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FACTORS ASSOCIATED WITH THE LABOUR FORCE  
PARTICIPATION OF PRIME-AGE INDIGENOUS  
AUSTRALIANS

Y DINKU AND J HUNT

Centre for  
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# FACTORS ASSOCIATED WITH THE LABOUR FORCE PARTICIPATION OF PRIME- AGE INDIGENOUS AUSTRALIANS

Y Dinku and J Hunt

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## Abstract

There is a high prevalence of disengagement from the labour market among prime-age Indigenous Australians (aged 25–54 years). People in this demographic group are at their most productive in terms of working lives. They have generally finished their schooling and are well before their retirement, and their absence from the labour market has important implications. However, little is known about the underlying factors influencing their decision to participate or not in the mainstream labour market. Drawing on data from a relatively recent nationally representative survey, this study finds that disability, education and history of incarceration are the three most important driving factors for both male and female labour force participation. Education and incarceration experiences have greater associations with female labour force participation, whereas disability has a greater association with male labour force participation. We also find that the factors affecting the labour force participation of people in their prime-working lives are largely different from those affecting the labour force participation of people entering the labour market (aged 15–24 years) and those approaching retirement (aged 55–64 years).

**Keywords:** Indigenous, prime-age, labour force, Australia

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## Acronyms

ABS	Australian Bureau of Statistics
CAEPR	Centre for Aboriginal Economic Policy Research
IRSAD	Index of Relative Socioeconomic Advantage and Disadvantage
NATSIS	National Aboriginal and Torres Strait Islander Survey
NATSISS	National Aboriginal and Torres Strait Islander Survey
NAIDOC	National Aboriginal and Islanders Day Observance Committee
VIF	Variance Inflation Factor

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## Introduction

The 2016 Census shows that, in Australia, 44% of the working-age Aboriginal and Torres Strait Islander people (aged 15-64 years) are out of the labour force, compared with only 23% of the non-Indigenous people (Australian Bureau of Statistics (ABS) 2018a). The 2014–15 National Aboriginal Torres Strait Islander Social Survey (NATSISS) shows similar results: people in their prime-working lives (i.e. aged 25–54 years) account for two-thirds of the Indigenous population not in the labour force; and 28% of males and 46% of females in this demographic group are not in the labour force. At the time of this survey, more than 80% of the prime-age people not in the labour force were absent from the labour force for more than 12 months, and a further 15% had never participated in the labour force (ABS 2016).

The labour force participation of prime-age people is of particular economic and policy importance. People in this demographic group are at their most productive in terms of working lives. They have generally finished their schooling and are well before their retirement, and their absence from the labour market has important implications. Evidence also shows that an ongoing disengagement from the labour force puts people at high risk of socioeconomic disadvantage such as financial insecurity, psychological distress and poor employment prospects (Parsons 1980; Goldsmith, Veum & William. 1996; Ganley 2002; Wakabayashi & Donato 2005; Hunter Kalb & Le 2014; Bowen & Finegan 2015). For the government, a high rate of non-participation in the labour force can lead to reduced tax revenue and increased welfare spending (Schofield et al. 2008).

This study advances previous research into the labour force participation of prime-age Indigenous people in several ways. First, while prior research looks into the determinants of labour force participation of the working-age Indigenous population in general, this study builds separate models of participation for the prime-age and other age groups (Borland & Hunter 2000; Hunter & Gray 2001; Gray & Hunter 2002; Stephens 2010; Kalb et al. 2014; Birch & Marshall 2016). Second, the study uses a relatively recent data set, the 2014–15 NATSISS. The latest data set that has been used in the labour force literature is the 2008 NATSISS (Hunter & Daly 2013; Birch & Marshall 2016) up to this time. Third, since NATSISS uses clustering and stratification sampling designs (ABS 2016), we apply estimation techniques that allow for the complex survey design and statistical accuracy. Fourth, much of the existing literature on Indigenous labour force participation focuses mainly on effects of behavioural, social and cultural factors. To increase the evidence base, this paper examines effects associated with differences in labour market opportunities.

We find that labour force participation of the prime-age population is significantly associated with a range of personal attributes (such as age, gender, marital status, disability, history of incarceration, and level of education) and household characteristics (such as overcrowding, family composition, and financial security). While there are some differences between males and females in the type of factors underlying their labour force participation, disability, education and contact with the criminal justice system appear to be the three most important factors associated with labour force participation of both sexes. Individuals with a higher level of education have a higher likelihood of participation in the labour force, whereas people with disabilities and who have been imprisoned are less likely to be in the labour force. The labour supply associations with education and incarceration are greater for females than males, whereas the association with disability is greater for males than females. Unlike previous studies, this paper shows that factors affecting the labour force participation of people in their prime-working lives are largely different from those affecting the labour force participation of people entering the labour market (aged 15–24 years) and those approaching retirement (aged 55–64 years). Furthermore, although previous studies show a significant association between cultural attachment and Indigenous labour force participation (Hunter & Gray 2001; Stephens 2010), this study suggests that the relationship is driven by spatial differences in Indigenous settlement. We note that prevalence of Indigenous language use and cultural participation are higher in very-remote communities where labour market

opportunities are more limited, and the influence of cultural attachment on labour market engagement appears to be less significant once local socioeconomic characteristics are considered.

The paper is organised as follows. Section 2 reviews the existing literature. Section 3 describes the data and variables of interest. Section 4 provides the empirical model. Section 5 presents the findings and Section 6 concludes the paper.

## Literature review

A growing body of research examines the factors associated with labour force participation of Indigenous Australians. The probability of not being in the labour force appears to have a strong association with personal attributes such as age, sex, marital status, English proficiency, educational attainment and health. Hunter and Gray (2001), using data from the 1994 National Aboriginal and Torres Strait Islander Survey (NATSIS), show that labour force participation varies with age: younger people (aged 15–24 years) and older people (aged 45–64 years) are less likely to be in the labour force than those aged 25–44 years. They also show that long-term illness increases the likelihood of not being in the labour force. Using data from the 2002 NATSISS, Stephens (2010) shows that labour force participation increases with English fluency and the level of education. Gray and Hunter (2002) use data from the 1981 and 1996 censuses and find that married males are more likely to be in the labour force than their unmarried counterparts, whereas married females are less likely than unmarried ones to be in the labour force. Perhaps marriage brings overwhelming domestic responsibilities (such as childcare and household chores) to married women.

Labour force participation has also been correlated with measures of cultural attachment such as speaking an Indigenous language, living in homeland or traditional country, and involvement in cultural and traditional practices. However, the direction of the relationship appears to be mixed. Stephens (2010) shows that participation in cultural events and living in homelands or traditional country are positively associated with participation in the labour force, whereas speaking an Indigenous language is associated with a higher chance of absence from the labour force. Hunter and Gray (2001) also find a similar correlation between speaking an Indigenous language and labour force participation. They also show that males and females participating in hunting and gathering activities are more likely to be out of the labour force, suggesting that such activities may substitute for activities in the mainstream labour market.

There is also evidence of a strong association between labour force participation and measures of social capital and civic engagement. A finding by Hunter and Gray (2001) shows that people who voted in a recent election are less likely to be out of the labour force. The authors also find that people who have been participating in voluntary work have a lower chance of not being in the labour force. They note that voluntary work may increase employability through acquired skills and experience; and social interactions at work may provide job information and positively influence individuals' attitude towards labour market employment.

Factors related to transportation are also found to have a significant association with Indigenous labour force participation. Using data from the 2008 NATSISS, Birch and Marshall (2016) find that individuals who own a car or have a driving licence are more likely to be in the labour force than their counterparts without a car or driving licence.

Studies show that contact with the criminal justice system is a determining factor for labour force participation. Borland and Hunter (2000) use data from the 1994 NATSIS and show that the history of arrest has a significant negative effect on Indigenous employment. Hunter and Daly (2013) use an all-female sample from the 2002 NATSISS and find that Indigenous females who have been arrested in the five years before the survey tend to

have lower labour force participation rates than females who have not been arrested. Stephens (2010) also shows that contact with the criminal justice system has a negative effect on the labour supply of females but not that of males. The results suggest that the high rates of Indigenous male incarceration and rapidly growing rates of female incarceration in Australia can have significant labour market implications for Indigenous people.

Congruent with the view that family is an integral part of the social and economic lives of Indigenous Australians, existing studies show that Indigenous persons' labour force participation is strongly correlated with household attributes. Both Hunter and Gray (2001) and Hunter and Daly (2013) show that sole parenthood has a large negative effect on labour force participation of Indigenous women. The former show that sole parent males also have a higher chance of becoming discouraged workers: people who want to work but are not actively looking for a job – believing they will not find any – and hence are not included in the labour force (ABS 2018b). Stephens (2010) notes that the presence of dependent children in the family is inversely related to female labour force participation, but positively related to male labour force participation. Hunter and Gray (2001) find a large negative labour supply effect of dependent children for females, but they do not find effects for males. In contrast, Hunter and Daly (2013) find a significant positive association between fertility and labour force participation rates: an increase in the number of children is associated with an increase in the probability of the mother being in the labour force. Together, the results imply that children can have both substitution and income effects on females' labour supply. On the one hand, more children may mean more domestic responsibilities, hence a higher chance of not being in the labour force. On the other hand, a few additional children may impose more demand on family resources and encourage females to join the labour force.

In terms of family composition, Hunter and Daly (2013) show that Indigenous females who live in 'ethnically mixed' families tend to have a higher rate of labour force participation than those who live in a family where all the household members are Indigenous. Stephens (2010) also shows that living in a 'mixed' household has a positive effect on labour force participation for both males and females; and the effect is fourfold for females. There is also evidence that labour force participation is associated with the employment status of other members of the family. Hunter and Gray (2001) find that the presence of employed adults in the family increases the likelihood of being part of the labour force, whereas the presence of unemployed adults increases the chance of not being in the labour force; and the effect is much larger for females. The authors suggest that such effects may be channelled through role modelling and better access to labour market information. Individuals in households with more than one unemployed household members may have limited access to labour market information. The presence of household members who are unemployed or out of the labour force may also negatively influence the attitude of other individuals toward labour market activities.

The literature also records that labour force participation rates vary spatially. Hunter and Daly (2013), using female Indigenous residents in major cities as a base category, show that Indigenous females who live in inner regional and outer regional Australia are less likely to be in the labour force, whereas those who live in remote Australia are more likely to be in the labour force. Hunter and Gray (2001) also show that females who live in capital cities and rural areas (places more than 100 kilometres away from a technical and further education institution) are more likely to be out of the labour force than those who live in urban areas but not in capital cities. However, the authors note that, the reasons for being out of the labour force are different for the females in capital cities and rural areas. Females in capital cities are out of the labour force due mainly to discouragement – they have a desire to work but are not actively looking for jobs, whereas those in rural areas are not in the labour force largely because they have less interest in working in the labour market. Hunter and Gray (2001) do not find a discernible rural–urban disparity in the labour force participation of men.

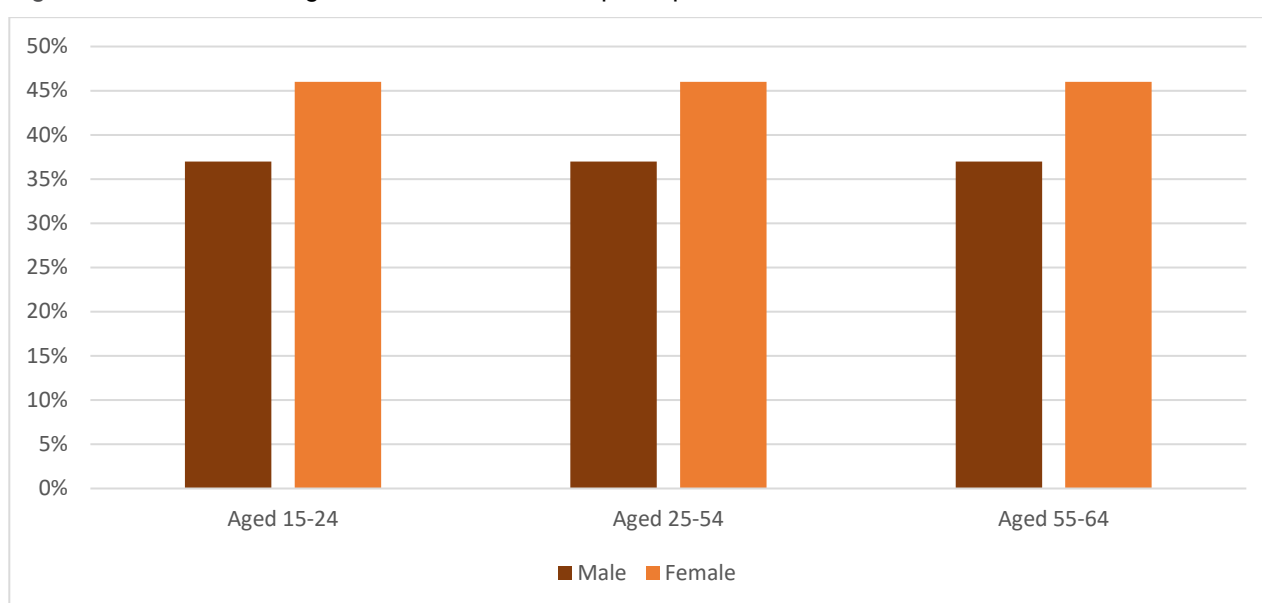
## Data and descriptive statistics

Our data come from the 2014–15 NATSISS. The survey consists of a nationally representative sample of 11,178 Aboriginal and Torres Strait Islander peoples living in private dwellings across Australia. Information about the survey design and sampling procedure is available from the ABS (2016). The NATSISS provides information on labour force status and other key socioeconomic indicators such as educational attainment, health status, social interactions, cultural participation, access to services, household finance, housing conditions, family composition, contact with the criminal justice system and regional remoteness. Table A1 in the Appendix presents the other variables of interest along with their definition.

In the NATSISS, the sample for the working-age population consists of 6424 Indigenous adults of whom 4024 are people in their prime-working lives. Labour force status is recorded in three categories: employed, unemployed and not in the labour force. These are mutually exclusive categories used by the ABS to measure the economically active population (people aged 15 years and over) at a given point in time. Employed people are those who worked during the reference week for one hour or more for pay or profit, or performed a task without pay for one hour or more that contributed directly to the operation of a farm or business run by a family member, or had a job but were not at work. A person is considered unemployed if they are jobless, but actively looking for a job and are available to start work in the reference period. The employed and unemployed people together make up the labour force. People without a job, but not actively seeking employment, or not available to start work in the reference week are considered to be not in the labour force (ABS 2018b).

For the purpose of this study, we construct a dichotomous variable that takes the value ‘1’ if the person reports to be employed or unemployed and takes the value ‘0’ if the person reports to be out of the labour force. People may be out of the labour force voluntarily (due to lack of desire to work) and involuntarily as discouraged workers (because of lack of employment opportunities), and the latter could be more prevalent in very-remote communities. However, the NATSISS does not clearly differentiate between the two groups of people, and the ‘not in the labour force’ category may include discouraged workers. To minimise biases arising from such measurement errors, our empirical model controls for indicators of regional and local labour market conditions.

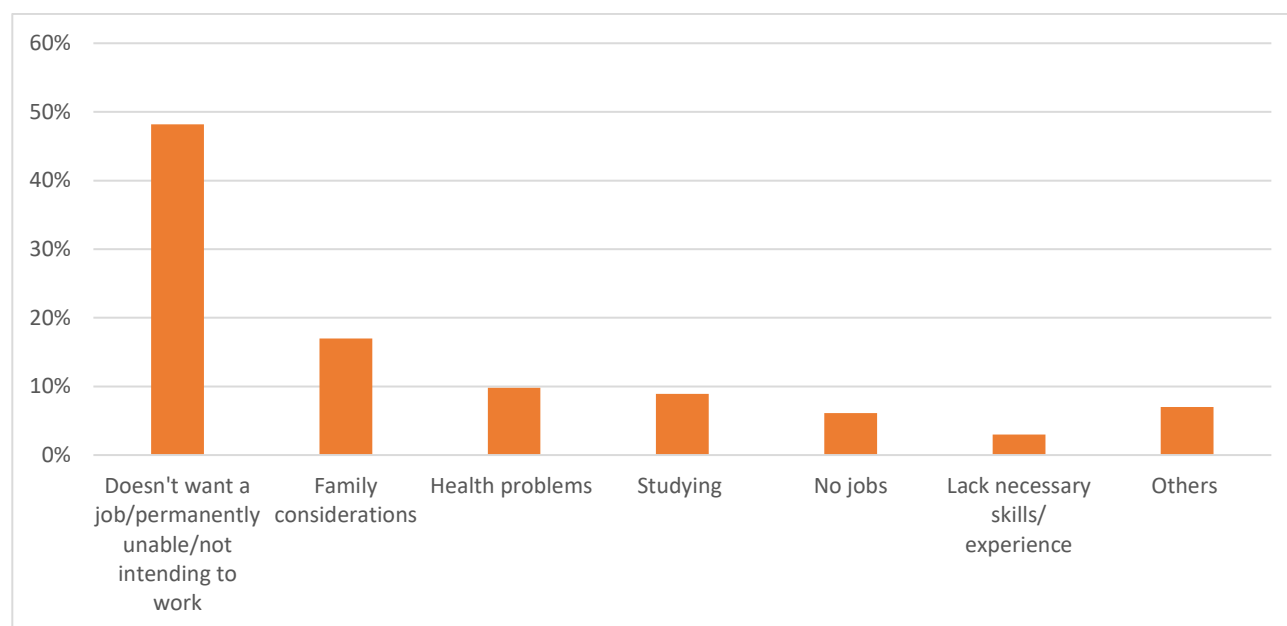
Fig. 1. Prevalence of Indigenous labour force non-participation



Source: NATSISS 2014–15 Expanded CURF (ABS 2016).

Table A2 in the Appendix shows that 42% of the working-age population (people aged 15–64 years) are not in the labour force. People in their prime-working lives account for the lion's share (66%), followed by those aged 15–24 years (23%) and people aged 55–64 years (11%). Variations in the rate of non-participation both within and between age groups are shown in Fig. 1. Older people have the highest non-participation rate followed by the younger ones and people in their prime-working lives. Across the three age groups, females are more likely to be out of the labour force than males. The widest gender gap is among the prime-working-age population, where females are 1.7 times as likely as males to be out of the labour force.

Fig. 2. Reasons for not being in the labour force (percentage of prime-age Indigenous population)



Source: NATSISS 2014–15 Expanded CURF (ABS 2016).

Note: The category 'Others' includes responses such as 'welfare payment may be affected', 'moving house', 'on holiday' and other unspecified reasons.

The reasons given by prime-age people not in the labour force for not looking for a job are depicted in Fig. 2. The three most common reasons are 'does not want a job/permanently unable/not intending to work', 'family considerations' (which includes ill-health of household members, childcare and other family responsibilities) and 'own health problem' (which includes own long- and short-term illnesses). Since disability and other long-term health issues are reported under the category 'health problems', it is not clear from the first category what the response 'permanently unable to work' refers to. In fact, the category combines two conceptually inconsistent responses: the response 'does not want a job or not intending to work' implies lack of desire to work, whereas the response 'permanently unable to work' implies inability to work. Fig. 2 shows that unavailability of jobs (in one's area of residence, or line of work, or with suitable hours) and lack of necessary skills account for less than 10% of the responses. The ABS considers people not in the labour force for reasons related to job unavailability and lack of skills/experience as discouraged job-seekers – that is, people who want and are available to start work, but have given up looking for a job due to unfavourable labour market conditions (ABS 2018b).

## Modelling labour force participation

This section provides a simplified conceptual framework to motivate the empirical model for labour force participation.

Traditionally, an individual's decision whether or not to supply labour to the market is considered part of a utility maximisation objective. Labour market employment increases utility through access to consumption of goods and services, but also causes disutility by reducing time available for other activities and posing physical or mental exhaustion. Thus, decision outcomes depend on net returns to working in the labour market and to the individual's assessment of the relative value of income from the labour market to time spent on other activities, which may in turn depend on a range of individual and family circumstances.

Suppose that an individual enters the labour force only if net utility from employment in the labour market is positive, a latent variable  $U_{ih}^*$  can be defined as:

$$LF_{ih} = \begin{cases} 1 & \text{if } U_{ih}^* = X_{ih}\gamma + Z_h\beta + \xi_{ih} > 0 \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

where  $i$  and  $h$  index the individual and household respectively;  $LF_{ih}$  is observed labour force status and equals 1 if in the labour force and equals 0 if not in the labour force;  $X_{ih}$  is a vector of observable individual characteristics;  $Z_h$  is a vector of proxies for household characteristics;  $\gamma$  and  $\beta$  represent parameters of interest corresponding to the explanatory variables; and  $\xi_{ih}$  is an idiosyncratic error term.

A desire to work, while expected to highly depend on non-labour income (including welfare benefits), may also depend on human capital such as health and education, as well as on the presence of competing priorities such as household chores and caregiving responsibilities. In this context, intra-household specialisation between the production of domestic tasks and market-based productions can be important.

Cultural norms may influence attitudes towards labour market employment. For example, cultural norms may underpin gender appropriateness of livelihood activities, and men and women may specialise in performing different activities. A strong cultural preference for specific economic activities (such as hunting and gathering) may also shift labour away from livelihood activities in the mainstream economy (Hunter & Gray 2001).

Individuals' labour force status may also depend on social interactions and acquaintanceship. Networking with people who are actively engaged in labour market activities may provide a wealth of information about a job opening and institutional details of potential employers, thereby reducing transaction costs associated with job searching and the likelihood of discouragement (Granovetter 2018). Social networks may also create enabling conditions for engagement in labour market activities. For instance, childcare support by families and friends can increase a mother's capacity to join the labour force. Nevertheless, involvement in social groups may bring individuals under the influence of group norms and increase the likelihood of disengagement from the labour force when norms of behaviour are inconsistent with working in the labour market (Gray & Hunter 2005; Maru & Davies 2011).

Demand-side factors also may influence a person's decision whether or not to be in the labour force. For example, being jobless for reasons relating to the unavailability of jobs in one's line of work, area of residence, or with suitable hours may lead to discouragement and withdrawal from the labour force. Such experiences are likely to be more prevalent in remote and economically disadvantaged communities. Lack of success in finding a job for reasons such as lacking appropriate skills and experiences, or discrimination may also lead to labour force discouragement.

People in different areas may face very different labour market opportunities, and those who live in areas with fewer labour market opportunities may have different incentives from those who live in areas with abundant labour market opportunities to participate in the labour force (Lilly, Laporte & Coyte 2007). The single most widely used geographic variable in the Australian labour force literature is remoteness, which identifies the

relative accessibility or inaccessibility of a residential location to population centres. In this study, we control for two additional variables that reflect inter-regional differences in labour market opportunities and show the extent to which social and economic needs of Indigenous peoples are met in a given area. The first variable measures regional unemployment. The 2014–15 NATSISS provides data on remoteness (such as major cities, inner regional, outer regional, remote and very-remote) based on the ABS Remoteness Structure and identifies 20 remoteness regions across Australia (ABS 2016). Our interest is to proxy how well Indigenous people's aspiration to work are satisfied by available labour market opportunities in each region, and the ratio of employed Indigenous people to all Indigenous people who are in employment and want to work would have been a better proxy in this regard. However, the NATSISS does not provide a direct measure for individuals' desire to work. Alternatively, we use unemployment rates as indicators of whether or not available labour supplies have been sufficiently met by labour market demands, where high unemployment rates correspond with limited availability of jobs for Indigenous persons in the area. The second variable is an index of relative socioeconomic advantage and disadvantage (IRSD). NATSISS also provides an index developed by the ABS and measures the average socioeconomic characteristics of individuals, families and households within an area. The index is defined in deciles and ranks geographic areas (Statistical Area Level 1) in Australia based on their relative advantages and disadvantage with regard to selected economic and social endowments such as income and tertiary education attainment (ABS 2011). We presume the variable helps to capture effects associated with the quality local labour markets.

Given the availability of data in the NATSISS on an array of individual, household and area characteristics, we can, therefore, redefine Eq. (1) in an estimable form as:

$$Pr(LF_{ihj} = 1) = F(X'_{ihj}\alpha + Z'_{hj}\varphi + W'_j\delta + \varepsilon_{ihj}) \quad (2)$$

where  $F(\cdot)$  is binary function;  $X_{ihj}$  and  $Z_{hj}$  are as defined in Eq. (1);  $\alpha$  and  $\varphi$  are the respective set of corresponding coefficients;  $W_j$  is a vector of area characteristics along with a set of coefficients  $\delta$ ; and  $\varepsilon_{ihj}$  is an error term.

A logit model is applied to Eq. (2). Taking into consideration that the NATSISS uses a multistage sampling process to choose sample households, the empirical model has been specified to allow for the complex survey design. Also, survey weights have been used to maintain the representativeness of the sample, and jack-knife standard errors have been computed. While the focus of this study is to investigate the factors associated with the labour force participation of prime-age Indigenous people, the probability of being in the labour force is also separately estimated for people aged 15–24 years and those aged 55–64 years. People younger than 15 are excluded from the analysis because of the unavailability of labour force data. People aged 65 years and over are generally excluded from labour force participation models (Borland & Hunter 2000; Hunter & Gray 2001; Stephens 2010; Birch & Marshall 2016).

## Results

The empirical results (average marginal effects and standard errors) for prime-age persons are presented in Table 1. Although some of the independent variables seem to proxy similar socioeconomic characteristics, there is no evidence of multicollinearity in the regression analysis (see Table 6A in the Appendix). For the sake of completeness, we begin by presenting results for the full sample in Columns (1–2). We note labour force participation is associated with a range of personal attributes. In looking at the first row, males are 15.7 percentage points more likely than females to be in the labour force. Married people are 8.1 percentage points more likely than unmarried ones to be in the labour force.

As expected, education attainment appears to be a strong predictor of labour force participation. Compared with people having 12 years of education, the likelihood of participation in the labour force is lower by 11.7 and 8.5 percentage points, respectively, for those with nine years of education or less and 10 or 11 years of education; and the likelihood is higher by 10.1 and 22.9 percentage points for those with a college certificate or diploma and a college degree or higher, respectively. Labour force participation is also found to have a significant association with some aspects of social capital. People reporting to have known a member of the government are 5.8 percentage points more likely to participate in the labour force.

People with disabilities are 17.4 percentage points less likely to be in the labour force than those with no disability conditions. Having a transportation problem is found to be associated with a 6.2 percentage point reduction in the likelihood of being in the labour force. Persons who have been incarcerated are 12.9 percentage points less likely to be in the labour force than those who have never been incarcerated. There is also evidence that prime-age labour force participation is closely linked with certain household characteristics. Individuals who live in crowded houses (in which one or more extra bedrooms are needed) are 9 percentage points less likely to be in the labour force. Those who live in households with tight financial conditions are also more likely to be out of the labour force. Compared with individuals who reported that members of their family could raise \$2000 within a week during an emergency, those who reported that their family members could not raise such amount of money are 7.8 percentage points less likely to participate in the labour force. All of these household characteristics may of course be associated with lack of income due to being out of the labour force. There is no evidence, however, that labour force participation is associated with area-level characteristics. The estimated marginal effects of remoteness, local socioeconomic status and regional unemployment rates are not statistically significant at the 5% level.

Table 1. Estimated marginal effects associated with prime-age labour force participation

Variable	Full sample		Women		Men	
	AME	SE	AME	SE	AME	SE
<b>Male</b>	0.157*	0.022				
<b>Age</b>	0.001	0.001	0.004*	0.002	-0.004*	0.002
<b>Married</b>	0.081*	0.028	0.013	0.034	0.117*	0.042
<b>Studying</b>	0.017	0.033	0.025	0.044	0.005	0.064
<b>Year 9 or less</b>	-0.117*	0.046	-0.189*	0.059	-0.047	0.067
<b>Year 10 or 11 only</b>	-0.085*	0.041	-0.130*	0.051	-0.024	0.061
<b>Certificate/diploma</b>	0.101*	0.038	0.093	0.050	0.107	0.055
<b>Degree or higher</b>	0.229*	0.052	0.240*	0.068	0.234*	0.076
<b>Diagnosed with long-term illness</b>	-0.030	0.025	-0.009	0.036	-0.047	0.036
<b>Living with disability</b>	-0.174*	0.021	-0.168*	0.033	-0.178*	0.028
<b>Transport problem</b>	-0.062*	0.029	-0.050	0.039	-0.076	0.041
<b>Indigenous language</b>	-0.017	0.012	-0.033	0.018	0.007	0.017
<b>Identifies with a clan, tribal or language group</b>	-0.007	0.022	-0.004	0.033	-0.008	0.034
<b>Participates in cultural activities</b>	0.018	0.022	0.010	0.031	0.034	0.033
<b>Involved in cultural events</b>	0.051	0.031	0.052	0.041	0.025	0.045
<b>Participates in community activities</b>	-0.054	0.062	-0.058	0.090	-0.047	0.073
<b>Knows a member of government</b>	0.058*	0.027	0.036	0.041	0.084*	0.040
<b>Able to get support</b>	0.017	0.040	0.035	0.060	-0.018	0.056
<b>Carer (non-childcare)</b>	0.034	0.024	0.033	0.031	0.026	0.035
<b>Frequent social contact</b>	-0.045	0.023	-0.029	0.031	-0.050	0.033
<b>Has confidants</b>	0.008	0.031	0.046	0.048	-0.016	0.040
<b>Unfairly treated</b>	0.030	0.024	0.014	0.031	0.026	0.036
<b>Ever incarcerated</b>	-0.129*	0.040	-0.230*	0.078	-0.077*	0.038
<b>Dependent children in the family</b>	-0.025	0.023	-0.067*	0.031	0.016	0.032
<b>N. older family members</b>	0.024	0.013	0.038*	0.015	0.002	0.021
<b>Mixed family</b>	0.038	0.030	0.083*	0.040	0.018	0.042
<b>Overcrowding</b>	-0.090*	0.031	-0.077	0.047	-0.110*	0.044
<b>Could not raise \$2000</b>	-0.078*	0.024	-0.104*	0.034	-0.043	0.037
<b>Unsure if raise \$2000</b>	-0.036	0.049	0.003	0.064	-0.053	0.065
<b>Ran out of money</b>	-0.009	0.032	0.020	0.040	-0.037	0.046
<b>Regional unemployment rate</b>	0.006	0.004	0.009	0.005	0.002	0.005
<b>Local area advantage and disadvantage</b>	0.005	0.005	0.001	0.008	0.010	0.007
<b>Remoteness</b>	0.004	0.028	0.057	0.040	-0.055	0.039
<b>Sample size</b>	3778		2206		1572	
<b>Population size</b>	221 163		117 749		103 414	

Note: AME and SE stand for average marginal effect and standard error, respectively. \* Shows statistical significance at the 5% level. Population sizes are estimated using individual replicate weights.

Since the result for the full sample shows a significant gender gap in labour force participation, we expect disaggregating the sample into male and female samples to show a more heterogeneous picture. Results for the female-only sample are presented in Columns (3–4) and results for the male-only sample are presented in Columns (5–6). We note that age has opposing relationships with female and male labour force participation. Labour force participation of females increases with age, whereas labour force participation of males decreases with age. One possible explanation for this disparity is that men are more likely to working in physically demanding occupations that reduces their ability to work as they age, whereas older women may have more time for paid work as children grow up.

Marriage is positively associated with male labour force participation. Transition to marriage may be accompanied by additional family and social responsibilities which require more time and money. While those requiring more time may compete with labour market activities, those responsibilities requiring more money may encourage participation in the labour market. For married men, therefore, perhaps financial needs associated with marriage may outweigh domestic responsibilities, thereby increasing their labour force participation. We do not see a significant association between marriage and women's labour force participation, this is perhaps because domestic responsibilities and financial needs offset each other.

The relationship between education and labour force participation has an interesting gender dimension. For males, it is only a post-school qualification that has a labour supply effect, whereas for females both school and post-school qualifications appear to be important for labour force participation. Females with education levels below Year 12 are less likely to be in the labour force, whereas those with school qualifications beyond Year 12 are more likely to be in the labour force. Taking Year 12 completion as a base category, the likelihood of participation in the labour force is lower by 18.9 percentage points for females with nine years of education or less and by 13 percentage points for those with 10 or 11 years of education.

Acquiring post-school qualifications appears to have similar effects male and female labour force participation. For females, the probability of labour force participation is higher by 9.3 percentage points for those with a college certificate or diploma and by 24 percentage points for those with a college degree or higher. For males, the probability of labour force participation is higher by 10.7 percentage points for those with a college certificate or diploma and by 23.4 percentage points for those with a college degree or higher. For both sexes, the relationships associated with having a college certificate or diploma are statistically significant only at the 10% level. The results suggest that at lower school levels, an increase in educational attainment increases females' employability, or their desire to work, by a larger margin than it does for males (Hunter & Gray 2001).

Females who reported having disabilities are about 17 percentage points less likely to be in the labour force than their counterparts without disabilities. For males, having a disability is associated with an 18-percentage point decrease in the probability of being in the labour force. For both sexes, the correlation between having a disability and labour force participation appears to increase with severity of disability. Females with severe or profound core activity limitations are 17 percentage points less likely than those with mild or moderate disabilities to be in the labour force; and males with severe or profound core activity limitations are 25 percentage points less likely than those with mild or moderate disabilities to be in the labour force.

Together, estimated marginal effects from education and disability suggest that people with a high level of human capital are likely to have a high rate of labour force participation. For males, it appears that not only human capital, but also social capital significantly predicts labour force participation. We note men who reported to have known someone in the government are 8.4 percentage points more likely to be in the labour force. This is perhaps because knowing a member of the government may help a person attain employment, or alternatively, active participation in the labour market may help people to get to know someone in the government.

The link between incarceration and labour force participation is statistically significant for both females and males. Females who have been incarcerated are 23 percentage points less likely than those who have not been incarcerated to be in the labour force. Males who have been incarcerated are 7.7 percentage points less likely to participate in the labour force than those who have not been incarcerated. Incarceration appears to damage employment prospects: people may have lost useful work skills and experiences while in prison; social networks that provide job information may also be lost as a result of imprisonment; conviction may be viewed as a sign of untrustworthiness and employers may discriminate against those with an incarceration history; and former prisoners may be still under parole conditions and other restrictions (such as being subject to curfew and restriction not to enter specific areas) that may make it difficult to work. Prison experiences also may pose emotional and psychological impairment and negatively impact desires to enter (re-enter) the labour market. Alternatively, not having a job may lead to a greater likelihood of incarceration due to possible participation in anti-social activities (Graffam, Shinkfield & Hardcastle. 2008).

Although the 2014–15 NATSISS shows that males are three times as likely as females to have been incarcerated and serve 1.2 times longer prison terms than females, our finding shows that females who have been incarcerated are almost three times as likely as their male counterparts to be out of the labour force. We also note that females who have been incarcerated are 17 and 10 percentage points more likely than males to have experienced a high level of psychological distress and to have been diagnosed with mental illness, respectively. This implies that prison experiences appear to have more adverse effects on females' post-prison life.

Measures of family composition have significant associations with labour force participation only for females. For example, the presence of dependent children in the family decreases the probability of females being in the labour force by 6.7 percentage points. Children can have income and substitution effects on women's labour supply. On the one hand, they may pose financial burdens, thereby motivating labour force participation. On the other hand, they may require parental time, thereby interfering with labour market activities. The result suggests that substitution effects outweigh income effects. We note that the presence of an additional household member aged 15 years and over in the household increases the probability of participation by 3.8 percentage points. This is perhaps because compared to children, older household members provide helping hands with performing domestic tasks so that females will have enough time to work outside the home.

Females who live in families of mixed Indigenous and non-Indigenous composition are 8.3 percentage points more likely to have participated in the labour force than those who live in families with only Indigenous members. It may be that Indigenous norms define gender appropriateness of labour activities and have a limiting effect on female labour force participation (Maru & Davies 2011); and living in a family with non-Indigenous members may create exposure to non-Indigenous ways of life and may influence employment preferences in favour of broader labour market activities (Stephens 2010).

Living in overcrowded households is negatively correlated with labour force participation. Males who live in houses where extra bedrooms are required are 11 percentage points less likely to be in the labour force than those who live in houses with a sufficient number of bedrooms. Although the estimated correlation with female labour force participation is large (a 7.7 percentage point decrease in the likelihood of participation in the labour force), it is only significant at the 10% level. Stephens (2010) finds a similar relationship between labour force participation and overcrowding: a greater negative effect on labour force participation of males than that of females. Although poor housing conditions are likely to affect labour force participation through poor health, the result may also reflect a correlation that runs in the opposite direction. People who are in the labour market may be in a better position to afford to live in less crowded houses.

We find a significant association between household financial condition and female labour force participation. Females who reported that members of their family could not raise \$2000 within a week during an emergency are 7.8 percentage points less likely to be in the labour force than those who reported that they could. A possible explanation is that members of families facing tight financial conditions may not be able to afford to acquire necessary skills for employment, or to buy appropriate clothes. And in the face of financial strains, intra-household resource allocation decisions may discriminate against females.

It is important to point out that despite the growing attention in academic and policy discourse to the labour supply implications of cultural attachment, we do not find a significant association between measures of cultural attachment (such as speaking an indigenous language and participating in selected cultural activities in the last 12 months) and labour force participation. Of course, the statistical insignificance in our model does not necessarily imply the absence of a statistical relationship between cultural attachment and labour force participation. However, it is equally important to note the presence of a statistically significant relationship between 'cultural variables' and labour force participation – as found by Hunter and Gray (2001) and Stephens (2010) – does not guarantee a causal link between cultural attachment and labour force participation; observed relationships could be driven by an omitted variable bias. The 2014–15 NATSISS shows that cultural attachments are stronger in areas where labour market opportunities are more limited. For example, 52% of the working-age Indigenous population in non-remote areas are employed, compared with 41% in remote areas and 35% in very-remote areas. On the other hand, the proportion of people reported to have been speaking an Indigenous language is only 28% in non-remote areas compared with 59% in remote areas and 86% in very-remote areas. There are similar differences across the remoteness categories in rates of cultural participation and living in homeland or traditional country (see Fig. A1 in the Appendix). Failures to account for spatial differences in cultural attachments and labour market opportunities can result in biased (often overinflated) parameter estimates. Unfortunately, many of the previous studies seem to have overlooked the issue. Although we do not include disaggregated data for remote and very-remote areas in our empirical model, the fact that we control for regional unemployment and IRSAD (a variable measured at Statistical Area Level 1), and apply a more stringent survey estimation technique that takes into account disproportionate representations of very-remote communities in the NATSISS sample means cultural variables are less likely to pick effects of residential location. We note that estimated coefficients on speaking an Indigenous language and participating in cultural activities become statistically significant when we drop the regional unemployment and IRSAD variables from our specification and apply a standard logit model to the data (see Table A5 in the Appendix).

For the sake of comparison, we also estimate the conditional probability of labour force participation for younger people (aged 15–24 years) and older people (aged 55–64 years). Results are presented in Tables A3 and A4 in the Appendix, respectively. The factors associated with labour force participation are different across sex and age cohorts. For younger women, for example, the presence of dependent children and financial constraints (measured by perceived ability of household members to raise \$2000 within a week) are negatively and significantly associated with labour force participation. For younger men, age and 'living in ethnically mixed' families are positively and significantly associated with labour force participation. For older women, high level of social connection (having friends to confide with and knowing someone in the government) are positively and significantly associated with labour force participation, whereas age and financial constraints are inversely related to labour force participation. For older men, on the other hand, being married and living in areas with a low level of socioeconomic disadvantage are positively and significantly associated with high labour force participation rates, whereas having a disability condition is inversely correlated with labour force participation.

## Conclusion

There is a high rate of non-participation (44%) in the labour force among Aboriginal and Torres Strait Islander persons. Indigenous people are 20 percentage points less likely than non-Indigenous people to be in the labour force (ABS 2018a). The 2014–15 NATSISS shows that prime-age people (aged 25–54 years) account for the preponderance of the Indigenous working-age population not in the labour force. About 28% of males and 46% of females in their prime-working lives are not in the labour force (ABS 2016). Since people in this demographic group have generally completed their schooling and are well before their retirement, such a high rate of non-participation generates policy interests. The NATSISS also shows that being out of the labour force could be a long-term phenomenon: more than 80% of the prime-age people not in the labour force have been absent from the labour market for more than 12 months, and a further 15% of them have never been in the labour force. While a transitory non-participation in the labour force may not necessarily have adverse impacts on outcomes (people may take time off to study, to do cultural activities, or to provide care to children, elderly persons or people with disabilities), being out of the labour force for extended periods of time may put people at high risk of socioeconomic disadvantage.

This study aims to identify the factors underlying the labour force participation of Indigenous people in their prime-working lives. Although there is an extensive body of literature that examines the determinants of Indigenous labour force status in general, this is the first study to investigate the factors associated with prime-age labour force participation. It is also the first paper to control for factors closely associated with the demand-side of the labour market. The study also allows for the complex survey design used by the NATSISS and maintains statistical accuracy of the estimated results.

Using the data from the 2014–15 NATSISS, we find that labour force participation is significantly associated with a range of individual attributes such as age, sex, marital status, education, disability and history of incarceration. It is also found to have a significant relationship with household characteristics such as the presence of non-Indigenous household members, overcrowding, the presence of dependent children in the family and financial position of household members. However, some of the factors affecting labour force are different for males and females. For example, marital status, overcrowding and interpersonal contact with government officials are only significantly associated with male labour force participation, whereas demographic and ethnic composition, as well as the financial position of household members are only significantly associated with female labour force participation. For both sexes, disability, education and contact with the criminal justice system are the three most important factors associated with labour force participation. Individuals with a higher level of education have a higher likelihood of participation in the labour force. But those with disabilities and who have been imprisoned are less likely to have participated in the labour force. We note that the relationship between labour force, and education and incarceration are greater for females than males, whereas the labour supply association with disability is larger for males than for females.

It is worth noting that labour supply implications of cultural attachment of Indigenous Australians have received much attention in academic and policy discourses. However, we find no significant relationship between labour force participation and any of the 'cultural variables' included in our benchmark model. While we acknowledge the multidimensional nature of culture, the complexity of its relationship with labour force participation and the need for a more rigorous study, we suppose that a high prevalence of speaking Indigenous languages or participating in cultural activities is a better proxy for living in areas where labour market opportunities are limited, rather than for cultural factors that directly influence labour market engagement.

The study is not without limitations. Given the cross-sectional nature of the data, we are unable to account for unobserved fixed effects. For instance, the significant relationship between labour force participation and

incarceration may reflect unobserved behavioural or institutional factors simultaneously placing Indigenous people at risk of incarceration and poor job prospects. It is also possible that some of the estimated results indicate relationships that go in a reverse direction in the model. Although we show that people with disabilities are less likely to participate in the labour force, a disability condition can also be caused by employment in hazardous physical working conditions.

Regardless of the direction of causal relationships, the result gives prima facie evidence for the presence of a significant association between the identified factors and labour force participation. The relationships also suggest that there would be substantial social and economic returns to holistic interventions that overcome barriers to employment, and address disability as well as justice programs. In relation to disability, it remains important to reduce the incidence of disability by improving Indigenous health and safety. Access to better disability services is a basic human right, but also can facilitate labour market participation. Employment services to people with disability should be well targeted. While those with severe and profound core limitations may be permanently unable to work, those with mild and moderate disabilities may be restricted in the type of activity they can perform. Some may also find it difficult to maintain employment because they face labour market discrimination. Thus, creating a disability-inclusive working environment that is favourable and supportive to employees with disabilities (for example, provision of aids to reading and writing to those with sight impairment) could increase labour market participation of those who are willing and able to work. In regard to incarceration, reducing the rate of incarceration through diversionary programs and other measures, and improving justice services, particularly transition to employment on release could be valuable. There is a need for post-prison adjustments through better access to employment services and the provision of job-driven training. Expanding educational opportunities can be another important step to increasing labour force participation among Indigenous people, especially women. Education increases employability through acquired skills, but also challenges social norms that may be inconsistent with engaging in labour market activities.

## Appendix

Table A1. Variables and definition

Variable	Definition
<b>Labour force status</b>	Equal to 1 if in the labour force; 0 if not in the labour force
<b>Male</b>	Equal to 1 if male; 0 if female
<b>Age</b>	Measured in single years
<b>Age squared</b>	Age*age
<b>Married</b>	Equal to 1 if married; 0 if not married
<b>Studying</b>	Equal to 1 if currently studying; 0 otherwise
<b>Education level</b>	Equal to 1 if Year 12 only; 2 if Year 9 or less; 3 if Year 10 or 11 only; 4 if has certificate or diploma and; 5 if has degree or higher
<b>Diagnosed with long-term illness</b>	Equal to 1 if have been diagnosed with a long-term health condition; 0 otherwise
<b>Living with disability</b>	Equal to 1 if having profound/sever/moderate/mild core activity limitation or a schooling/employment restriction; 0 if has no specific limitation or disability
<b>Transportation problem</b>	Equal to 1 if can't get, or often/sometimes has difficulty to get/ the place needed; 0 if can easily get the place needed
<b>Speaks an Indigenous language</b>	Equal to 1 if the person speaks an Indigenous language; 0 otherwise
<b>Identifies with a clan, tribal or language group</b>	1 if identifies with clan tribal or language groups; 0 otherwise
<b>Participates in cultural activities</b>	Equal to 1 if individual reports participation in cultural activities in the last 12 months including making Aboriginal and/or Torres Strait Islander arts or crafts, performing any Aboriginal and/or Torres Strait Islander music, dance or theatre or writing or telling Aboriginal and/or Torres Strait Islander stories, fishing, hunting and gathering; 0 otherwise
<b>Involved in cultural events</b>	Equal to 1 if individual reports participation in ceremonies, funerals/sorry business, NAIDOC week activities, sports carnivals, festivals or carnivals involving arts, craft, music or dance or being involved with Aboriginal and/or Torres Strait Islander organisations in last 12 months; 0 otherwise
<b>Participates in community activities</b>	Equal to 1 if participated in selected sporting, social or community activities in the last 12 months; 0 if did not participate in sporting, social or community activities
<b>Knows a member of government</b>	1 if knows a member of the government would feel comfortable contacting; 0 otherwise
<b>Able to get support</b>	Equal to 1 if able to get support in time of crisis from someone outside of the household; 0 if not able to get support in time of crisis

<b>Carer (non-childcare)</b>	Equal to 1 if cared for a person with disability, long-term health condition or old age in the last 4 weeks; 0 otherwise
<b>Frequent social contact</b>	Equal to 1 if has contact at least every day with family or friends outside the household; 0 if contact with family or friends outside the household is less frequent than every day
<b>Has confidants</b>	1 if can confide in any family or friends outside the household; 0 otherwise
<b>Unfairly treated</b>	Equal to 1 if experienced unfair treatment in last 12 months for being Aboriginal and or/Torres Strait Islander; 0 otherwise
<b>Ever incarcerated</b>	Equal to 1 if ever experienced incarceration; 0 otherwise
<b>Dependent children in the family</b>	Equal to 1 if there are dependent children in the family; 0 otherwise
<b>N. older family members</b>	Number of people in the family who are 15 and over (top-coded)
<b>Mixed family</b>	Equal to 1 if non-Indigenous members also live in the household; 0 if only Indigenous members live in the household
<b>Overcrowding</b>	Equal to 1 if dwelling requires 1 or more bedrooms according to Canadian National Occupancy Standard; 0 otherwise
<b>Raise money</b>	Equal to 1 if household members could raise \$2000 within a week; 2 if could not raise \$2000 within a week; 3 if unsure if raise \$2000 within a week
<b>Ran out of money</b>	Equal to 1 if household members ran out of money for basic living expenses in the last 2 weeks; 0 otherwise
<b>Regional unemployment</b>	The rate of unemployment by regional remoteness (20 regions); it shows the number of unemployed people (aged 15–64 years) as a percentage of the working age population in each region
<b>Remoteness</b>	Equal to 0 if lives in non-remote areas; 1 if lives in remote and very-remote areas
<b>Local area advantage and disadvantage</b>	Index of relative socioeconomic disadvantage in 2011 at Statistical Area Level 1 measured in deciles; where 1 is shows most disadvantaged areas (e.g. many households with low incomes, or many people with unskilled occupation) and 10 shows least disadvantaged areas (e.g. few households with low incomes or people in unskilled occupations)

Table A2. Summary statistics

<b>Variable</b>	<b>Mean</b>	<b>SE</b>
<b>Not in the labour force</b>	0.420	0.012
<b>Male</b>	0.479	0.007
<b>Age</b>	35.975	0.078
<b>Married</b>	0.421	0.010
<b>Studying</b>	0.217	0.008
<b>Year 9 or less</b>	0.238	0.009
<b>Year 10 or 11 only</b>	0.294	0.010
<b>Year 12 only</b>	0.122	0.007
<b>Certificate/diploma</b>	0.297	0.009
<b>Degree or higher</b>	0.049	0.004
<b>Diagnosed with long-term illness</b>	0.653	0.011
<b>Living with disability</b>	0.284	0.010
<b>Transport problem</b>	0.242	0.010
<b>Speaks an Indigenous language</b>	1.306	0.021
<b>Identifies with a clan, tribal or language group</b>	0.623	0.011
<b>Participates in cultural activities</b>	0.644	0.011
<b>Involved in cultural events</b>	0.628	0.012
<b>Participates in community activities</b>	0.971	0.003
<b>Knows a member of government</b>	0.154	0.007
<b>Able to get support</b>	0.920	0.006
<b>Carer (non-childcare)</b>	0.256	0.012
<b>Frequent social contact</b>	0.661	0.010
<b>Has confidants</b>	0.832	0.008
<b>Unfairly treated</b>	0.354	0.011
<b>Ever incarcerated</b>	0.088	0.006
<b>Dependent children in the family</b>	0.512	0.013
<b>N. older family members</b>	2.602	0.034
<b>Mixed family</b>	0.576	0.013
<b>Overcrowding</b>	0.182	0.011
<b>Could raise \$2000</b>	0.500	0.014
<b>Could not raise \$2000</b>	0.454	0.014
<b>Unsure if raise \$2000</b>	0.046	0.005
<b>Ran out of money</b>	0.141	0.008
<b>Regional unemployment</b>	10.890	0.028
<b>Local area advantage and disadvantage</b>	3.386	0.113
<b>Remoteness</b>	0.212	0.003

Note: Reported parameters are weighted means along with jack-knife standard errors. The total unweighted sample size used in the calculation is 4,024.

Source: NATSISS 2015–4 Expanded CURF (ABS 2016).

Table A3. Estimates for younger people (aged 15–24 years)

Variable	Women		Men	
	AME	SE	AME	SE
Age	0.007	0.014	0.042*	0.015
Married	-0.047	0.067	0.071	0.075
Studying	-0.003	0.078	-0.041	0.068
Year 9 or less	-0.110	0.105	-0.201	0.130
Year 10 or 11 only	-0.088	0.082	-0.099	0.086
Certificate/diploma	0.024	0.100	-0.013	0.084
Degree or higher	0.188 <sup>s</sup>	0.099	-0.309 <sup>s</sup>	0.171
Diagnosed with long-term illness	-0.054	0.065	-0.023	0.064
Living with disability	0.031	0.075	-0.079	0.086
Transport problem	-0.049	0.066	-0.040	0.056
Speaks an Indigenous language	0.015	0.036	-0.005	0.028
Identifies with clan, tribal or language group	-0.061	0.061	0.028	0.064
Participates in cultural activities	0.050	0.059	0.073	0.060
Involved in cultural events	-0.019	0.064	0.025	0.067
Participates in community activities	-0.003	0.150	-0.042	0.127
Knows a member of government	0.128	0.094	0.103	0.100
Able to get support	0.033	0.163	0.006	0.106
Carer (non-childcare)	0.055	0.061	0.025	0.061
Frequent social contact	0.080	0.067	0.042	0.059
Has confidant	0.122	0.111	0.069	0.060
Unfairly treated	0.002	0.066	0.007	0.065
Ever incarcerated	-0.462*	0.235	-0.064	0.096
Dependent children in the family	-0.196*	0.065	-0.018	0.053
N. older family members	0.004	0.033	-0.026	0.036
Mixed family	0.122 <sup>s</sup>	0.071	0.158*	0.077
Overcrowding	0.010	0.085	0.025	0.066
Could not raise \$2000	-0.125*	0.058	-0.062	0.055
Unsure if raise \$2000	-0.134	0.157	-0.118	0.096
Ran out of money	0.005	0.071	0.030	0.065
Regional unemployment	0.008	0.010	-0.003	0.009
Local area advantage and disadvantage	0.013	0.015	0.012	0.014
Remoteness	-0.058	0.085	-0.080	0.067
Number of observations	748		592	

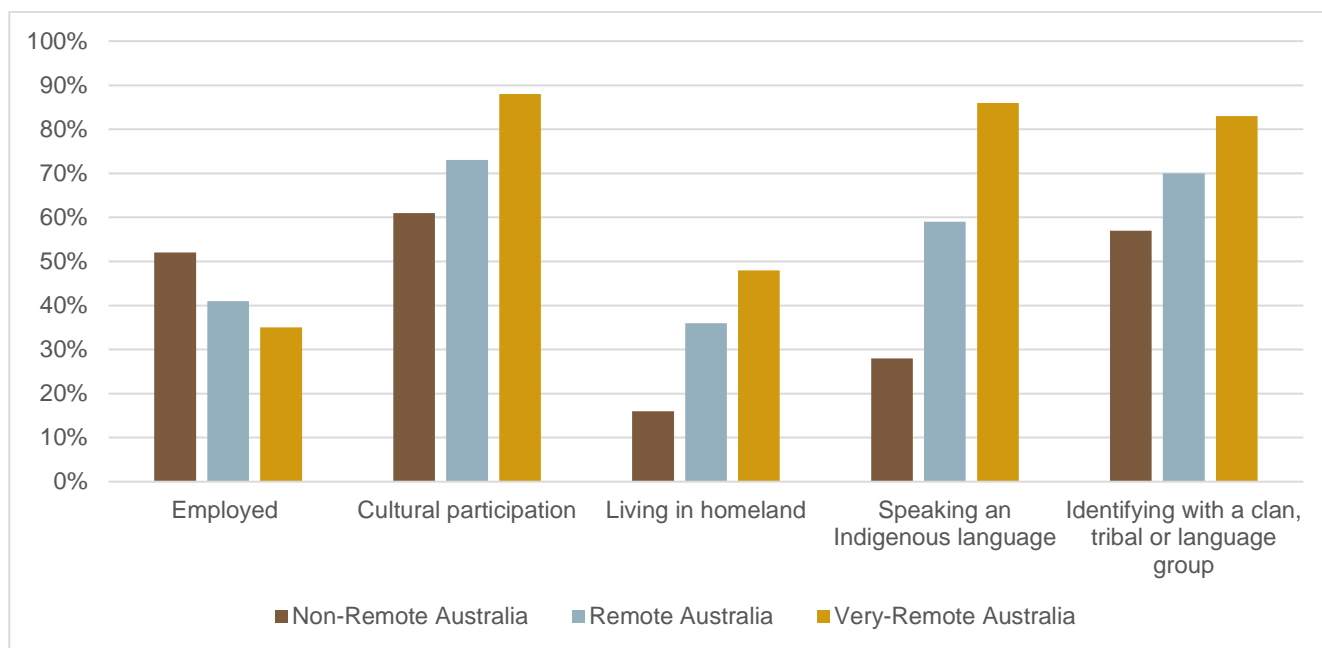
Note: AME and SE stand for average marginal effect and standard error, respectively. \* Shows statistical significance at the 5% level. While significant only at the 10% level, the correlations between female labour force participation, and having a degree or higher qualification and living in mixed families, and the correlation between male labour force participation and having a degree or higher qualification appear to be large in terms of magnitude.

Table A4. Estimates for older people (aged 55–64 years)

Variable	Women		Men	
	AME	SE	AME	SE
Age	-0.040*	0.012	-0.001	0.013
Married	0.143	0.089	0.304*	0.083
Studying	0.074	0.168	-0.054	0.210
Year 9 or less	-0.281	0.176	0.110	0.172
Year 10 or 11 only	-0.063	0.181	0.032	0.183
Certificate/diploma	-0.022	0.185	0.009	0.176
Degree or higher	-0.165	0.240	0.272	0.172
Diagnosed with long-term illness	-0.004	0.107	0.066	0.113
Living with disability	-0.119 <sup>s</sup>	0.070	-0.301*	0.071
Transport problem	0.002	0.094	-0.150	0.122
Speaks an Indigenous language	-0.013	0.045	0.038	0.058
Identifies with clan, tribal or language group	0.014	0.088	0.063	0.135
Participates in cultural activities	0.012	0.076	0.050	0.063
Involved in cultural events	-0.022	0.079	-0.146	0.109
Participates in community activities	0.111	0.520	0.116	0.442
Knows a member of government	0.181*	0.084	0.006	0.098
Able to get support	-0.021	0.139	-0.110	0.112
Carer (non-childcare)	-0.033	0.063	0.007	0.085
Frequent social contact	0.068	0.071	0.036	0.064
Has confidant	0.196*	0.098	0.009	0.077
Unfairly treated	0.131	0.080	-0.024	0.071
Ever incarcerated	-0.413 <sup>s</sup>	0.245	-0.028	0.084
Dependent children in the family	-0.047	0.075	-0.027	0.130
N. older family members	-0.027	0.046	-0.039	0.060
Mixed family	0.131	0.092	0.011	0.090
Overcrowding	0.069	0.173	0.161	0.171
Could not raise \$2000	-0.241*	0.083	-0.189	0.129
Unsure if raise \$2000	0.022	0.184	0.002	0.153
Ran out of money	0.037	0.115	0.095	0.230
Regional unemployment	0.001	0.013	-0.002	0.010
Local area advantage and disadvantage	0.020	0.018	0.032*	0.012
Remoteness	0.014	0.089	-0.008	0.102
Number of observations	485		386	

Note: AME and SE stand for average marginal effect and standard error, respectively. \* Shows statistical significance at the 5% level. Female labour force participation has a strong association (in terms of magnitude) with history of incarceration and disability, but only significant at the 10% level.

Fig. A1. Rates of labour force participation and cultural attachment by remoteness



Source: NATSISS 2014–15 TableBuilder (ABS 2016).

Table A5. Specifications without controlling for regional employment and local area socioeconomic advantage and disadvantage and applying survey estimation techniques

Variable	Women		Men	
	Coef.	SE	Coef.	SE
Age	0.149*	0.059	0.094*	0.082
Age2	-0.002*	0.001	-0.001	0.001
Married	-0.032	0.125	0.569*	0.171
Studying	0.213	0.150	-0.071	0.263
Year 9 or less	-0.900*	0.187	-0.381	0.264
Year 10 or 11 only	-0.556*	0.170	-0.063	0.254
Certificate/diploma	0.482*	0.171	0.618*	0.261
Degree or higher	1.463*	0.304	1.756*	0.584
Diagnosed with long-term illness	-0.077	0.119	-0.268	0.158
Having disability	-0.893*	0.122	-0.122*	0.152
Transport problem	-0.481	0.123	-0.414*	0.158
Speaks an Indigenous language	0.016	0.055	0.123*	0.062
Identifies with a clan, tribe or language group	-0.195	0.118	-0.100	0.166
Participates in cultural activities	0.229	0.114	0.242	0.160
Involved in cultural events	0.118	0.123	0.326*	0.165
Participates in community activities	0.261	0.317	-0.175	0.378
Knows a member of government	0.225	0.137	0.449*	0.191
Able to get support	0.199	0.180	0.181	0.223
Carer (non-childcare)	0.170	0.189	0.224	0.158
Frequent social contact	-0.134	0.114	-0.104	0.148
Has confidants	0.220	0.138	-0.117	0.165
Unfairly treated	0.176	0.110	0.271	0.144
Ever incarcerated	-1.172*	0.252	-0.383*	0.156
Dependent children in the family	-0.363*	0.120	0.075	0.169
N. older family members	0.145*	0.058	0.055	0.079
Mixed family	0.501*	0.142	0.319	0.188
Overcrowding	-0.395*	0.158	-0.512*	0.240
Could not raise \$2000	-0.466*	0.114	-0.597*	0.157
Unsure if raise \$2000	-0.026	0.239	-0.631*	0.320
Ran out of money	0.029	0.143	-0.221	0.188
Remoteness	0.293*	0.130	-0.317	0.183
Constant	-2.804*	1.182	0.139	0.188
Sample size	2206		1572	

Note: Coef. and SE stand for coefficient and standard error, respectively. \* Shows statistical significance at the 5% level.

Table A6. Testing for multicollinearity using variance inflation factor (VIF)

<b>Variable</b>	<b>VIF</b>	<b>1/VIF</b>
<b>Age</b>	47.74	0.021
<b>Age square</b>	46.47	0.022
<b>Married</b>	1.49	0.671
<b>Studying</b>	1.26	0.794
<b>Year 9 or less</b>	2.97	0.337
<b>Year 10 or 11 only</b>	2.74	0.365
<b>Certificate/diploma</b>	2.91	0.344
<b>Degree or higher</b>	1.61	0.621
<b>Diagnosed with long-term illness</b>	1.26	0.794
<b>Living with disability</b>	1.25	0.800
<b>Transport problem</b>	1.19	0.840
<b>Speaks an Indigenous language</b>	1.57	0.637
<b>Identifies with clan, tribal or language group</b>	1.26	0.794
<b>Participate in cultural activities</b>	1.20	0.833
<b>Involved in cultural events</b>	1.37	0.730
<b>Participate in community activities</b>	1.08	0.926
<b>Knows a member of government</b>	1.09	0.917
<b>Able to get support</b>	1.08	0.926
<b>Carer (non-childcare)</b>	1.05	0.952
<b>Frequent social contact</b>	1.10	0.909
<b>Has confidant</b>	1.19	0.840
<b>Unfairly treated</b>	1.14	0.877
<b>Ever incarcerated</b>	1.09	0.917
<b>dependent children in the family</b>	1.39	0.719
<b>Number of older family members</b>	1.59	0.629
<b>Mixed family</b>	1.72	0.581
<b>Overcrowding</b>	1.56	0.641
<b>Could not raise \$2000</b>	1.42	0.704
<b>Unsure if raise \$2000</b>	1.08	0.926
<b>Ran out of money</b>	1.12	0.893
<b>Regional unemployment</b>	1.20	0.833
<b>Local area advantage and disadvantage</b>	1.28	0.781
<b>Remoteness</b>	1.70	0.588

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