

To further assess the effect of having an arrest record on employment status estimates of the marginal effect on the probability of employment of having been arrested in the previous five years are presented in Table 6. Marginal effects are measured for a hypothetical reference person, 'the base case', and a range of alternative cases are presented. The base case for this exercise is an Aboriginal person aged 25–44 who: is living in an urban region outside a capital city, left school in years 6 to 9, has no post-school qualification, has had no training in the previous 12 months, does not have difficulty in speaking English and does not speak an indigenous language, who is married with no children, but does not live

in a racially mixed family, does not spend time in hunting and gathering activities, voted in a recent election, has drunk alcohol and does not have a long-term health condition. This base case was chosen using sample information on the most likely outcome for each variable (Appendix Table A2).

The results for the base case for both males and females suggest that having been arrested has a significant effect on the probability of employment. For males having been arrested reduces the probability of employment from about 0.488 to 0.294; and for females the probability of employment falls from about 0.275 to 0.144. Both marginal effects are significant at the 1 per cent level. There is some, although not substantial, variation in the marginal effect of arrest on employment for the alternative cases considered. For males the marginal effect varies from 13 to 20 per cent, and for females from 7 to 13 per cent. The largest effect of arrest is for cases where the probability of employment in the absence of arrest is highest. For example, for a female with 12 years of school and a degree/diploma the probability of employment is much larger than in the base case, and the effect of arrest on the probability of employment is correspondingly higher. Therefore the opportunity cost of being arrested is higher if you are well educated because, as well as foregoing your (usually) higher wages during the period of incarceration,[14] your employment prospects are significantly reduced relative to other indigenous Australians.

This last proposition can be generalised to encompass other factors which increase one's employment prospects. For example, people who live in areas with well developed labour markets, such as capital cities, or older indigenous workers are more affected by the employment consequences of arrest than other workers with poorer employment prospects.

What are the implications of the effect of arrest on employment status for understanding differences in employment outcomes between indigenous and non-indigenous Australians? Since arrest rates are substantially lower for non-indigenous than indigenous Australians it might be expected that the negative effect of arrest on employment would provide some explanation for why employment/population rates of indigenous Australians are lower than for non-indigenous Australians. One approach to estimating the size of this effect is to multiply the difference in arrest rates between indigenous and non-indigenous Australians by the effect of arrest on the probability of employment. To undertake this exercise we use data on the difference in arrest rates between indigenous and non-indigenous persons between 1990 and 1994 from Western Australia (Ferrante and Loh 1996: 39), and estimates of the effect of arrest on employment from the regression analysis in this paper. As data on arrest rates of indigenous and non-indigenous Australians are not available disaggregated by gender the analysis is restricted to total persons.

Based on calculations reported earlier in the paper, the proportion of indigenous persons arrested between 1990 and 1994 is taken as 24.6 per cent. For the proportion of non-indigenous persons arrested in the same period, we take an upper bound estimate of 8.5 per cent and a lower bound estimate of 2.6 per cent.[15]

Alternative cases where the marginal effect of arrest is to reduce the probability of employment by 10 per cent and 20 per cent are considered. Effects of 10 and 20 per cent approximately correspond to the average effect of arrest on employment respectively for females and males and hence seem reasonable as lower bound and upper bound estimates of the size of the effect.

Table 6. The marginal effect of having an arrest record on the probability of employment, indigenous Australians, 1994

		Males			Females		
		No arrest	Arrest		No arrest	Arrest	
		Prob (emp)	Change in prob (emp)	Stand. error	Prob (emp)	Change in prob (emp)	Stand. error
1	Base case	0.4880	-0.1944	0.023	0.2754	-0.1316	0.026
2	Capital city	0.5621	-0.2014	0.024	0.2444	-0.1212	0.026
3	Rural area	0.4400	-0.1866	0.022	0.2241	-0.1139	0.023
4	Remote area	0.3853	-0.1747	0.022	0.2194	-0.1122	0.023
5	Age 15–24	0.3383	-0.1621	0.022	0.1780	-0.0957	0.020
6	Age 15–24 + capital city	0.4088	-0.1802	0.024	0.1542	-0.0855	0.021
7	Age 15–24 + rural area	0.2952	-0.1486	0.021	0.1389	-0.0786	0.018
8	Age 15–24 + remote area	0.2487	-0.1320	0.020	0.1355	-0.0771	0.018
9	Age 45–64	0.4198	-0.1826	0.021	0.2379	-0.1189	0.024
10	Degree/diploma + year 12	0.7711	-0.1803	0.030	0.7637	-0.1645	0.041
11	Vocational + year 10	0.7587	-0.1837	0.024	0.5579	-0.1839	0.039
12	Difficulty in English + remote	0.2922	-0.1476	0.022	0.1482	-0.0828	0.020
13	Two–three children	0.4349	-0.1856	0.022	0.1488	-0.0831	0.017
14	Two–three children + Mixed family	0.6240	-0.2021	0.024	0.2529	-0.1242	0.025
15	Not married	0.3569	-0.1674	0.021	0.2657	-0.1285	0.026

Notes: Base case = An Aboriginal aged between 25 and 44 who: lived in urban region outside capital city; did not complete training course in previous 12 months; had no difficulty in speaking English; left school years 6–9; had no post-school qualification; was married without children; did not speak indigenous language; voted in recent Federal, State or ATSIC election; did not living in mixed family; did not have long-term health condition; and has drunk alcohol.

Prob(emp) in the 'No arrest' case is the probability of employment derived for the base case after adjusting for the alternative characteristics of each case.

Source: Borland and Hunter (1997)

For the case where the lower bound estimate of non-indigenous persons arrested is applied together with the assumption of a marginal effect of arrest on employment of 20 per cent it is found that the difference in arrest rates between indigenous and non-indigenous Australians would result in a 4.4 per cent lower employment/population ratio for indigenous than non-indigenous Australians. In the case where the upper-bound estimate of non-indigenous persons arrested is applied together with the assumption of a marginal effect of arrest on employment of 10 per cent the difference in arrest rates would result in an employment/population ratio that were 1.7 per cent lower for indigenous than non-indigenous Australians. As the difference in the employment/population ratio between these groups in 1994 was 19.5 per cent (Table 1) it can be seen that the arrest effect would account for between 9 to 23 per cent of the difference in employment/population ratios between indigenous and non-indigenous Australians in 1994.

It is interesting to consider this finding in the context of recent studies of employment outcomes for indigenous and non-indigenous Australians which have generally concluded that the difference in employment/population ratio between those groups is mainly due to differences in labour market treatment rather than differences in average characteristics. For example, a common finding is that 20 per cent of the difference in employment/population ratios is due to differences in average characteristics, and the remaining 80 per cent is due to differences in treatment (Miller 1989; Daly 1993, 1995). The findings from this study suggest that by omitting arrest records from the set of characteristics used to explain employment outcomes, previous studies may have under-estimated the role of differences in characteristics in explaining differences in employment/population ratios between indigenous and non-indigenous Australians.

Type of arrest and indigenous employment outcomes

The alternative specification of the arrest variable in this study involves a decomposition of the arrest variable by reason for most recent arrest. How does each type of arrest affect employment outcomes? The findings of the analysis of the determinants of reason for arrest are similar to those for the previous specification of the arrest variable. Differences in the size and significance of explanatory variables across the arrest equations are also generally as would be expected—for example, the variable 'ever-drunk-alcohol' has a larger effect on the probability of arrest for drinking-related offences than on other types of arrest. Identification of the disaggregated arrest equations is, for the most part, satisfactory.

The analysis of the affect of type of arrest on employment indicates that unobservable characteristics of people who have been arrested cannot explain the correlation between arrest and employment for each category of arrest. The conclusion that the experience of arrest adversely affects employment prospects is robust for each sub-category of arrest. This alternative specification of arrest yields similar patterns amongst the determinants of employment with each of the four

categories of explanatory variables (socioeconomic, regional, family, economic) being significantly related to employment.

Table 7 presents the marginal effect of type of arrest on the probability of employment for the base case scenario. For both males and females the largest negative effect on employment occurs where a person's most recent arrest involved charges for drinking-related offences or on an outstanding warrant. It is of interest that even after controlling for whether a person has ever drunk alcohol arrest for drinking-related offences has a significant negative effect on employment. Arrest for theft has no significant effect on the probability of employment for either males or females, and arrest for assault significantly reduces the probability of employment only for males.

Table 7. Effect on probability of employment of arrest record by reason for last arrest

	No arrest	Arrest	
	Prob (emp)	Change in prob (emp)	Standard error
Males			
Drink driving/drunk in public	0.4706	-0.1339	0.027
Theft	0.4706	-0.0536	0.054
Assault	0.4706	-0.1167	0.046
Outstanding warrant	0.4706	-0.1755	0.046
Females			
Drink driving/drunk in public	0.2630	-0.1277	0.030
Theft	0.2630	-0.1452	0.076
Assault	0.2630	-0.0944	0.062
Outstanding warrant	0.2630	-0.1740	0.059

Notes: Prob(emp) in the 'No arrest' case is the probability of employment derived for the base case. The characteristics of the base case person are defined in Table 6.

Source: Borland and Hunter (1997)

There are a number of potential explanations for why the effect of arrest on employment might differ by reason for most recent arrest. One possibility is that the variables for the reason for arrest are a proxy for the number of arrests in the employment equation. For example, it might be thought being arrested on an outstanding warrant makes it more likely that persons will have been arrested on multiple occasions and that this explains the large size of the effect on employment of having been arrested on an outstanding warrant. However, analysis of the number of arrests by reason for last arrest revealed that there was no difference in the number of arrests in each arrest category.[16] Another possibility is that each type of arrest is treated differently by employers when choosing which potential worker to hire or has a different effect on an individual's motivation to

seek employment. On the demand side it is difficult, however, to see why an employer would not take into account an arrest for theft but would take into account arrest for drinking-related offences. Hence, it may be that the pattern of marginal effects by reason for arrest is explained by supply-side behaviour. For example, arrest for drinking-related offences may indicate that an individual is in an environment where lack of employment opportunities or social conditions reduce the perceived returns to seeking employment.

Concluding remarks

This study has provided a number of new insights into the determinants of employment for indigenous Australians. First, we find that a wide variety of factors are related to employment outcomes. In addition to explanatory variables which seek to capture skill, location or family differences between individuals, it is also found that a set of socioeconomic variables are significant determinants of employment. Second, we find that persons who have been arrested have a significantly lower probability of employment—about 13 per cent for females and 19 per cent for males. On the basis of these estimates it is calculated that differences in arrest rates between indigenous and non-indigenous Australians could account for over 20 per cent of the difference in employment outcomes between these groups. Third, we find that the effect of arrest on employment differs by reason for most recent arrest. The pattern of the effects leads us to speculate that the effect of arrest on employment may represent a supply-side rather than demand-side phenomenon. If this is the case, then policy needs to address the lack of employment opportunities and/or the social conditions which reduce the perceived returns to seeking employment.

The findings of this paper resonate with the recommendations of the Royal Commission into Aboriginal Deaths in Custody. For example, recommendation 62 indicates that

> [T]here is an urgent need for governments and Aboriginal organizations to negotiate together to devise strategies designed to reduce the rate at which Aboriginal juveniles are involved in the welfare and criminal justice systems and, in particular, to reduce the rate at which Aboriginal juveniles are separated from their families and communities, whether being declared in need of care, detained, imprisoned or otherwise (Commonwealth of Australia, 1991: 83).

This study confirms that removal from family environment has an adverse impact on the final socioeconomic status of individuals with the experience of arrest being the mode of transmission of disadvantage. Being taken from one's family increases the probability of arrest, but does not directly influence the employment outcome. This result contradicts the claims of certain conservative demagogues who believe that members of the 'stolen generation' benefited from being taken away from their families. The statistical evidence clearly indicates that the average member of this generation has not experienced improved economic outcomes through greater employment opportunities. While the evidence is

definitive for employment, the relative economic status of individual members of the 'stolen generation' is a complex issue which requires further analysis. Notwithstanding any future evidence about relative economic status of this generation, the inherently racist nature of the policy means that it should be condemned (Commonwealth of Australia 1997).

The preponderance of alcohol-related offences in the indigenous population also emphasises the direct benefits of decriminalising drunkenness (Commonwealth of Australia 1991: 87–88). For example, given that offences relating to drinking in public or disorderly conduct account for between 30 to 40 per cent of indigenous arrests, the above analysis indicates that decriminalising drunkenness and related drunken behaviour will substantially reduce indigenous employment disadvantage. With 12.4 per cent of indigenous males having been arrested in the previous five years for public drunkenness and disorderly conduct, more than 10 per cent of the differential employment rates between the indigenous and non-indigenous population may be eliminated by changing the law(s) which fail to recognise cultural differences between indigenous and mainstream Australian societies.[17] Clearly, the Royal Commission's emphasis on preventing custodial sentences has tangible economic benefits for individual indigenous people and will have a measurable impact on reducing Australia's welfare bill (see recommendations 79 to 121 in Commonwealth of Australia 1991: 87–95).

The importance of general socioeconomic and family factors in determining employment outcomes has general implications for employment studies in the population at large. For example, the significance of the socioeconomic indicators, such as whether a person voted in a recent election or whether they have a long-term health condition, means that labour economists should consider controlling for such factors, where possible, as a matter of course.

The economic and social costs of low rates of employment for indigenous Australians are significant and a represent a major problem for policy-makers in Australia (Taylor and Altman 1997). Much attention has been devoted to policy solutions to the problem of low rates of employment which involve direct labour market intervention. The analysis in this paper suggests that it will also be necessary to address the social environment in which individuals make decisions about labour supply and labour demand—and in particular, to address the problem of the high arrest rates among indigenous Australians.

Notes

1. Data on arrest by race are only available from Western Australia—see Ferrante and Loh (1996).

2. Broadhurst (1997: 417) argues that there is '...clear statistical support for the proposition that 'race' or Aboriginality increases the risk of arrest'. However, he also cautions that '...Aboriginality may be a factor or variable that catches a number of

stigmatizing characteristics (such as truancy, unemployment, substance abuse) and in this sense operates as a shorthand 'predictive' model for police...'.

3. One previous study has used the NATSIS to examine the effects of previous arrests on the probability of employment for indigenous Australians (ABS/CAEPR 1996). This study differs from ABS (1996a) in its use of an estimation method which allows for potential joint endogeneity between employment and arrest, the inclusion of alternative representations of the arrest variable and a broader range of potential explanatory variables for employment outcomes, and by reporting marginal effects of arrest on employment (and associated standard errors) for a range of alternative scenarios. Other studies of the determinants of employment outcomes for indigenous Australians which do not consider the role of arrest are Miller (1989), Ross (1993), and Daly (1993, 1995).

4. Some studies have examined the relative effects on employment probabilities of arrest compared to conviction. Although persons convicted of a crime are generally found to have the lowest employment probabilities, having been arrested also has a significant negative effect on the probability of employment (Schwartz and Skolnick 1962; Finn and Fontaine 1985; Freeman 1994).

5. For more details on the characteristics of the population in jail at the survey date, see Carach and Mukherjee (1996).

6. The CDEP scheme is a Commonwealth government program whereby unemployed indigenous persons of working age forego individual entitlements to unemployment benefit payments in return for a grant to their local community council which is used to fund job creation in community development activities. A community wishing to participate in the CDEP scheme applies to the Aboriginal and Torres Strait Islander Commission (ATSIC). The number of people allowed to participate in the CDEP scheme has recently been capped by the present government, and ATSIC's role is to choose those communities which will participate in the scheme. Those communities already participating in the CDEP scheme are given precedence in the allocation of places, and communities not receiving funding are placed on a waiting list. In communities receiving CDEP payments individuals are not eligible to receive unemployment benefits. The CDEP scheme began in 1976/77 with the participation of a single community of 100 persons and at that time accounted for only 0.1 per cent of Commonwealth expenditure on indigenous persons; by the time of the NATSIS survey, however, the scheme had expanded to 262 communities with over 27,000 participants and accounted for more than 30 per cent of expenditure on indigenous persons (Sanders 1993; Hunter and Taylor 1996).

7. Proportions of males and females arrested by reason of most recent arrest presented in Table 5 do not sum to the total proportion of males and females arrested in Table 4 as the most recent arrest may involve charges for multiple offences.

8. Data from the NATSIS show that 25.4 per cent of the indigenous population in Western Australia in 1994 had been arrested in the previous five years (ABS 1995: Table 51). Data from official police data show that in each year from 1990 to 1994 total arrests were 15.9 per cent, 16.9 per cent, 15.9 per cent, 15.6 per cent, and

15.9 per cent of the indigenous population in Western Australia (Ferrante and Loh 1996: 39). To make the official police data comparable with the NATSIS data it is necessary to convert the annual percentages to an estimate of the proportion of the indigenous population arrested over the previous five years. This calculation is made by summing total arrests as a percentage of the indigenous population across the five year period from 1990 to 1994, and then adjusting to take account of persons who were arrested multiple times throughout the period. The adjustment is necessary because some persons were arrested more than once in a year and therefore the official police data will over-estimate the proportion of the population who were arrested in that year. The adjustment uses a measure of the average number of arrests per arrested person over the previous five years in Western Australia derived from the NATSIS data (3.26 arrests).

9. Note that we do not take account of the possibility that some persons living in Western Australia at the time of the NATSIS survey had been arrested in other States, or that some persons recorded in official police data as having been arrested in Western Australia during 1990 to 1993 were no longer living in Western Australia in 1994. However, inter-State mobility is generally fairly low. For example, Taylor and Bell (1996: 397) report that only 5.1 per cent of the indigenous population moved between States from 1986 to 1991.

10. Another potential source of bias in the estimated effect of arrest on employment is the possible reverse causality between employment and arrest. This possibility is excluded by the nature of the data with employment status being contemporaneously measured and arrest information being based on the reported historical experience of respondents.

11. Classifying persons employed under the CDEP scheme as non-employed does not involve any judgement about the 'genuineness' of CDEP employment. It simply derives from an assumption that those persons would not be in employment in the absence of government intervention through the CDEP scheme.

12. For example, Taylor and Bell (1996) using 54 regions find that about 47 per cent of the indigenous population changed residence between 1986 and 1991.

13. The positive employment impact of living in a mixed family is probably driven by the socioeconomic differences within families. The concentration of mixed families in urban areas is a factor in the persistence of the social and regional structure of indigenous economic status with about 82 per cent of mixed families living in such areas. The incidence of mixed families in capital cities is more than five times that of remote areas with 57.6 per cent (as opposed to 10.2 per cent) of families being mixed in our major cities.

14. Daly (1995) finds that better educated indigenous workers have higher wages on average than other indigenous workers.

15. The upper bound estimate which assumes that each person is arrested only once equals the total number of non-indigenous arrests as a proportion of non-indigenous population. The lower bound estimate which adjusts for the possibility that the same individual is arrested on multiple occasions equals the total number of non-indigenous arrests as a proportion of the non-indigenous population divided by the estimate of arrests per person in Western Australia from the NATSIS data.

16. The chi-squared test for equality of means revealed that it was not possible to reject at the 10 per cent level of significance the hypothesis of equal number of arrests in each reason for arrest category.

17. The indigenous male employment/population ratio could be increased by 2.5 percentage points if offences for public drunkenness and disorderly conduct were eliminated. The female employment ratio would improve by about 1.0 percentage points. While the majority of States had decriminalised public drunkenness before 1990 (Commonwealth of Australia 1992: 279–80), the results indicate that substantial economic gains can still be made by addressing problems relating to the policing of statutes relating to disorderly conduct or drinking in public. An alternative strategy, nominally supported by all State and Federal governments in their responses to the Royal Commission in Aboriginal Deaths in Custody (Commonwealth of Australia 1992: 281–84), is to ensure ongoing funding and maintenance of adequate non-custodial facilities for the care and treatment of intoxicated persons.

Appendix A. Descriptive Tables

Table A1. Variable definitions in alphabetical order

Dependent Variables

ARREST =	Whether arrested in previous five years
ASSAULT =	Last arrest for assault
DRINKDRI/PUBDRINK =	Last arrest for drink driving or public drunkenness
EMP =	Whether a person was employed in non-CDEP employment
OUTSWARR =	Last arrest for outstanding warrant
THEFT =	Last arrest for theft

Explanatory Variables

BELOWYEAR6 =	Highest level of schooling completed—less than year 6
CAPCITY =	Lives in a capital city
COMPLETE =	Completed training course in last 12 months
DIFENG =	Has difficulty in speaking English
DRINKS =	Whether have ever drunk alcohol
FOURPLKID =	Greater than or equal to 4 children aged 0–12 years
GENRESID1 =	Generalised residual from probit arrest regression and
GENRESID2X =	Generalised residual from probit arrest regressions by reason of last arrest
HEALTH =	Have a long-term health condition
HUNTGATH =	Spent time in last week in hunting and gathering activity
INDIGLAN =	Speaks indigenous language
INDIGPOL =	Indigenous police aides/liaison officers in community
MARRIED =	Whether married
MIXEDFAM =	Lives in family with non-indigenous persons
NEARPOLIC =	distance to nearest police station is less than 50 kilometres
NOKIDS =	No children aged 0–12 years
ONEKID =	1 child aged 0–12 years
OTHURBAN =	Lives in non-capital city urban area
QDEGRDIP =	Post-school qualification—degree or diploma
QVOCAT =	Post-school qualification—vocational qualification
QOTHER =	Post-School qualification—other
QNONE =	No post-school qualification
REMOTE =	Lives in a rural remote area (more than 100 kilometres from a TAFE institution)
RURAL =	Lives in rural non-remote area (less than 100 kilometres from a TAFE institution)
SOLEPAR =	Sole parent
TAKEN =	Taken from natural family
TSI =	Whether a Torres Strait Islander
TWOTHKID =	2–3 children aged 0–12 years
VOTED =	Voted in one of most recent Federal, State, ATSIC, or local Land Council elections
YEAR12 =	Completed year 12 schooling
YEARS1011 =	Highest level of schooling completed—year 10 or 11
YEARS69 =	Highest level of schooling completed—years 6 to 9
ZEROKID =	zero children aged 0–12 years

Table A2. Descriptive statistics of the sample used in the regression analysis

Variables	Males		Females	
	Mean	Standard deviation	Mean	Standard deviation
EMP	0.299	0.458	0.205	0.404
ARREST	0.341	0.474	0.113	0.317
DRINKDRI	0.107	0.309	0.019	0.137
PUBDRINK	0.124	0.330	0.047	0.212
THEFT	0.049	0.217	0.012	0.099
ASSAULT	0.063	0.243	0.023	0.144
OUTSWARR	0.062	0.241	0.017	0.120
AGE15–24	0.279	0.449	0.278	0.448
AGE25–44	0.516	0.499	0.524	0.500
AGE45–64	0.205	0.403	0.198	0.398
TSI	0.062	0.243	0.063	0.243
CAPCITY	0.087	0.283	0.094	0.292
OTHURBAN	0.458	0.498	0.494	0.500
RURAL	0.190	0.393	0.168	0.374
REMOTE	0.265	0.441	0.244	0.430
DIFENG	0.152	0.359	0.155	0.362
COMPLETE	0.066	0.248	0.043	0.204
QDEGRDIP	0.017	0.129	0.041	0.199
QVOCAT	0.084	0.277	0.068	0.252
QOTHER	0.051	0.220	0.045	0.207
QNONE	0.848	0.359	0.846	0.361
YEAR12	0.066	0.249	0.081	0.272
YEARS1011	0.373	0.484	0.412	0.492
YEARS69	0.451	0.498	0.410	0.492
LESSYEAR6	0.110	0.312	0.097	0.297
MARRIED	0.571	0.495	0.546	0.498
NOKIDS	0.430	0.495	0.342	0.474
ONEKID	0.198	0.398	0.227	0.419
TWOTHKID	0.273	0.446	0.326	0.469
FOURPLKID	0.099	0.299	0.105	0.306
SOLEPAR	0.029	0.167	0.197	0.398
HUNTGATH	0.182	0.386	0.109	0.312
INDLANG	0.334	0.471	0.314	0.464
VOTED	0.776	0.417	0.799	0.401
TAKEN	0.085	0.279	0.083	0.275
MIXEDFAM	0.153	0.360	0.156	0.363
HEALTH	0.328	0.470	0.405	0.491
DRINKS	0.889	0.315	0.681	0.466
INDPOL	0.624	0.484	0.644	0.479
NEARPOL	0.824	0.381	0.842	0.365
GENRES1	0.000	0.733	0.000	0.554
GENRES21	0.000	0.671	0.000	0.464
GENRES22	0.000	0.429	0.000	0.235
GENRES23	0.000	0.489	0.000	0.926
GENRES24	0.000	0.480	0.000	0.282
Observations	2835		3350	

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