Australian Government
Department of Education, Skills and Employment

Factors Affecting Higher Education Completions

The impact of multiple equity groups on completion

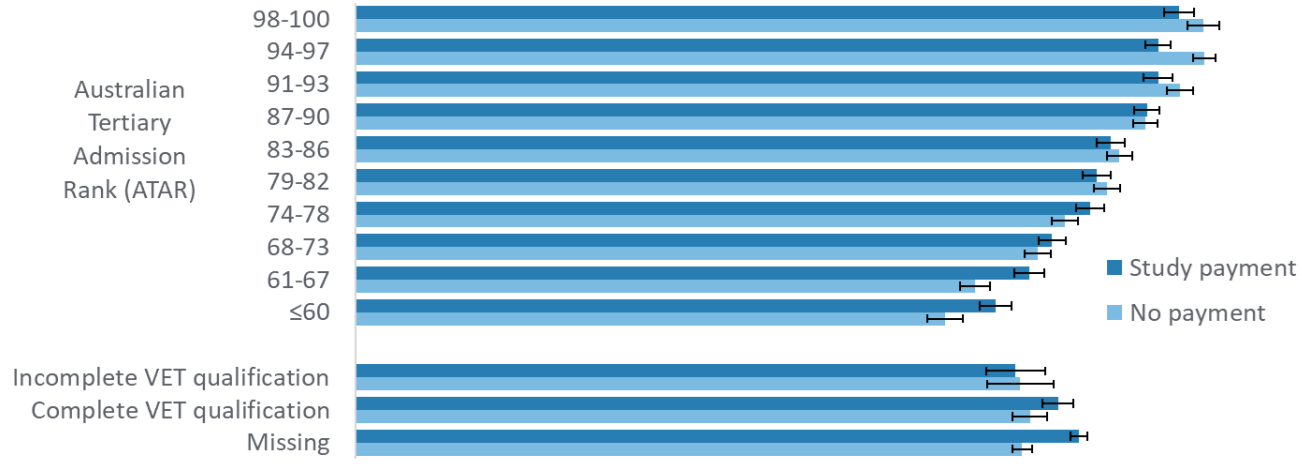
- *Bachelor's degree students commencing in higher education with poorer prior academic achievement are also more likely to be otherwise disadvantaged making it harder to complete their study.*
- *Income support helps overcome these disadvantages, increasing completion rates for students with low ATARs and/or belonging to multiple equity groups.*
- *Belonging to multiple equity groups could be part of a more expansive definition of disadvantage.*

Income support helps bachelor's degree students with disadvantage complete their study

One of the ways that students are supported by government is through income support. In 2015-16 there were around 278,000 (or 33 per cent) undergraduate degree students that were receiving some form of means-tested study assistance such as *Youth Allowance*, *ABSTUDY* or *Austudy*. Youth Allowance here refers only to student payments.

Overall, study support (Youth Allowance and Austudy) shows positive average effects on six-year completion rates of 6-7 percentage points for full-time students (most forms of study assistance require a student to be full-time; (See *Study Assistance* factsheet). This positive effect of completion rates on full-time students varies depending on the students prior academic performance, positive at low ATARs but negative or no difference at mid to high ATAR bands (Figure 1). These results hold after controlling for a wide range of confounding variables including equity group, study load, institution attended and gross income per semester (See Data and Methodology).

Figure 1. Six-year completion rates for full-time bachelor's degree students, by basis of admission, by student income support status, 2011-16.



Source: Custom Multi-Agency Data Integration Project extract linked to Higher Education Information Management System (HEIMS) records.
Notes: Proportions shown are from the unmatched sample; mean completion rate = 74 per cent; N = 93,904. Error bars are 95 per cent confidence intervals. Study payment included any of the following received during study: Youth Allowance, Austudy, ABSTUDY (See Data and methodology section).

Prior academic achievement drives university completion…

It is well understood that there is a strong and positive association between prior academic achievement[1] and undergraduate student completion rates.[i,ii,iii] Over the period 2011 to 2016, the number of domestic onshore students grew from 787,000 to 938,000.[iv] The Australian government supports the majority of domestic undergraduate students[v] through HECS-HELP loans and/or study assistance. The majority of these higher education students are admitted on the basis of Australian Tertiary Admission Rank (ATAR). ATARs are a signal for opportunity, ability and motivation in school which translate into a university setting (Figure 2).

Dropping out of university is costly for both the student and the government and there are many reasons that encourage students to drop out.[vi] ATARs are highly correlated with university grades[vii] and we should expect that, of those students who complete, or fail to complete, there will be a strong relationship with their prior academic achievement. Not surprisingly, completion of bachelor's degree study in six years is much more likely among academically stronger students (Figure 2). Completion rates for all students increased from 59 per cent to 87 per cent between ATAR bands of ≤60 to 98-100, respectively.

…but predicting student completion at enrolment is complicated by background circumstances…

While not as influential as prior academic achievement, other background circumstances or characteristics known at, or prior to, enrolment can also harm student completion rates. For example, by 2016 there were around 721,000 undergraduate students of which there were approximately 15,000 student Aboriginal or Torres Strait Islander Australians, 158,000 low socio-economic status students and 196,000 regional and remote students in the higher education sector. These are often known as equity groups where vulnerability or disadvantage are well understood and indeed our earlier analyses (see Introduction) tells us that belonging to each of these equity groups can negatively affect a student's chances to complete their course.

[1] We use Australian Tertiary Admission Ranks (ATARs), as a well established proxy indicator for prior academic achievement. If two ATARs are provided per student due to bonus points, we took the lower, unadjusted ATAR. We also compare prior Vocational Education and Training (VET) qualifications as a proxy measure.

Figure 2. Six-year completion rates for full-time bachelor's degree students, by basis of admission, 2011-16.

Source: Custom Multi-Agency Data Integration Project extract linked to HEIMS[2] records.
Notes: Proportions shown are from the unmatched sample; mean completion rate = 74 per cent; N = 98,882 (see data notes section for details). Error bars are 95 per cent confidence intervals.

As our measure of a student belonging to one or more equity groups we used cumulative counts of any instance of:

- originating from a low socio-economic background,
- having no parents with higher education qualifications,
- living with mental illness,
- living with chronic health conditions,
- living with disability,
- Aboriginal or Torres Strait Islander Australian peoples and
- coming from a regional or remote area.

These factors may not directly cause a student to drop out of study, but can signal underlying causes such as lack of financial or social support.[viii] These characteristics and/or circumstances are known risks to study completion.

Between 2014 and 2016, one-third of commencing domestic bachelor's degree students belonged to two or more of these equity groups. While the average number of equity groups across all categories was 1.4 per student for commencing students in 2011, the cohort belonging to two or more equity groups increased from one in every four students at the highest ATAR band to one in every two students in the lowest ATAR band (Figure 3). This could be higher for specific groups of students. For example, commencing Aboriginal and Torres Strait Islander peoples students belonged to almost two additional equity groups (1.9 in 2016). This is in addition to Indigeneity which carries with it additional risk(s) to completion that cannot be explained by other data. Other Australian students by comparison belonged to one equity group on average (1.1 in 2016).

[2] Higher Education Information Management System

…that combine in ways that put student completion at risk…

Once we adjust for these multiple equity groups, completion rates fall across all bases for admisssion (Figure 4).

The impact of these equity groups are *additive*. Basically, the more of these backgrounds you have the less likely you are to complete (Figure 5). Belonging to multiple equity groups can reduce completion rates by up to 30 percentage points across all basis of admission categories.This significant result is well understood, is consistent with other research,[ix] and is the reason why we use the doubly-robust method of matching and regression to control for a wide range of circumstances or backgrounds to predict student completion rates. Even in the ATAR bands where the majority of students enrol (80 or above), compounding equity groups play a role. The biggest declines in completion rates from these equity groups happen at the highest ATAR bands.[3] One of the major contributing factors to a six-year completion rate is part-time study (see Introduction) and it appears that belonging to multiple equity groups increases the likelihood of part-time study. The results also hold if you compare only full-time students.

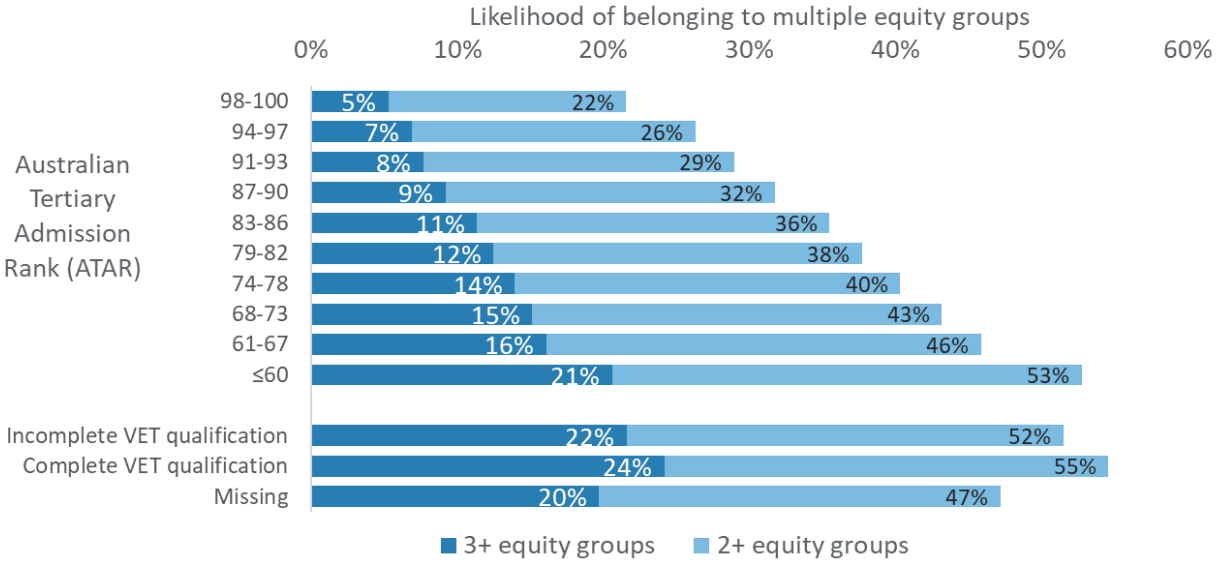
However, we also see evidence that equity groups have a *compounding* negative effect on completion, that is, where the combined effect of two or more equity groups on lowering completion rates is greater than the sum of each equity group effect considered in isolation (Figure 5). The widening of the gap at the highest ATARs shows that academically-gifted students enrolling with three or more of these identified background characteristics are less likely to complete than you would expect from each equity group alone. Students in these high risk groups are more likely to have one or more known health conditions suggesting that health issues combine with other circumstances or characteristics. This compounding effect should be further investigated. We were not able to statistically validate whether there are specific risk factors that are often found together but these links are expected, for example, the link between physical and mental health disorders[x] or between low socio-economic status and disability.[xi]

…with implications for policy.

Given that, at lower ATAR bands, students can be up to four times more likely to belong to three or more equity groups (Figure 3). Education institutions and policy-makers should consider these risks, particularly student health risk factors in defining student equity groups. Our results are consistent with other research, in that study choices (study load, academic performance and work) are more critical than many of these background characteristics.[xii] However, other factsheets in this series show that these background characteristics also influence study choices, for example, low socio-economic backgrounds, having to contribute financially to your family or having many dependents can drive students to work and study part-time which in turn reduces six-year completion rates. Belonging to multiple equity groups should be included in a more expansive definition of student disadvantage.

[3] Predictive margins were calculated from the unmatched sample and were statistically significant for ATARs higher than 90 ($p < 0.01$) after controlling for all other variables using logistic regression ($\chi^2 = 29{,}000$; Pseudo-$R^2 = 0.19$; $N = 119{,}274$).

Figure 3. The likelihood of bachelor's degree students commencing in 2011 to belong to two or more or three or more equity groups, by basis of admission.



Source: Custom Multi-Agency Data Integration Project extract linked to Higher Education Information Management System records.
Notes: Proportions shown are from the unmatched sample; mean completion rate = 74%; N = 98,882). Multiple equity groups included low socio-economic status, regional or remote background, Indigenous status, known disability, chronic and/or mental health conditions and low parental educational attainment (See Data and methodology section).

These combined results can be used by policy-makers to better identify at-risk students and inform services that could help these students overcome some of these challenges that have a detrimental effect on completions. As shown in Figure 1, study payments can have a positive effect on completion rates depending on the students ATAR.

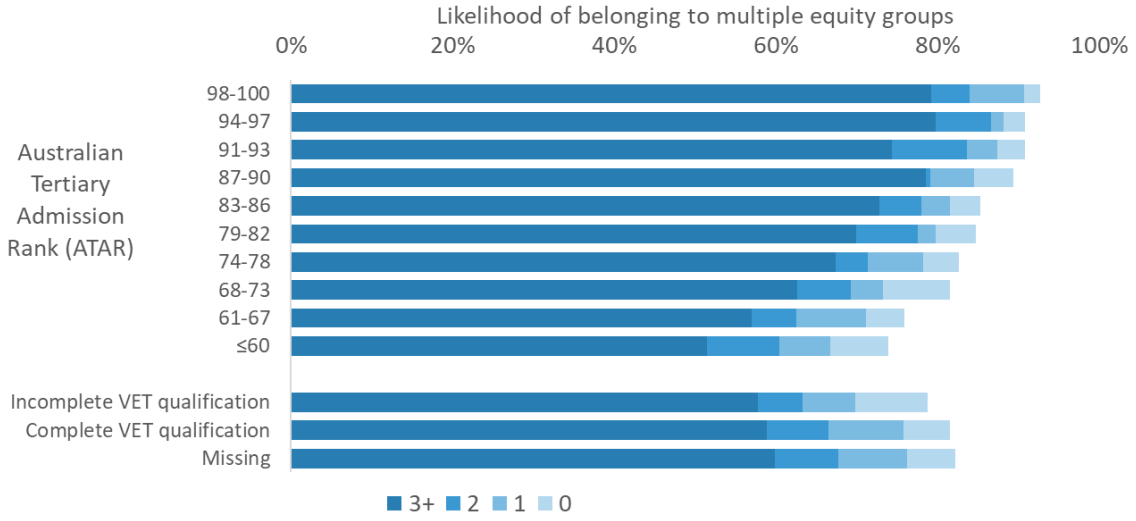
Figure 6 shows that the positive effect of *any* income support on completion rates on full-time students also varies depending on the students background or personal circumstances, in this case combinations of students coming from a regional or remote community and/or low socio-economic community and/or having no parents with undergraduate qualifications.

The benefit of income support on completion rates is highest where students belong to two or more equity groups, where income support can increase completion rates by up to eight percentage points. In other cases, for example student Indigenous Australians coming from regional/remote communities whose parents have no undergraduate qualifications, the increase in completion rates could be as high as twenty percentage points. For students that belong to no equity group, completion rates are high and we found no additional positive effect for students that received study support.

One of the challenging exceptions to the positive effect of income support on completions are health conditions. Students with chronic physical or mental health conditions or disabilities that access income support have poorer completion rates than those that do not. This can be partly explained by the fact that health conditions can vary in severity.

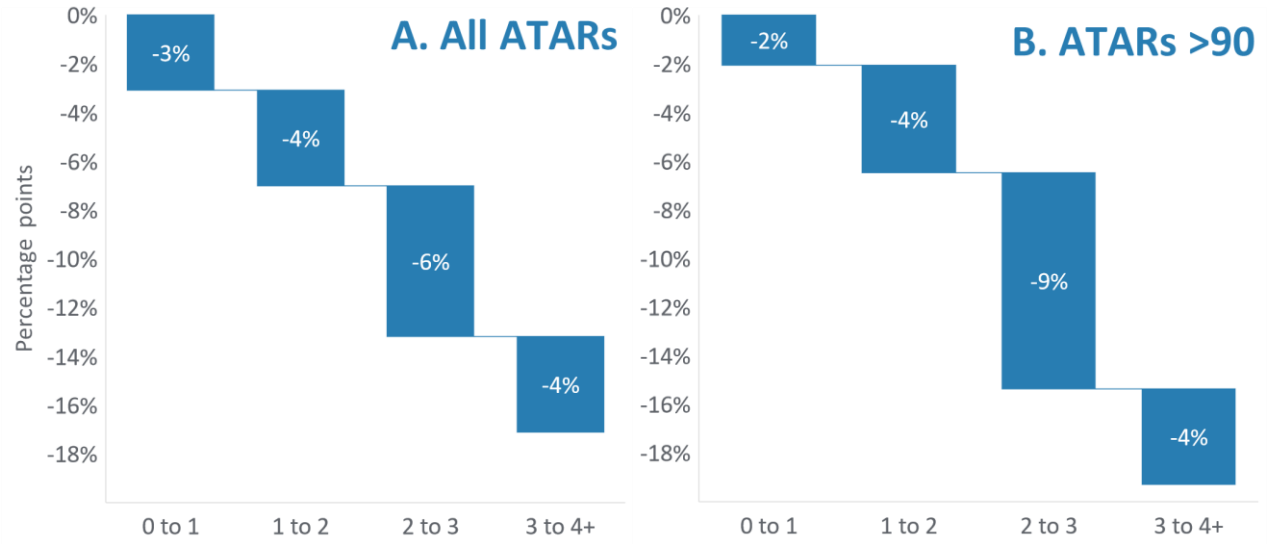
Three quarters of all students study and work in any given year. This analysis has been undertaken on full-time students but if we included part-time students in our analysis the marginal effect of income support improving completion rates for students belonging to one or more equity groups generally doubles (data not shown).

Figure 4. Six-year completion rates for bachelor's degree students commencing in 2011, by basis of admission adjusted for the number of equity groups that the student belonged to.



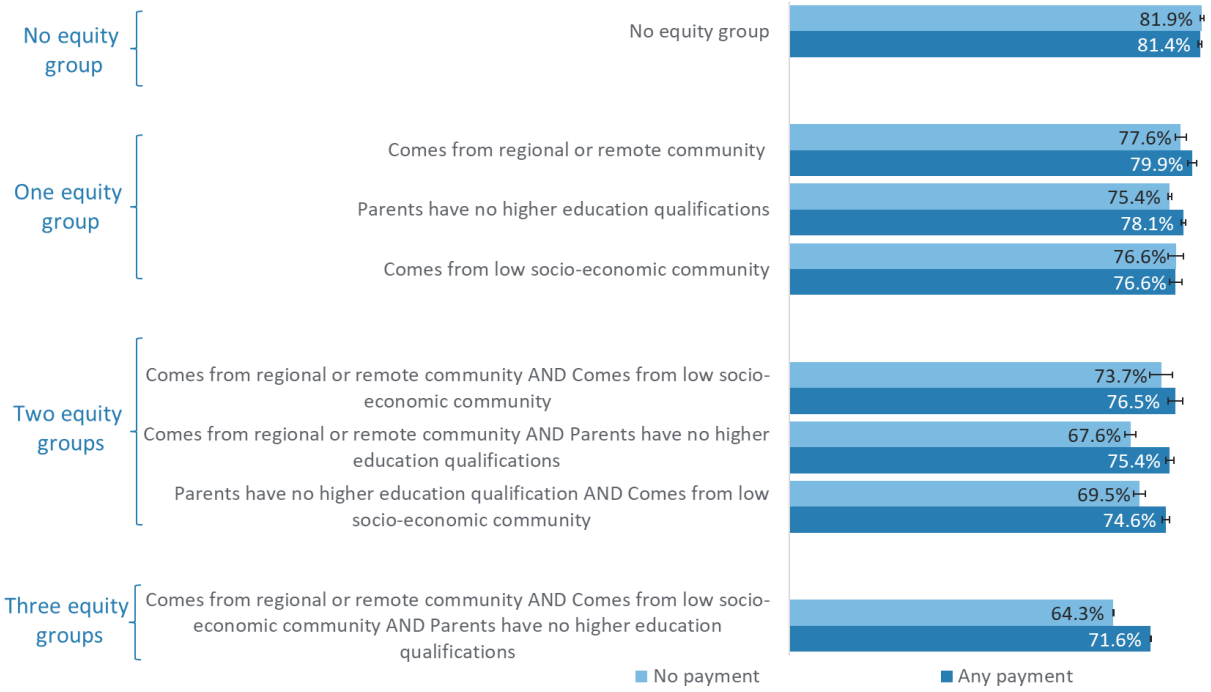
Source: Custom Multi-Agency Data Integration Project extract linked to Higher Education Information Management System records.
Notes: Proportions shown are from statistically matched sub-sample; mean completion rate = 70%; N = 65,000 (see data notes section for details). The relationship between basis for admission and completion rate was compared for students with 0-1 vs. 2 or more equity groups using generalised linear model post-matching (Overall χ^2=15,600, p<0.001; Pseudo R^2=0.2; pairwise comparisons were statistically different (p <0.05) in all cases. Multiple equity groups included low socio-economic status, regional or remote background, Indigeneity, living with disability, chronic and/or mental health conditions and low parental educational attainment (See Data and methodology section).

Figure 5. The average percentage point decline in completion rates with each additional background equity group added, by basis of admission.



Source: Custom Multi-Agency Data Integration Project extract linked to Higher Education Information Management System records.
Notes: Proportions shown are from the unmatched sample; mean completion rate = 74%; N = 98,882). Multiple equity groups included low socio-economic status, regional or remote background, Indigeneity, living with disability, chronic and/or mental health conditions and low parental educational attainment (See Data and methodology section).

Figure 6. Six-year completion rates for full-time bachelor's degree students belonging to one or more selected equity groups, by income support status, 2011-16.



Source: Custom Multi-Agency Data Integration Project extract linked to Higher Education Information Management System records.
Notes: Proportions shown are from the unmatched sample; mean completion rate = 74%; N = 98,882). Error bars are 95 per cent confidence intervals. Income support included any of the following received during study: Youth Allowance, Austudy, ABSTUDY, Carer Payment, Disability Support Pension or Parenting Payment. Equity groups included low socio-economic status community (where the student originated from an SA3 area in the lowest 30 per cent of Socio-Economic Index for Areas Index of Relative Socio-economic Advantage and Disadvantage, where a student came from a regional or remote background and/or had no parents with higher education qualifications (See Data and methodology section).

Data and methodology

The analysis in this factsheet used higher education student records linked to MADIP (Microdata: Multi-Agency Data Integration Project, Australia). The MADIP data contains records from: Census 2016, Social Security, Medicare Benefits Schedule, Personal Income Tax and the Pharmaceutical Benefits Scheme. The records have been de-identified and are accessed via that ABS DataLab, a secure server, run by the ABS who maintain the integrity of the data held on the DataLab.

We examined all students who commenced a bachelor's Graduate Entry and Bachelor's Honours award courses for the first time on a Commonwealth Supported Place in 2011 (course types: 9, 10; excluding Open University Australia courses). There were 119,175 students in this cohort, of which 67 per cent completed their bachelor's studies within the 6-year time period. For this factsheet we focussed on full-time students of which there were 98,882 students in this cohort, with a 74 per cent completion rate within the 6-year time period. The analysis included all students who commenced in 2011, undertook study between 2011 and 2016 (reference period) and determines their completion status at the end of 2016 (completed, still actively studying (i.e. enrolled) or inactive (i.e. no instance of enrolment). We simulated a randomised control trial by creating a matched sub-population of 66,393 students. We considered a wide range of covariates to match on. By applying a high accuracy random forest model predicting the treatment and outcome, we selected on the seven highest contributing features (a proxy for confoundedness), which still preserved a large sample size. The covariates controlled for are institution size, mode of attendance (Full-time or Part-time study based on EFTSL semester average), STEM Field of Education flag, total income (semester average), Socio-economic background (Low-Med-High IRSAD), age at commencement (grouped), and gender. A doubly robust method of matching and binomial logit regression was used according to Gelman & Hill (2006)[xiii] on the matched sample to confirm significance. Additional variables in the regression were Tertiary Entrance Rank, parents' educational status, gender, receiving student payment, English-speaking country of birth, age group, attendance type, institution, SEIFA, STEM field of education, and income per semester.

Income support

Income support flags indicate whether a student was in receipt of government study assistance or another form of income support payment while studying. Study assistance is Youth Allowance, Austudy and ABSTUDY. While student income support payments are designed for people who are studying, a student may be eligible for other non-study related income support payments. These included students who received Carer Payment, Disability Support Pension or Parenting Payment (Single or Partnered). Youth Allowance and Austudy require a student to be full-time. Other forms of income support such as ABSTUDY, carer payments and Disability Support Pension allow a student to study part-time.

Multiple equity groups

We calculated the proportion of commencing students with more than two equity groups on both the matched and unmatched cohort, in both cases the results being consistent. The count was defined as a point system, giving one point for each of the following prior to enrolment: lower 30 per cent of Socio-Economic Index for Areas *Index of Relative Socio-economic Advantage and Disadvantage (IRSAD)*[4]; Indigeneity; coming from a regional or remote community; access to disability or chronic health related services prior to study; mental health service use prior to study; and no parents with recorded higher education qualifications. The last item is likely to be highly correlated with IRSAD. Due to limited health data in earlier years of MADIP data we confirmed that the likelihood of living with a mental and chronic health condition is the same in the first year of study as in the year prior. While not necessarily persistent, the relationship between health risk factors prior to and in the first year of study has the same relationship with basis of admission.

[i] Norton A, Cherastidtham I and Mackey W (2018) *Dropping out: The benefits and costs of trying university*. Grattan Institute

[ii] Cardak B, Brett M, Barry P, McAllister R, Bowden M, Bahtsevanoglou J and Vecci J (2017) *Regional Student Participation and Migration: Analysis of factors influencing regional student participation and internal migration in Australian higher education*. National Centre for Student Equity in Higher Education. Curtin University

[iii] Marks G (2007) *Completing university: Characteristics and outcomes of completing and non-completing students*, Longitudinal Survey of Australian Youth research report No. 51

[iv] Department of Education, Skills and Employment (2019) '2018 First half year student summary time series', *Selected Higher Education statistics – 2018 Student data*, Department of Education, Skills and Employment, Accessed on 10 October 2019.

[v] Department of Education and Training (2018) *Undergraduate Applications, Offers and Acceptances 2018*, Department of Education and Training, Accessed on 10 October 2019.

[vi] Norton A, Cherastidtham I and Mackey W (2018) *Dropping out: The benefits and costs of trying university*. Grattan Institute

[vii] Cherastidtham I and Norton A (2018) *University attrition: What helps and what hinders university completion?* Grattan Institute

[viii] Cherastidtham I and Norton A (2018) *University attrition: What helps and what hinders university completion?* Grattan Institute

[ix] Gemici S, Lim P and Karmel T (2013) *The impact of schools on young people's transition to university*, NCVER, Adelaide.

[x] Australian Institute of Health and Welfare (2019) *Mental Health Services in Australia*, Australian Institute of Health and Welfare, Accessed on 6 December 2019.

[xi] Coyle J, Freire K, Wood D, Wilding C, Taylor D, Ganguly R, Burke J, Downing L and Siliézar L (2018) *The Influence of Disability, Socioeconomic Status and Regionality on Higher Education Access and Participation*, National Centre for Student Equity in Higher Education, Accessed on 6 December 2019.

[xii] Tumen S, Shulruf B and Hattie J (2008) 'Student pathways at the university: Patterns and predictors of completion', *Studies in Higher Education* **33**: 233–252

[xiii] Gelman A and Hill J (2006) *Data Analysis Using Regression and Multilevel/Hierarchical Models*, Cambridge University Press, Cambridge.

[4] The Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) summarises information about the economic and social conditions of people and households within an area, including both relative advantage and disadvantage measures.https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2033.0.55.001~2016~Main%20Features~IRSAD~20