A longitudinal analysis of economic inactivity among Indigenous youth

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Abstract

Census and survey data show a high prevalence of youth inactivity among Indigenous Australians. The new Closing the Gap Agreement between the Coalition of Aboriginal and Torres Strait Islander Peak Organisations and the Australian governments at the federal, state and territory level aims to increase the proportion of Indigenous youth (aged 15-24 years) in full-time employment, education or training to 67 per cent by 2031. Understanding the factors that put young people at risk of disengagement from school or the labour market is a requisite for identifying the type and level of support required to increase the engagement of Indigenous Australians with the labour market and education system. However, there is a limited empirical evidence base to guide policy actions. Using data from the Australian Census of Longitudinal Dataset, this study provides extensive profiling of the characteristics of Indigenous youth not in employment, education or training. It also identifies the factors underlying individual-level changes in economic inactivity. The findings suggest that providing well-targeted supports to those who live in disadvantaged circumstances is paramount for mitigating economic inactivity among Indigenous youth.

JEL Codes: I20, J20, J60
Keywords: NEET youth, Indigenous, employment, education, training, Australia

1. Introduction

The 2016 Census shows that over a quarter of a million (278, 408) Australians aged 15-24 years are not in employment, education or training (NEET). Indigenous youth make up 17 per cent of the NEET population while representing only about 5.0 per cent of 15-24 year olds. In particular, 29 per cent of Indigenous youth are not engaged in any employment or educational activity compared with only 8.0 per cent of their non-Indigenous peers (Australian Bureau of Statistics (ABS), 2019).

The assumption that youth inactivity has detrimental personal and societal impacts underpins both the academic literature and policy debate on youth disengagement. In the literature, it is assumed that participation in education, employment, or training keeps young people away from engaging in delinquency and substance use (Maynard, Salas-Wright, and Vaughn, 2015; Melchior *et al*., 2015). Engagement with the labour market and education system at a young age is also vital for personal development and labour market success later in life. While education provides scientific skills that enhance productivity and competency in the labour market (Becker, 2009), employment experience provides on-the-job training and an opportunity to develop a good work ethic (Hopkin, 2012). A growing body of evidence shows that NEET youth have a lifetime of poorer socioeconomic outcomes than otherwise identical individuals. They are at a higher risk of becoming less educated, unemployed and unhealthy future adults (see, Crawford *et al*., 2011; Henderson *et al*., 2017; Ralston *et al*., 2016; Ranzani and Rosati, 2012). The damaging effects of NEET appear to accrue beyond inactive individuals, to impact on society as a whole. Whereas widespread school dropouts by young people can result in suboptimal accumulation of human capital in the society (Catterall, 1987; Leigh, 2008), weak attachments with the labour market can lead to increased welfare spending and reduced tax revenue (Gorjón, de la Rica, and Villar, 2018). In Australia, the overall cost of NEET spells is estimated to be $16 billion per year (Organisation for Economic Co-operation and Development (OECD), 2016).

From a policy perspective, there is a perception that the social and economic returns to eliminating youth disengagement are very large. In this context, Australian governments at national, state and territory levels have been introducing various job and training compacts to curb youth inactivity and help young people grow into healthy, productive, and resilient adults (Council of Australian Governments (COAG), 2009; The Commonwealth Department of Employment, 2013). As such, one of the new Closing the Gap Agreements between the Coalition of Aboriginal and Torres Strait Islander Peak Organisations and the Australian governments at the federal, state and territory level is to increase the proportion of Aboriginal and Torres Strait Islander youth aged 15-24 years who are in employment, education and training to 67 per cent by 2031 (Australian Government, 2020).

Understanding the factors that put young people at risk of being NEET is a requisite for identifying the type and level of supports required and for designing well-targeted policies to mitigate the NEET problem. However, the empirical evidence that rigorously examines the factors driving NEET status among Indigenous Australians is limited. The bulk of research in Australia (reviewed in Section 2) focuses on

comparing NEET prevalences across various socio-demographic groups (such as sex, age and Indigenous status) with little attempt to identify the factors underlying NEET status among various youth groups. Using data from the 2011-2016 Australian Census of Longitudinal Dataset (ACLD), this study provides extensive profiling of Indigenous young people who are NEET but also employs a fixed-effects regression to examine the factors driving overtime changes in NEET status at an individual level.

We find that NEETs are a diverse group, and so are the challenges they face. Results from bivariate analyses show that NEET is more prevalent among young people of older ages, without post-school qualifications, with disabilities and who live in remote and low socioeconomic status areas. NEET spells are also more prevalent among females than males. Results obtained with a fixed-effects estimation show that individual, household, and local circumstances constitute an important factor in determining a person's NEET status. A change in NEET status between 2011 and 2016 is strongly associated with changes in disability status, education attainment, household composition, housing condition, residential remoteness, and local socioeconomic status. Together, the findings suggest creating disability-inclusive working and training environments, improving housing conditions and addressing locational disadvantages will be instrumental in tackling the NEET problem among young Indigenous Australians.

The study sheds further light into the literature in different ways. To the best of our knowledge, this is the first study to show the distribution of NEET spells by local socioeconomic status. It is also the first paper to apply a fixed-effects estimation to a nationally representative sample of Indigenous youth. Moreover, the study is the only longitudinal analysis of the dynamics of Indigenous NEET spells.

2. Literature Review

A multitude of factors could be responsible for the participation of young people in employment, education, or training. Being NEET could be related to poor health, growing up in low-income families, residing in disadvantaged neighbourhoods, or a combination of these and other factors. While it is scanty and highly descriptive, the existing literature in Australia suggests that the NEET group consists of young people with diverse characteristics. The Australian Workforce and Productivity Agency (AWPA) uses data from the 2011 Census and profiles the background characteristics of 15-24 year olds who are NEETs. The study finds higher NEET rates for people with Indigenous background and who have poor English (AWPA 2014). Carcillo *et al*. (2015), drawing on data from the Labour Force Survey and the Household, Income and Labour Dynamics in Australia (HILDA), note that 16-29 year olds who are single parents, live with poor health conditions, have low levels of education and were born to less-educated parents are at a greater risk of falling into the NEET category. Similarly, a study by the OECD uses data from the HILDA Survey for people aged 15-29 years and shows that NEET youth are characterised by being female, being a parent, having a disability, being an Indigenous person or having a migrant background, low vehicle ownership, low levels of education, having less-educated parents and having a broken family (OECD 2016).

Using data from the 1995 wave of the Longitudinal Surveys of Australian Youth (LSAY), Hillman (2005) shows that young people (15-24 year olds) are more likely to become NEETs for up to 13 months if they perform poorly at secondary school, do not have a Year 12 completion certificate, live with a disability and are from culturally diverse backgrounds. The author also shows that NEET status is more prevalent among females, married individuals, and those with children. Stanwick, Forrest and Skujins (2017) use data from the 2003 and 2006 waves of the LSAY and apply logistic regression to identify the factors associated with becoming persistently NEET (i.e., a NEET spell lasting for at least six months). They show that prolonged NEET status is positively associated with being female, having children at the age of 15-19, not completing Year 12, being Indigenous and living in low socioeconomic status communities.

Some issues are worth noting regarding inconsistencies in the literature. Firstly, despite the youth population being defined as people aged 15-24 years in much of the literature on youth disengagement, OECD (2016) and Carcillo *et al.* (2015) include 25-29 year olds in their analysis. Secondly, typically NEET indexes include unemployed people and those not in the labour force if they are not attending an educational institution at a particular point in time. However, the analysis by Hillman (2005) includes only those who are not in the labour force and not in full-time education. Thirdly, except Stanwick, Forrest and Skujins (2017), who use a logit model, all the studies only use cross-tabulations to present NEET rates among various sociodemographic groups such as females, males, Indigenous and non-Indigenous youth. While such studies are vital in informing how a particular youth group fare relative to others in terms of vulnerability to NEET spells, they are limited in providing insights into the reason why the group is at a higher risk of falling into NEET than others. For instance, many of the above studies show that NEET is more prevalent among Indigenous than non-Indigenous youth. However, they do not confirm whether the Indigenous/non-Indigenous gap is inherent to indigeneity or driven by differences in socioeconomic characteristics (such as health, education and wealth) that coexist with indigeneity differences.

One of the key advantages of a regression analysis over a descriptive analysis is that it allows one to examine whether Indigenous youth still have higher NEET rates once other attributes are taken into consideration. This study builds on the existing literature by using a NEET index that is consistent with definitions used in the broader literature and by employing regression models that control for both observed and unobserved differences in individual, family and community circumstances.

3. Data

Our data come from the 2011-2016 Australian Census Longitudinal Dataset (ACLD), which links a representative five per cent sample from the counts in the 2011 Census with corresponding populations in the 2016 Census. There is also a dataset that links a representative five per cent sample from the 2006 Census with corresponding counts in the 2011 and 2016 censuses. However, the 2006 and 2016 samples cannot be used together as individuals who were part of the youth population (15-24 year olds) in

2006 were already in their prime working years (25-34 year olds) in 2016. We choose the 2011-2016 ACLD over the 2006-2011 ACLD since the quality of data linkage is better (and the rate of sample attrition is lower) in the former than the latter.

Though there were minor differences in questionnaire design between the 2011 and 2016 censuses, the way our variables of interest were measured is predominantly the same, and we can observe meaningful longitudinal transitions in the data (see ABS (2019) for more information). It is worth noting, however, that there were some changes in Indigenous status among the linked sample over the period 2011-2016. Of those who were identified as being Indigenous in 2011, 11.3 per cent were identified as being non-Indigenous and 0.53 per cent had not stated Indigenous status in 2016. Of those identified as being non-Indigenous in 2011, 0.58 per cent identified as being Indigenous and 0.61 per cent were unidentified in 2016. Of those who did not state Indigenous status in 2011, 94.6 per cent stated being non-Indigenous, and a further 3.2 per cent stated being Indigenous in 2016.[1] To account for unobserved heterogeneities that lead to inconsistent reporting of one's Indigenous identity, we define the Indigenous population as any individual who was recorded as Indigenous in any of the censuses. This leaves us with about 4,005 observations.

The 2011-2016 ACLD provides a unique opportunity to examine the dynamics of Indigenous youth disengagement from employment, education or training and to identify the factors underlying overtime changes in disengagement status. Although surveys such as the LSAY and HILDA also provide longitudinal samples of the general youth population in Australia, to our knowledge, the ACLD provides the most representative and largest longitudinal sample of Indigenous Australians. It also contains information on a range of relevant topics to our study, such as labour force status, education, health, demography, housing condition, household composition, remoteness, and local socioeconomic status. Table A1 presents a list of relevant background characteristics included in the study.

We use the information provided on individual-level labour force participation (full-time employed, part-time employed, unemployed and not in the labour force) and attendance at educational institutions (full-time student, part-time student and not-attending) on the census night to compute a composite index measuring non-participation in education, employment or training. The NEET variable equals one if a person is non-employed (either unemployed or not in the labour force) and not attending an educational institution, otherwise equals zero. The longitudinal data used in this study show that the NEET prevalence increased from 23.6 per cent to 37.2 per cent between 2011 and 2016. The low NEET rate in 2011 was perhaps because the majority of young people in the sample were required to attend compulsory education.

1 It is worth noting that although people are changing their identity from Indigenous to non-Indigenous at a higher rate (11.3 per cent) than those changing from non-Indigenous to Indigenous (0.53 per cent), because of the large non-Indigenous population size, the number of people switching to an Indigenous identity is over threefold the number switching to a non-Indigenous identity, resulting in a net increase in the number of people who identified as Indigenous over the period 2011-2016.

Our data show 68 per cent of 15-19 year olds are in education compared with only 16 per cent of 20-24 year-olds.[2]

Table A2 presents summary statistics for background characteristics included in the empirical analysis. We note discernible differences in some of the characteristics both cross-sectionally and longitudinally. Cross-sectional comparisons show that a higher proportion of NEETs than non-NEETs live in households where a language other than English is spoken and where at least one household member is non-employed or has a disability. NEETs are also more likely than non-NEETs to live in remote and economically least advantaged areas. On the other hand, a higher percentage of non-NEETs than NEETs undertake voluntary work, live in major cities and live in households with at least one employed member. Between 2011 and 2016, the proportion of young people who were married, with non-school qualifications and who live in households with a Year 12 completed increased substantially. On the other hand, the proportion of NEETs and non-NEETs who live in crowded homes and in households with a non-employed member decreased over the same period.

4. Empirical Approach

The study uses both descriptive (cross-tabulations and graphical presentations) and regression analyses techniques. The former aims to profile the socio-demographic characteristics of NEET youth, whereas the latter aims to examine the factors underlying the incidence and recurrence of NEET spells. In particular, we use fixed-effects regression models to identify the factors that induce an overtime change in NEET status at an individual level. We also use ordered logit models to examine the background characteristics associated with intercensal persistence in NEET status. The descriptive analyses use data from the ABS's TableBuilder and are based on the youth population aged 15-24 years in each relevant census. The regression analyses draw on data from the five per cent sample available in the ABS's DataLab and are restricted to people aged 15-19 years in 2011.

We presume that no single factor is solely responsible for a person's non-participation in education, employment or training and would expect an array of factors to be at play. As indicated in Section 3, the 2011-2016 ACLD includes a wealth of information on potential determinants of NEET status (presented in Table A1). However, individuals may also differ in certain characteristics that we cannot fully observe in the data, and some of the unobserved characteristics may correlate with observed characteristics and NEET status.

2 However, high rates of participation in compulsory education do not necessarily signify regular class attendance by students. Quicke and Biddle (2017) show that irregular class attendance among Indigenous students remain a public policy concern and suggest various policy options to address the problem.

Suppose NEET status of an individual i at time t is determined as follows:

$$NEET_{it} = 1[X'_{it}\,\beta + \theta_i + \varsigma_{it}] > 0$$

Here, 1[.] is a binary function; $NEET_{it}$ equals one if the person is NEET, otherwise equals zero; X_{it} includes unity and a vector of observable covariates; β is a set of parameters corresponding to X_{it}; θ_i represents time-invariant unobserved effects and; ς_{it} is an error term.

The usual approach to deal with the presence of unobservable differences in panel data models is to use either a fixed-effects or a random-effects estimator. The former allows X_{it} and θ_i to be correlated and produces consistent estimates for β. However, it computes the estimates with a great deal of variation from sample-to-sample and a lesser precision than the latter. The fixed-effects estimator does not allow the estimation of parameters of useful time-invariant observables such as sex. A random-effects estimator does not allow a correlation between X_{it} and θ_i and will produce inconsistent estimates if the unobservables are not randomly distributed. However, it greatly limits the variability of the estimation and gives estimates that are closer, on average, to the true value in a given sample. It also allows the estimation of parameters of interest for time-invariant observables. We use a Hausman test to check whether the fixed-effects model is preferred to the random-effects model. The test rejects the null hypothesis (at Chi2 (22) =1,066.85) in favour of the fixed-effects model.

Notwithstanding the binary nature of the outcome variable, we use a linear fixed-effects model as a benchmark specification. Linear fixed-effects models have some advantages over non-linear variants. Firstly, the estimation of marginal effects is straightforward, and the results are easy to interpret. Secondly, they are more efficient than non-linear fixed-effects estimators, such as the conditional logit models. A conditional logit model drops observations whose value does not switch between 0 and 1 across time and results in a significant reduction in the sample size and degree of precision. The use of a conditional logit model would reduce our sample by 37 per cent.[3]

In our fixed-effects model, identification of the estimates of β comes from the within-individual variation in the time-varying observables. Thus, the consistency of the estimated coefficients rests on the assumption that θ_i is the only source of unobserved heterogeneity. The identifying assumption is that, once we control for all observables and time-invariant unobservables, any change in the observed characteristics is assumed to be exogenous to non-participation in education, employment, or training. The assumption could be violated if there are unobserved time-varying factors driving NEET status that also correlate with X_{it}. Although we cannot be certain what kinds of factors these would be, they would include policies (such as job and training compacts) enacted after the 2011 Census. To bolster the validity of our identifying assumption, we control for several observable characteristics (listed in Table A1) along with a time-dummy to capture census-to-census variations in unobserved factors.

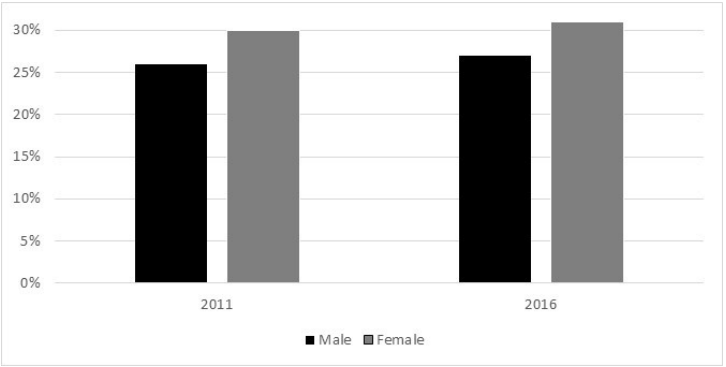
3 Our model assumes linear relationships between the covariates and the outcome of interest despite statistical relationships between a binary outcome and continuous variables (such as age) are generally non-linear. Therefore, we would like to alert readers that our specification may result in biased coefficient estimates and predicted probabilities that fall below zero or over 100 per cent.

5. Results

Descriptive analysis

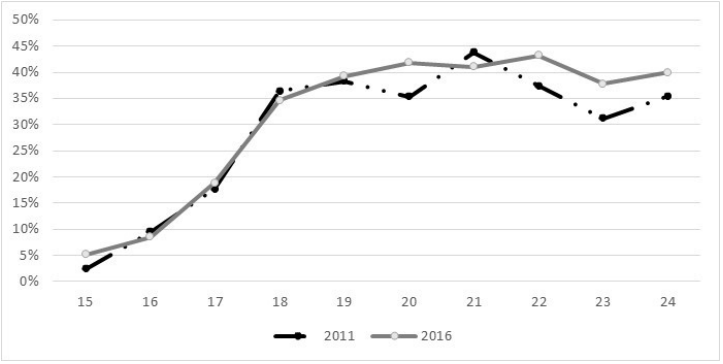
This subsection provides a brief analysis of the profile of NEET youth. Figure 1 shows NEET rates for males and females. NEET is more prevalent among females than males. In 2011, 30 per cent of females were NEET compared with 26 per cent males. For both sexes, NEET prevalence increased by one percentage point between 2011 and 2016.

Figure 1. NEET status by gender



Source: The 2011-2016 ACLD TableBuilder (ABS, 2019).

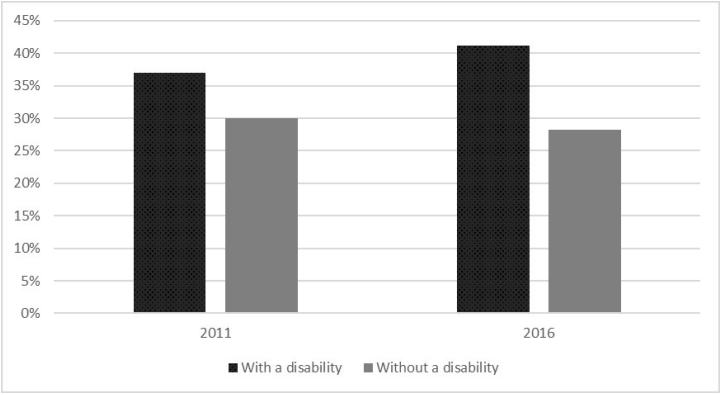
Figure 2. NEET rates by age



Source: The 2011-2016 ACLD TableBuilder (ABS, 2019).

We see in Figure 2 an overall increase in NEET prevalence rates with age. The NEET prevalence in 2011 increased from two per cent for young people aged 15 years to ten per cent for those aged 16 years, and doubled between the ages of 17 and 18 years. While remaining high, the rate zigzagged at the older age brackets with 39 per cent prevalence among 19 year olds and then falling to 35 per cent for 20 year olds before going up to 44 per cent for 21 year olds and dropping back to 31 per cent among 23 year olds and going up again to 35 per cent for 24 year olds. The prevalence in 2016 trended in a similar fashion along with the age profile. The low NEET rates at younger age brackets could be due to youth activation policies in Australia which require young people to be in full-time education, training or employment or a combination of these activities until they turn 17 years (COAG, 2009).

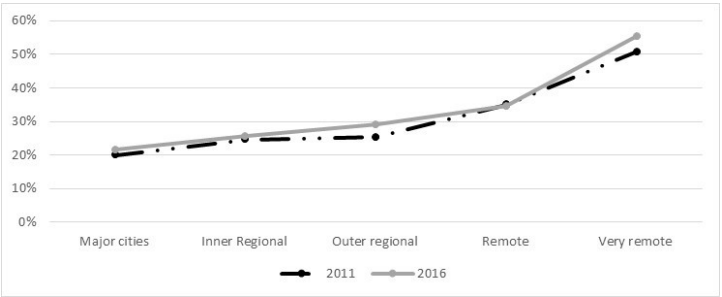
Figure 3. NEET prevalence by disability status



Note: Disability status is defined based on needs for assistance with core activities. People who have reported having needs for assistance with core activities are considered as having a disability.
Source: The ACLD 2011-2016 TableBuilder (ABS, 2019).

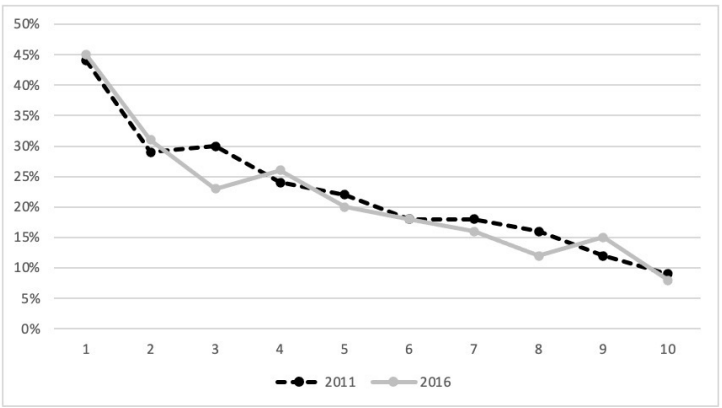
Figure 3 provides NEET prevalence for people who need assistance with core activities and those who do not need assistance. We note that NEET rates are higher among people who need assistance with core activities. The gap almost doubled between 2011 and 2016 (from 7 to 13 percentage points), as the prevalence rate increased substantially for people having disabilities while it fell slightly for those without disabilities. In Figure 4, we depict NEET prevalence rates by geographic remoteness. We note that the risk of falling into NEET increases with remoteness. Over 50 per cent of Indigenous youth who live in very remote areas are NEETs compared with 39 per cent in remote areas, about 26-29 per cent in regional areas and nearly 20 per cent in major cities.

Figure 4. NEET status by remoteness



Source: The 2011-2016 ACLD TableBuilder (ABS, 2019).

Figure 5. NEET prevalence by local socioeconomic status



Source: The 2011-2016 ACLD TableBuilder (ABS, 2019).

We also explore the distribution of NEET prevalences by areas' relative advantages and disadvantages in accessing economic resources, see Figure 5. The ACLD provides a composite index called 'The Index of Economic Resources' that uses household income and wealth and ranks areas in Australia according to relative accesses (or lack of accesses) to economic resources. In the figure, for example, the low deciles represent the presence of many households in the area earning a low income or without house ownership and the high deciles represent many households earning a high income or owning houses. NEET rates fall as access to economic resources improves. In other words, NEET spells are more prevalent in areas where there are fewer households with

high income or home ownership. NEET rates are five times higher in economically most disadvantaged areas (Decile 1) than in least disadvantaged areas (Decile 10).

From a policy perspective, the recurrence of NEET spells is also worth discussing. Though we would generally expect most young people to have at least one short NEET spell (up to six months) at some point in time, especially during transitions between education (training) and employment, only a few of them are expected to experience recurring or persistent NEET spells. To get a better insight into the challenges that young people are facing while navigating education and employment pathways, we explore rates of intercensal transition between NEET and non-NEET status. Table A3 shows the NEET recurrence between 2011 and 2016. We note that the rates of transition into and out of the NEET category are similar (34 versus 33 per cent), and the majority (67 per cent) of those who experienced NEET spells in 2011 were also NEETs in 2016.

Regression results

Before proceeding to the main regression results, it is worth noting that about 30 per cent of the young people with records in the 2011 Census do not have linked data to records from the 2016 Census. In traditional longitudinal datasets, a sample attrition (a reduction in sample size) occurs when study participants refuse or are unavailable to provide information. And sample attrition may cause an estimation bias if factors that drive the attrition correlate with outcome variables. In the case of the ACLD, however, the reduction in sample size is likely to be caused by lack of matching identifiers across censuses. Even if we expect this to be independent of individuals' characteristics, we follow Fitzgerald, Gottschalk, and Moffitt (1998) and estimate a logit model of attrition and examine whether the reduction in sample size in 2016 is associated with observable characteristics (including NEET status) in 2011. Table A4 shows that attrition is positively associated with age, disability status and completing Year 12, but negatively correlated with disability status of other household members and their Year 12 completion status. We do not find a significant association between NEET status and attrition. Since our model controls for those characteristics significantly associated with attrition, we do not expect attrition bias to confound our results.

Table 1 presents results from two alternative panel data models. Though our preferred results are those obtained with a fixed-effects specification, we also present results obtained with a random-effects model for the sake of completeness. Looking into the results from the random-effects model, almost all the covariates are significantly associated with NEET status. However, the coefficient estimates tend to be biased for the reasons discussed in Section 4. We see a substantial change in the statistical significance and magnitude of the estimated coefficients when we control for fixed effects.

Table 1. Results from panel data models

Variable	*Random-effects Model*		*Fixed-effects Model*	
	Coef.	*SE*	*Coef.*	*SE*
Age	0.070 *	0.005	0.081	0.068
Female	0.017	0.013		
Married	-0.025	0.021	-0.029	0.034
Living with a disability	0.203 *	0.038	0.260 *	0.101
Speaks other than English	0.051	0.029	-0.067	0.084
Changed usual address	0.003	0.002	0.001	0.001
Year 12 or equivalent	-0.090 *	0.019	0.048	0.034
Certificate level	-0.179 *	0.023	-0.010	0.039
Diploma/Advanced diploma	-0.296 *	0.042	-0.157 *	0.067
Bachelor degree or higher	-0.350 *	0.037	-0.085 *	0.049
Voluntary work	-0.027	0.018	0.010	0.032
Children aged 0-4	0.127 *	0.018	0.150 *	0.035
Children aged 5-14	-0.003	0.014	-0.041	0.027
Anyone else with disability	0.003	0.021	0.020	0.042
Anyone else completed Year 12	-0.060 *	0.016	-0.039	0.034
Anyone else employed	-0.150 *	0.018	-0.129 *	0.038
Anyone else non-employed	0.044 *	0.014	-0.030	0.027
Ethnically mixed household	-0.041 *	0.013	-0.027	0.026
No extra bedroom needed	-0.103 *	0.020	-0.084 *	0.041
Spare bedrooms	-0.110 *	0.020	-0.140 *	0.042
Regional areas	0.018	0.014	0.049	0.054
Remote areas	0.027	0.025	0.122 *	0.085
Local economic resources	-0.016 *	0.002	-0.017 *	0.006
2016 dummy	-0.111 *	0.027	-0.238	0.343
_cons	-0.678 *	0.091	-0.102	0.163
Number of observations	4,005		-0.102	
rho	0.112		0.530	

Note: Coef. refers to coefficients; SE stands for standard error; * statistically significant at the five per cent level.

In looking at the results from our benchmark specification, we note that having needs for assistance with core activities is associated with a 26 percentage point increase in a person's probability of being in a spell of NEET. While people with a severe or profound disability may be permanently unable to work or study, those with a mild or moderate disability may require special assistance (such as mobility and communication aids) to maintain attachment with the labour market or the education system. Thus, the under-provision of such services may result in youth inactivity. Young people with disability may also find it difficult to work or attend educational institutions due to marginalisation by employers and education providers (Cumming and Dickson, 2013).

Living in households with young children (0-4 year olds) also increases the likelihood of falling into NEET by 15 percentage points. This could be because childcare services are inadequate, unaffordable, or poor quality so that families have to resort to home caring for their children. Living in remote areas is also associated with a 12 percentage point increase in the probability of being in a spell of NEET. This is likely to be associated with the scarcity of appropriate employment and training opportunities in those areas.

On the other hand, the probability of being a NEET falls with educational attainment. People with a diploma or advanced diploma and a bachelor degree or higher are 15.7 and 8.5 percentage points, respectively, less likely to experience a spell of NEET. A possible explanation is that higher levels of education provide better employment prospects for Indigenous youth (Birch and Marshall, 2016). We also find that the presence of an employed household member reduces a person's probability of being NEET by 12.9 percentage points. This is because family members with successful labour market engagements might have had a positive influence on young people's perception of the value of education and employment (Hunter and Gray, 2001). The likelihood of falling into NEET is also lower among Indigenous youth who live in uncrowded homes. Youth who live in a house with a sufficient number of bedrooms and those who live in a house with at least one spare bedroom are 8.4 and 14 percentage points, respectively, less likely to be in a spell of NEET than those who live in a house where extra bedrooms are needed. Evidence shows that uncrowded housing provides young people with sufficient space to do homework, study, socialise, practice skills and have quiet time for personal development (Goux and Maurin, 2005; Solari and Mare, 2012) which could translate into enhanced school progression and employability. It is worth mentioning, however, that the observed relationship could be a result of unobserved correlations between uncrowded housing and other household circumstances (such as wealth and income) that positively impact on personal development and economic engagement.

We also find that the economic engagement of Indigenous youth increases with the improvement of local economic conditions. A one decile increase in area-level socioeconomic status is associated with a one percentage point decline in a person's probability of being NEET. Improvement in local economic conditions could mean that new employment and training opportunities are opening up for young people.

In Section 3, we show that a significant share of our sample changed their Indigenous status between the 2011 and 2016. We restrict the sample to people whose identity was recorded as Indigenous in both censuses to check if our results remain robust. Table A5 shows that the results obtained with the restricted sample are generally consistent with estimates of the full sample.

As reported in Table A3, more than two-thirds of Indigenous youth who were NEETs in 2011 were also NEETs in 2016. Prior research shows that persistently NEET youth are more at risk than those experiencing short NEET spells (Crawford *et al*., 2011; Samoilenko and Carter, 2015). Unfortunately, the ACLD does not provide data on the length of NEET spells, but shows whether or not a person's NEET status changed between the 2011 and 2016 censuses. We compute a categorical variable defined as never if the person did not experience a spell of NEET in both 2011 and 2016; ever if the person experienced a spell of NEET either in 2011 or 2016 and; always if the person experienced

a spell of NEET in both 2011 and 2016.[4] We use ordered logits (as the variable is coded with increasing order of NEET recurrence) to identify the factors underlying NEET persistence. Results are presented in Table 2. Young people in older age brackets and those who have a disability, live with young children (0-4 year olds) and reside in remote areas are more likely to be NEET in both time periods. On the other hand, those whose highest levels of education are Year 12 and Certificates are less likely to be recurrently NEET. So are those who live in uncrowded homes. The probability of being recurrently NEET also falls with the improvement of local economic conditions.

Table 2. Factors associated with NEET recurrence

Variable	*Never*		*Ever*		*Always*	
	AME	*SE*	*AME*	*SE*	*AME*	*SE*
Age	-0.062 *	0.008	0.033 *	0.004	0.039 *	0.004
Female	-0.020	0.020	0.011	0.010	0.010	0.009
Married	-0.076	0.050	0.040	0.030	0.036	0.023
Living with a disability	-0.038 *	0.052	0.076 *	0.028	0.068 *	0.025
Speaks other than English	-0.038	0.042	0.020	0.022	0.018	0.020
Year 12 or equivalent	0.104 *	0.045	-0.055 *	0.017	-0.049 *	0.015
Certificate level	0.201 *	0.045	-0.106 *	0.024	-0.094 *	0.021
Voluntary work	0.023	0.032	-0.012	0.017	-0.011	0.015
Children aged 0-4	-0.100 *	0.027	0.053 *	0.015	0.047 *	0.013
Children aged 5-14	-0.015	0.021	0.008	0.011	0.007	0.010
Anyone else with disability	-0.036	0.031	0.019	0.016	0.017	0.014
Anyone else completed Year 12	0.046 *	0.024	-0.025 *	0.013	-0.022 *	0.011
Anyone else employed	0.160 *	0.025	-0.085 *	0.014	-0.075 *	0.012
Anyone else non-employed	-0.094	0.023	0.050	0.010	0.043	0.012
Ethnically mixed household	0.008	0.022	-0.004	0.012	-0.004	0.010
No extra bedroom needed	0.073 *	0.022	-0.034 *	0.015	-0.034 *	0.013
Spare bedrooms	0.077 *	0.029	-0.041 *	0.016	-0.036 *	0.014
Regional areas	-0.006	0.022	0.003	0.020	0.002	0.010
Remote areas	-0.117 *	0.037	0.062 *	0.020	0.055 *	0.018
Local economic resources	0.018 *	0.004	-0.009 *	-0.002	-0.009 *	0.002
Number of observations	1,644		1,644		1,644	

Note: AME refers to average marginal effects; SE stands for standard error; * statistically significant at the five per cent level. Highest levels of education such as 'Diploma and advanced diploma' and 'Bachelor degree or higher' are dropped from the models due to a very small number of observations.

4 Previous studies use the term 'persistently NEET' to refer to people who experienced a spell of NEET for an extended period of time (usually for over six months). This paper uses term 'recurrently NEET' not to rule out the possibility that those who were NEETs in 2011 may have worked or attended an educational institution before experiencing another spell of NEET in 2016.

6. Conclusion

Using data from the 2011-2016 ACLD, this study provides in-depth profiling of the characteristics of Indigenous NEET youth and examines the factors driving individual-level overtime changes in NEET status. Descriptive results show that NEET is more prevalent among females and young people at older age brackets. Young Indigenous Australians with disabilities and those who live in remote and low socioeconomic status areas also have higher rates of NEET.

Regression results show that individual, household, and local circumstances constitute important factors in explaining the underlying NEET status. In particular, results obtained with a fixed-effects regression show that a young Indigenous person (aged 15-24 years) is more likely to experience a spell of NEET if they experience a disability, live in households with young children (0-4 year olds) and migrate to remote areas. However, their probability of being in a spell of NEET significantly decreases if they obtain a diploma or higher qualification, live in an uncrowded home, someone else in the household is employed, and the economic condition of their area of residence improves.

We also show a strong persistence of NEET status among Indigenous youth, with 67 per cent of the NEETs in 2011 remaining as NEET five years later. Results obtained with ordered logit show that Indigenous youth at older age brackets, with disabilities, from remote and low socioeconomic status areas and who live in crowded homes and with young children are at a higher risk of being recurrently NEET.

Our findings provide key policy insights. While imposing minimum school-leaving ages and mutual obligation requirements could deter inactivity among young people resisting employment and education opportunities (COAG, 2009), a particular policy concern should be directed at providing appropriate supports to those who live in disadvantaged circumstances. Therefore, programs that aim to alleviate the NEET problem among Indigenous youth should:

- create disability-inclusive employment, education, and training environments;
- provide childcare services that are affordable and that meet the needs of Indigenous children and their families;
- improve housing conditions ;and
- address geographic disadvantages in employment and education opportunities.

We want to acknowledge that our analysis does not distinguish between NEETs who are unemployed and those who are not in the labour force. Given that the degree of disengagement from the labour market is different for the two NEET groups, young people in the former group actively seek employment while those in the latter group do not want work or are unable to do so. In future work, we hope to use a larger dataset that will enable us to explore whether different factors are at play for the two NEET categories.

Appendix

Table A1. Variable definition

Variable	*Definition*
NEET	1 if experiences a spell of NEET; 0 otherwise
Age	Age of person in years
Female	1 if female; 0 if male
Married	1 if legally married or lives in a de facto relationship; 0 otherwise
Living with a disability	1 if has needs for assistance with core activities; 0 if does not have need for assistance
Speaks other languages	1 if speaks languages other than English at home; 0 if speaks only English at home
Changed usual address	1 if has changed usual residential address within five years prior the census; 0 otherwise
Level of highest education attained	1 if Year 11 or below; 2 if Year 12 or equivalent; 3 if Year 12 or equivalent; 4 if Diploma/advanced diploma; 5 if Bachelor degree or higher
Voluntary work	1 if does voluntary work for an organisation or group; 0 otherwise
Children aged 0-4	1 if children aged 0-4 years live in the household; 0 otherwise
Children aged 5-14	1 if children aged 5-14 years live in the household; 0 otherwise
Anyone else with disability	1 if anyone else in the household has needs for assistance with core activities; 0 otherwise
Anyone else completed Year 12	1 if the highest year of school completed any household member is Year 12; 0 if the highest year of school completed is Year 11 or below
Anyone else employed	1 if there is an employed household member; 0 otherwise
Anyone else non-employed	1 if there is non-employed household member; 0 otherwise
Ethnically mixed household	1 if Indigenous and non-Indigenous household members live in the house; 0 if all household members are Indigenous
Housing utilisation	1 if extra bedroom is needed; 2 if no extra bedroom is needed; 3 if spare bedrooms available in the house
Remoteness	1 if lives in major cities; 2 if lives in regional areas; 3 if lives in remote and very remote areas
Index of economic resources	This is a ranking of areas (in deciles) in Australia according to relative access and lack of access to economic resources. Low deciles signify the presence of many households in the area earning low income or without house ownership and high deciles signify many households earning high income or owning houses.

Table A2. Summary statistics

	2011				*2016*			
	NEET		*Non-NEET*		*NEET*		*Non-NEET*	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
Age	17.704	1.147	16.600	1.368	21.921	1.373	21.940	1.387
Female	0.501	0.500	0.473	0.499	0.529	0.499	0.469	0.499
Married	0.096	0.295	0.027	0.163	0.224	0.416	0.235	0.424
Living with a disability	0.041	0.198	0.033	0.178	0.093	0.290	0.013	0.114
Speaks other languages	0.174	0.379	0.092	0.289	0.183	0.387	0.053	0.225
Changed usual address	0.089	0.285	0.065	0.248	0.085	0.280	0.070	0.256
Year 11 or below	0.758	0.289	0.717	0.451	0.556	0.497	0.189	0.384
Year 12 or equivalent	0.184	0.388	0.210	0.407	0.290	0.454	0.396	0.389
Certificate level	0.056	0.229	0.071	0.257	0.131	0.337	0.292	0.455
Diploma/Advanced diploma	0.003	0.050	0.002	0.045	0.014	0.118	0.056	0.233
Bachelor degree or higher	0.000	0.000	0.001	0.020	0.009	0.094	0.075	0.264
Voluntary work	0.082	0.275	0.142	0.349	0.076	0.265	0.173	0.378
Children aged 0-4	0.355	0.479	0.161	0.367	0.431	0.496	0.170	0.375
Children aged 5-14	0.500	0.500	0.520	0.500	0.376	0.485	0.177	0.382
Anyone else with disability	0.194	0.396	0.149	0.356	0.229	0.420	0.100	0.300
Anyone else completed Year 12	0.370	0.483	0.525	0.499	0.530	0.499	0.806	0.395
Anyone else employed	0.518	0.500	0.753	0.430	0.480	0.500	0.783	0.412
Anyone else non-employed	0.810	0.392	0.587	0.492	0.711	0.454	0.420	0.494
Ethnically mixed household	0.343	0.475	0.489	0.500	0.365	0.482	0.605	0.489
Extra bedroom needed	0.426	0.495	0.204	0.403	0.325	0.469	0.131	0.338
No extra bedroom needed	0.244	0.430	0.319	0.466	0.292	0.455	0.293	0.455
Spare bedrooms	0.329	0.470	0.477	0.500	0.383	0.486	0.576	0.494
Major cities	0.295	0.456	0.400	0.490	0.341	0.474	0.513	0.500
Regional areas	0.417	0.493	0.460	0.498	0.415	0.493	0.396	0.489
Remote areas	0.287	0.453	0.140	0.347	0.244	0.430	0.091	0.287
Local economic resources	2.730	2.310	4.200	2.858	2.873	2.364	4.511	2.822

Note: The data are for unbalanced panel of 4005 observations; SD stands for standard deviation.
Source: The 2011-2016 ACLD DataLab

Table A3. Recurrence in NEET status

2011	*2016*	
	Non-NEET	*NEET*
Non-NEET	66%	34%
NEET	33%	67%

Source: The 2011-2016 ACLD TableBuilder (ABS 2019).

Table A4. Determinates of sample attrition

Variable	*AME*	*SE*
NEET	0.002	0.006
Age	0.017 *	0.007
Female	0.003	0.006
Married	-0.003	0.006
Living with a disability	0.169 *	0.044
Speaks other than English	-0.002	0.008
Changed usual address	0.001	0.001
Year 12 or equivalent	0.145 *	0.044
Certificate level	0.006	0.012
Voluntary work	0.000	0.000
Children aged 0-4	-0.004	0.007
Children aged 5-14	-0.011	0.006
Anyone else with disability	-0.153 *	0.041
Anyone else completed Year 12	-0.147 *	0.041
Anyone else employed	0.005	0.007
Anyone else non-employed	0.017	0.011
Ethnically mixed household	-0.001	0.008
No extra bedroom needed	-0.001	0.006
Spare bedrooms	-0.003	0.009
Regional areas	0.008	0.009
Remote areas	0.022	0.011
Local economic resources	-0.001	0.002
Number of observations	2,434	

Note: AME refers to average marginal effect; SE stands for standard error;
* statistically significant at the five per cent level.

Table A5. Estimates for a subsample of young people whose identity recorded as Indigenous in both 2011 and 2016

Variable	*Random-effects Model*		*Fixed-effects Model*	
	Coef.	*SE*	*Coef.*	*SE*
Age	0.058 *	0.007	0.055	0.083
Female	0.011	0.015		
Married	-0.026	0.027	-0.034	0.043
Living with a disability	0.201 *	0.052	0.222 *	0.121
Speaks other than English	0.068	0.036	-0.077	0.095
Changed usual address	0.002	0.002	0.001	0.001
Year 12 or equivalent	-0.084 *	0.026	0.074	0.043
Certificate level	-0.176 *	0.030	-0.018	0.049
Diploma/Advanced diploma	-0.255 *	0.026	-0.169 *	0.079
Bachelor degree or higher	-0.312 *	0.056	-0.074	0.081
Voluntary work	-0.044	0.024	0.029	0.039
Children aged 0-4	0.139 *	0.023	0.149 *	0.039
Children aged 5-14	0.002	0.018	-0.062	0.033
Anyone else with disability	0.014	0.029	0.011	0.050
Anyone else completed Year 12	-0.058	0.021	-0.046	0.040
Anyone else employed	-0.173 *	0.027	-0.168 *	0.042
Anyone else non-employed	-0.037 *	0.018	-0.032	0.032
Ethnically mixed household	-0.063 *	0.020	-0.029	0.046
No extra bedroom needed	-0.085 *	0.026	-0.081 *	0.040
Spare bedrooms	-0.126 *	0.027	-0.156 *	0.048
Regional areas	0.027	0.087	0.073	0.070
Remote areas	0.010	0.032	0.269 *	0.131
Local economic resources	0.015 *	0.003	-0.015 *	0.007
2016 dummy	-0.132 *	0.060	-0.118 *	0.417
_cons	-0.471 *	0.118	-0.394	1.421
Number of observations	3,289		3,289	
rho	0.050		0.531	

Note: Coef. refers to coefficient; SE stands for standard error; * statistically significant at the five per cent level.

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