

Regional Student Participation and Migration

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Analysis of factors influencing regional student participation and internal migration in Australian higher education

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Executive Summary

This research study examines regional student participation and migration by use of novel data sources and analytic techniques. The data and techniques utilised within the study provide insights that are relevant to contemporary higher education policy challenges and reform processes.

This study builds our knowledge of regional student participation and mobility through quantitative analysis of:

- factors associated with regional youth progression through school and into higher education, using data from the Longitudinal Survey of Australian Youth (LSAY)
- factors associated with the migration of students with a commencing regional home address to major cities and other regional areas, using customised administrative data obtained from the Department of Education and Training, with particular emphasis on the impact of demand driven funding on patterns of student migration.

Through analysis of the 2006 Cohort of the LSAY we find that regional and remote students are on average:

- 10.0 per cent less likely to have plans to attend university than metropolitan students, after controlling for socioeconomic status (SES)
- 7.0 per cent less likely to complete high school than their metropolitan counterparts after controlling for SES
- 4.7 per cent less likely to attend university than their metropolitan counterparts after controlling for Equivalent National Tertiary Entrance Rank (ENTER)
- 5.8 per cent less likely than metropolitan students to graduate from university.

A more detailed investigation of LSAY data explores the impact of credit constraints (an inability to borrow to fund costs of higher education participation) and the original place of residence (metropolitan or regional and remote) on (i) plans at age 15 for university study, (ii) high school completion, (iii) university commencement, and (iv) university outcomes, using four separate models and incorporating a wide range of control variables.¹

The investigation finds no evidence that likely constrained regional students are less inclined to attend university than their unlikely constrained regional peers, nor are they less inclined to attend university than their likely constrained metropolitan peers. We surprisingly find that likely constrained regional students have a much higher probability of graduating from university than their unlikely constrained regional peers are also more likely to graduate than their likely constrained metropolitan peers. This suggests that likely constrained regional students who make it to university are probably more talented and determined than might be expected, based on observed characteristics.

In view of the importance of school outcomes for higher education success, we also modelled high school outcomes. We find that unlikely and potentially credit constrained regional students (at 15 years) are less likely to have plans to attend university than their metropolitan peers, suggesting lower regional student aspirations, consistent with some of

¹ The definition of the likely, potentially and unlikely credit constrained groups used in the analysis below is detailed on page 15.

the earlier literature on the lack of educational role models, infrastructure and information supporting higher education in regional locations. We also find evidence that regional students are less likely to complete high school; regional potentially constrained students are 2.9 per cent less likely than metropolitan potentially constrained peers to graduate from high school – a critical factor in their eligibility for higher education. (See Cardak and Ryan (2009) for more information on high school achievement and university enrolment eligibility.)

Finally, high school achievement is a strong predictor of university admission and more importantly a strong predictor of university outcomes; students with high ENTER scores are more likely to graduate and less likely to drop out/fail to complete. The policy implication is that an effective way to improve higher education participation and graduation among students of regional and remote origin is to improve educational outcomes in regional and remote schools.

The LSAY 2006 cohort largely commenced university in 2009-10, before the full implementation of the demand driven funding system and associated equity interventions such as the Higher Education Participation and Partnerships Program (HEPPP). Given this, the above findings may require further analysis in view of the expansion in student participation evident in recent years. This expansion has led to wider opportunity, with a greater potential for credit constraints to influence student participation. The increased participation of more marginal or at-risk students in higher education may have heightened the effects of credit constraints on academic success at university. Further investigation might involve the use of LSAY data from cohorts that commenced after the introduction of demand driven funding (yet to be collected) and/or a more in-depth longitudinal analysis of administrative data.

Our analysis also draws from customised Department of Education and Training administrative data for the years 2008, 2011 and 2014. The important innovation in this data is that for each cohort, the regional or metropolitan status of students has been identified by their commencing permanent home address, in addition to their regional or metropolitan status while studying, based on current term address. The importance of this approach is that it allows students of regional origin who have migrated to metropolitan areas to be identified as regional students. Current higher education indicators are based on current permanent home address in the year of reporting. Any change in a student's permanent home address from year to year may lead to changes in the regional and socioeconomic status conferred with implications for overall patterns of participation identified in equity performance indicators. The analysis identified that the growth in the number of students with a regional commencing permanent home address between 2008 and 2014 (38.8 per cent), and between 2011 and 2014 (18.2 per cent), has been significantly higher than the growth in students identified as regional under the existing higher education equity performance indicator framework, and has been significantly higher than overall sector growth (33.1 per cent between 2008 and 2014, and 15.6 per cent from 2011 to 2014).

The data enables us to study the destination of students originating from regional locations, providing:

- the participation of students with a regional commencing permanent home address and a regional term address is not growing as quickly as the overall student body and this difference is statistically significant (28.4 per cent vs. 33.1 per cent from 2008 to 2014)

- the participation of students with a regional commencing permanent home address and metropolitan term address is growing more quickly than the overall student body and this difference is also statistically significant (76.3 per cent vs. 33.1 per cent from 2008 to 2014)

The growth in participation of students with a regional commencing permanent home address and metropolitan term address was examined in more detail across a range of variables to ascertain any specific trends relating to demography, enrolment and admissions practices. The analysis finds higher growth that is statistically significant for the proportion of students with a regional permanent home address at commencement and metropolitan term address across a range of variables. Specific examples include:

- mode of study, with particularly high growth for multi-modal (149.5 per cent from 2008 to 2014) and external study (156.6 per cent from 2008 to 2014)
- type of attendance, with a significant increase evident in the proportion of students undertaking part time study
- age, for all ages above 20, and with particularly strong growth for mature age students between the ages of 25 to 29 (228.6 per cent from 2008 to 2014). There was, however, a significantly lower rate of growth for students aged 19 years and under
- equity, with particularly strong growth for students with disabilities (145.0 per cent from 2008 to 2014) and Indigenous students (168.4 per cent from 2008 to 2014). There was no significant change, however, evident in the distribution of students by socioeconomic status, nor in student gender
- course level, with a significant shift in the proportion of relocating students undertaking postgraduate and enabling study, and a parallel reduction in undergraduate level study
- field of education, with a significant increase in enrolments across every field of study when compared against other students in the field of study.

In addition to analysis of students relocating to metropolitan areas, analysis was also undertaken of the propensity of regional origin students to move to other regional locations. In 2014, students who apparently relocated from one regional postcode to another accounted for 7.5 per cent of all regional students. Those relocating to metropolitan locations accounted for 24.2 per cent of regional students, indicating that around a third of regional students relocate. The regional relocation data highlights a dynamic pattern of mobility, with students tending to gravitate towards adjacent regional centres with campuses operating at significant scale within their state. Future research may examine patterns of intra-regional mobility in more depth.

The data obtained from the Department of Education and Training included information on the relocation of metropolitan and remote students. There are differences between patterns of relocation for regional and remote student populations that necessitate separate analysis for remote students. The relocation of metropolitan students to regional locations occurs at a lower rate than relocation of regional students to metropolitan locations. The drivers of metropolitan relocation are different from those of regional students and also require a separate analysis. These analyses are part of our future research agenda on student geographical mobility and migration.

The findings of this report are relevant to contemporary higher education policy challenges and reform processes. The higher education options paper, *Driving Innovation, Fairness, and Excellence in Australian Higher Education* (Department of Education and Training, 2016a), sought feedback on a range of questions relating to regional student access and

support, and regional higher education delivery. The questions raised in the options paper were predicated on the view of regional student underrepresentation and declining rates of participation.

Measuring regional student status using regional commencing permanent home address, this report finds growth in regional student participation is significantly higher than conventional indicators currently in use would suggest. Regional students remain underrepresented. However, their true level of access is higher than reflected in the current statistics based on existing indicators.

The number of regional students who move to the city has grown at a much faster rate than the number choosing to undertake study in regional areas. This has implications for the design of incentives that support regional delivery and regional student relocation. The demographics of students relocating also reveal a growing proportion of mature age students, students with disabilities and Indigenous students. This again has implications for the assumptions driving student income support and institutional support practices.

The authors recommend piloting the use of commencing permanent home address as an additional measure for postcode based equity indicators used in Australian higher education. This type of measure has potential use in understanding influences of social origin and mobility by statistical geography measures of regional and socioeconomic status. The rich administrative data available through the Commonwealth Department of Education and Training provides excellent opportunities to study the progress of students through their education pathways, and optimally would be examined using more granular unit record data. Appropriate access to longitudinal data of this type will enrich our understanding of important factors that determine academic success.

The report highlights slower rates of participation growth for regional youth. The LSAY analysis highlights that when controlling for other variables, regional status is not a significant driver of participation. Rather, school achievement and aspiration exert more influence on poor outcomes relating to regional student school completion, higher education participation and higher education completion. To reiterate the policy implications of our findings based on LSAY data, investment in regional families, regional schools, partnerships between regional schools and higher education providers, and in regional school outreach programs, remain key interventions for improving regional student participation rates. These policy outcomes could be achieved by appropriately pursuing needs-based funding recommended by the Gonski review into school funding and recalibrating higher education equity funding towards regional-specific interventions.

The emphasis in the report on regional student relocation to major cities is counterbalanced to some extent by analysis of mobility within regional Australia. Regional higher education delivery will continue to be an important feature of Australian higher education (around 70 per cent of regional students had a regional term address in 2014). The pattern evident in 2014 suggests that there are only a handful of regions with campuses operating at sufficient scale and the reputation to act as net recruiters of students from a more distant regional geography. Policy makers may wish to consider these patterns of mobility, and the extent to which regional campuses are serving a broader geography when investing in regional higher education delivery.

The authors anticipate that this study will be of interest to many stakeholders in regional higher education. We have deliberately avoided normative positions around whether the

patterns of regional student participation and mobility are inherently positive or negative. This study is perhaps the first study of its kind in using a new indicator for student geographic origins, with potential applicability to regional and socioeconomic status related policy questions. From the authors' perspective it throws new light on a long-standing policy challenge, but also raises many additional questions. For example:

- What forms of school interventions will lead to improved regional school outcomes and higher education participation and success?
- Beyond the information on commencement and participation analysed here, how do patterns of geographical mobility vary across the student life cycle and post-graduation?
- Do student success and employment outcomes vary by patterns of geographic mobility and participation?
- How responsive are regional students to policy reforms such as scholarships and relocation grants that incentivise geographic mobility?

We would encourage those that engage with this report, or who undertake future research, to consider exploration around how this analytic approach can be used to progress the objectives of providing regional communities with better access to high quality tertiary education and an advanced skill base to drive social and economic development. The research team will continue to analyse the data underpinning this report, and anticipate that research considering metropolitan to regional migration and remote to regional and metropolitan migration will be published in the near future. We welcome feedback and opportunities to collaborate with other researchers interested in this topic area.

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1. INTRODUCTION

This research study examines regional student participation and migration, using novel data sources and analytic techniques. The data and techniques utilised within the study provide insights that are particularly relevant to contemporary higher education policy challenges and reform processes.

Regional communities demonstrate persistently lower levels of higher education participation and attainment. Regional underrepresentation is the focal point for a range of policy interventions that seek to increase participation. These include increasing university outreach and engagement with regional communities; increasing the supply of university places available to and targeted at regional students; subsidising the costs of delivering higher education in regional communities; and providing financial support to defray the costs of relocation faced by regional students.

There is a diverse literature that examines factors influencing regional participation. Whilst the factors influencing regional participation are well documented, there remain significant gaps in our knowledge. There has, until now, been a lack of robust empirical analysis of the relative effects of factors associated with regional student underrepresentation. Our knowledge of regional student participation is also limited by the characteristics of the data used to capture participation levels. Existing indicators confer regional status to students on the basis of their current home address, and can therefore provide limited insights into matters of regional origin, mobility and migration.

This study seeks to progress our knowledge of regional student participation and mobility through quantitative analysis of:

- factors associated with regional student progression through school and into higher education, using data generated by the Longitudinal Survey of Australian Youth (LSAY)
- factors associated with the migration of students with a commencing regional home address to major cities and other regional areas using customised data obtained from the Department of Education and Training.

Recent higher education policy has been motivated by the assumption that future demand for advanced skills and higher education qualifications will grow, that the accommodation of this growth requires an increase in participation levels from traditionally underrepresented groups, and that additional investment in interventions is needed to stimulate this increase. Regional students are recognised as an underrepresented group in higher education and a range of policy interventions are in place that aim to improve their participation.

This policy logic is evident in the introduction of demand driven funding and interventions such as the Regional Loading and Higher Education Participation and Partnership Program (HEPPP). As a result of these policies and interventions, more regional students are enrolling in higher education than ever before. However, existing indicators of regional participation suggest that the relative participation of regional students is declining.

2. BACKGROUND AND CONTEXT

Policy Context and Policy Interventions

There have been many studies that document the differences in educational attainment between regional and metropolitan students. Although the focus of this report is on higher education, the evidence suggests that at all levels of the education system, regional students experience educational outcomes inferior to their metropolitan counterparts. Regional students experience lower outcomes in terms of school attendance, senior secondary school completion, academic achievement, and in terms of participation in further education and training, including vocational, certificate level courses.

The factors shaping regional underrepresentation are multi-dimensional and complex, emerging from the social and economic context of regional families and communities. The policy responses to regional underrepresentation are also multi-dimensional, and span policy jurisdictions and government department portfolios. This complexity limits the effectiveness of Commonwealth policy interventions in shifting regional higher education participation levels. Early childhood education and child and maternal health involve local government management; school education and vocational education are managed by state governments; and welfare and student income support payments are generally managed by the Commonwealth Department of Human Services. Despite fragmented responsibility for interventions that influence participation in higher education, there remains a significant role for higher education policy in influencing regional community access and participation.

Consideration of access to higher education for regional communities stretches back to the origins of Australian higher education. Regional communities were active participants in the establishment of Australia's first university – the University of Sydney (New South Wales Legislative Council, 1850).² Through the early twentieth century, public funding for the University of Melbourne was conditional on an expansion of regional outreach and extension programs (University Act 1904; University Act 1928).³ Throughout the twentieth century, there was an expansion in the number of stand-alone and satellite campuses of established universities located in regional communities. Community advocacy to achieve university town status contributed to the Martin Committee's review of tertiary education in 1965 considering this as an issue, which went on to identify principles by which regional campuses and universities should be established (Committee on the Future of Tertiary Education in Australia & Martin, 1965).

Regional students were formally identified as a higher education equity group with the publication of the white paper *Higher Education: A Policy Statement* (Dawkins, 1988) and strategies for improving their participation were outlined in *A Fair Chance for All* (Department of Education Employment and Training, 1990). Standardised time series data on regional

² Petitions were made to the Legislative Council on the Bill to establish the University of Sydney from regional communities including Maitland, Bathurst, Berrima, Newcastle, Goulbourn, Yass, Penrith, and Picton: New South Wales Legislative Council, 1850, pp. 271, 289, 295 and 305.

³ Section 4 of the University Act 1904 (Vic) made additional funding conditional on collaboration in program delivery with schools of mines and agricultural colleges, and in accepting students into these programs who had not matriculated. Section 34b of the University Act 1928 (Vic) allocated funds for the establishment of a University Extension Department so as to provide facilities for university education throughout whether by tutorial classes, correspondence classes, university extension classes, vacation classes or otherwise.

participation has been collated and reported since the creation of a higher education equity performance indicator (Harvey et al., 2016; Martin, 1994). In 2004, regional loading was introduced, recognising the challenges of sustainable higher education delivery in regional communities given thin markets and higher costs, while also recognising the public benefits of delivering higher education to traditionally disadvantaged communities (Department of Education, Employment and Workplace Relations, 2011; Nelson, 2003).

A central issue in regional higher education policy has been the tension between delivery of higher education in the regions, and support of students to move from the regions to undertake study. The small population size of regional communities can make it difficult to sustain a critical mass of higher education operations and infrastructure at a quality consistent with public expectations (Higher Education Infrastructure Working Group, 2016). Policy emphasis on relocation through scholarships and other incentives can, however, denude regional communities of their most talented young people, and fails to recognise that many capable students prefer to remain in regional communities, or have family or other responsibilities that prevent their relocation. The response to these policy tensions include an increase in the number of campuses in regional communities across the country and continued evolution in income support policy. Dow's (2011) review of student income support provides a good overview of the logic driving student income support policy. Scholarships, relocation allowances and student income support to mitigate the financial costs of relocation and studying away from the family home are well entrenched. These issues focus on higher education participation and outcomes and do not adequately consider labour market interventions to address potential skills shortages in regional Australia.

In addition to considerations of campus and institutional proliferation and an evolution in individual financial support, Australia has a long tradition of distance education. Distance education is often cited as a means of balancing tensions between cost, convenience and quality. There is significant growth in online delivery of higher education across Australia and in regional communities. There remain, however, major limitations to this mode of delivery, and completion rates for students undertaking distance education are low (Department of Education and Training, 2015a). However as learning technology and pedagogy matures, the completion rates of students undertaking distance education may improve over time.

It is against this broad regional policy backdrop that the dominant feature of Australian higher education policy over the last decade has been introduced: demand driven funding for undergraduate places in public universities. This financing policy emerged from the *Review of Australian Higher Education* (Bradley et al., 2008). Bradley's reforms provided eligible students with an entitlement to a Commonwealth Supported Place, and allowed institutions to enrol as many eligible students as they deemed appropriate. The demand driven funding system has led to a large increase in enrolments. Equivalent full time student load increased by one third from 2008 to 2015 (Department of Education and Training, 2016a).

The introduction of demand driven funding coincided with a major increase in funding to support student aspiration and participation. Funding for the Regional Loading was increased from \$32 million (2010) to \$70 million (2016) (Department of Education and Training, 2017). Regional Loading provides additional funding to universities based on their share of enrolments at regional campuses. New student scholarships and grants were also introduced, although some of these income support measures have subsequently been converted to student loans. The Higher Education Participation and Partnership Program

(HEPPP) was also introduced, providing additional funds for supporting university outreach to low SES communities and low SES students' learning support needs.

Whilst HEPPP focused on low SES students, there is a significant overlap between low SES and regional communities. One of the aims of HEPPP was to support regional participation by increasing the scale of outreach activity already undertaken by the sector, and enabling new and innovative forms of engagement with communities. HEPPP support for participation also allowed for an increase in investment in student support services and scholarships (Naylor, Baik & James, 2013).

System expansion was anticipated to have had a positive impact on the participation of students from equity groups. Long-standing stability in the participation of students from low socioeconomic status (low SES) backgrounds has been disrupted by demand driven funding, with low SES participation rates increasing from 16.67 per cent in 2010 to 18.15 per cent in 2015 (2007 postcode measure all ages) (Department of Education and Training 2015). However, growth in participation has not been evident for regional students. Over the same time frame, the regional student participation rate has decreased slightly from 19.6 per cent in 2010 to 19.24 per cent in 2015 (Department of Education and Training, 2015b).

The apparent decline in regional student participation is a function of the construction of the equity performance indicator. There is no question that regional communities have inferior results across a range of educational, social, health and economic indicators, warranting continued policy focus and intervention. Nonetheless, a key message associated with regional participation indicators is that the construction of those indicators influences policy interventions, and that the use of different indicators of regional participation may encourage a recalibration of policy focus and program delivery.

The relevance of the regional indicator for the current policy context is evident in *Driving Innovation, Excellence and Fairness in Australian Higher Education Discussion Paper* (Department of Education and Training, 2016a) which states:

Despite recent strong growth in student numbers under the demand driven system, the proportion of people from regional and remote Australia who participate in higher education continues to decline in relative terms. We need to do more to raise student aspiration and reduce the barriers that regional and remote students face to enter the higher education system – whether at an institution in their region, in their capital city, or online. (p. 12)

This research paper aims to augment our understanding of regional student participation to quantify factors influencing regional student participation and mobility. Subsequent sections examine more deeply the disparities in regional education participation and their underlying causes.

Disparities in Regional Education Participation and Attainment

There have been many studies that have documented the differences in educational attainment between regional and metropolitan students.⁴ Although the focus of this report is on higher education, the evidence suggests that at all stages of the education system, regional students experience educational outcomes inferior to their metropolitan counterparts. Regional students experience lower outcomes in terms of school attendance, senior secondary school completion, academic achievement, and in terms of participation in further education and training, including vocational, certificate level courses.

Inferior outcomes in secondary school completion and academic achievement are a critical component of higher education eligibility (see Cardak & Ryan, 2009), and have unsurprising implications for higher education participation and attainment. Robinson and Lamb (2009) find that people living in metropolitan areas have almost twice the probability of holding a university degree as those living in regional areas.

Regional students also face obstacles in completing higher education studies. Bradley's review noted the retention of regional students at university has been decreasing relative to urban students; in 2008 regional student retention rates were three per cent below retention rates of the remainder of the student population (Bradley et al., 2008). Similarly, James, Krause and Jennings (2010) find that regional students are more likely to express a desire to leave university compared to students from metropolitan backgrounds.

Lower rates of retention have implications for attainment. Analysis of students commencing in 2005 reveals that nine years after commencement, 75 per cent of metropolitan students had completed their degree compared to 69.8 per cent of regional students and 59.5 per cent of remote students (Edwards & McMillan, 2013). The research also indicates that 10.1 per cent of regional students and 14.8 per cent of remote students had dropped out of university before the commencement of second year, compared to 7.5 per cent of metropolitan students.

Cohort completion studies (including Edwards and McMillan, 2013 and Department of Education and Training, 2015a) provide important insights into the efficiency of Australian higher education. In line with this study, the cohort completion studies confer regional status on students at commencement, tracking them through the use of the Commonwealth Higher Education Student Support Number (CHESSN). This approach differs from that of conventional equity performance indicators. These cohort completion studies do not, however, consider the role that geographical mobility may play in student attrition and completion.

Data on deferral of higher education courses also indicates that there are disparities between regional and metropolitan student outcomes. Freeman, Klatt and Polesel (2014) report that 15.7 per cent of regional high school graduates defer a higher education offer compared to 6.4 per cent of metropolitan high school graduates. They also find this gap has grown over time (Freeman, Klatt & Polesel, 2014; Polesel, 2009). The analysis indicates that regional students who deferred a university offer were significantly concentrated in the two

⁴ Analysis in Department of Education Employment and Workplace Relations (2010) shows that, based on census data from 1996-2006, regional educational disadvantage extends to outer metropolitan locations.

lowest SES categories, suggesting strong inter-relationships between geographic location, socioeconomic status and educational outcomes.

Finally, the higher education course choices of students are significantly influenced by geographic location. Studies have found regional and remote students are more highly represented in the fields of study of education, agriculture, nursing and veterinary science than in traditionally more prestigious fields such as medicine, dentistry and law. Research also indicates that regional and remote students are significantly underrepresented in higher degree courses, with such students representing about 10 per cent of total students undertaking higher degrees (Robinson & Lamb, 2009).

Disparities in regional education participation and attainment are long-standing and have triggered sustained policy interest in their reduction. Before examining contemporary policy settings and interventions, we look at the underlying factors that drive persistent underrepresentation.

Factors Influencing Disparities in Regional Education

Financial and Non-Financial Costs

Many researchers have identified the significant financial and non-financial costs faced by regional students as a key limiting factor in their participation in higher education. James, Baldwin and McInnis (1999) find that the costs of higher education, including fees and the living expenses associated with moving away from home, are significant barriers to rural students attending university in metropolitan areas. For many low SES regional families, these costs cannot be covered. As a result, students from these families are unable to participate in higher education. It is also found by James, Baldwin and McInnis (1999) that the most disadvantaged regional students are twice as likely to believe that the cost of university fees may stop them from attending university. A further study by James et al. (1999) concludes:

The difference between rural and urban students in their perceptions of the impact of costs is unmistakable: on the inhibiting effect of university fees, on the capacity of their families to support them while studying, and on the affordability of suitable accommodation. These perceptions explain in part why rural students tend to view TAFE as a more affordable option, a belief magnified by large and somewhat predictable socioeconomic differences in perceptions of the relative affordability of TAFE and university study.

This is a consistent theme in the literature. For example, Godden (2007) finds that living expenses can double the cost of a higher education degree for regional and remote students who cannot continue to live at home while studying. Regional students also report extreme financial difficulties associated with working part time while studying, and there are declining levels of subsequent enrolment among those who defer studies in order to work and qualify for income support. These issues act as significant deterrents for regional students in pursuing higher education opportunities (Considine and Zappalà, 2002; Gale et al. 2010; National Tertiary Education Union, 2011).

It is not only the financial costs that may deter regional students from pursuing higher education. Non-financial costs are also significant contributors to regional students' lower academic outcomes. As Gale et al. (2010) note, regional students in higher education are faced with significant social and cultural readjustment which many metropolitan students do

not experience. These students often move from small schools, towns and communities to a new urban environment where everyday life can be challenging, intimidating and confusing. These challenges, together with the emotional stress caused by distance from family, social and friendship networks pose significant obstacles to the transition into – and ultimate success in – higher education. Even academically high-achieving regional students experience problems. These students are often highly visible and well supported in their local communities and schools, and find it difficult to adjust to a university environment where they are one of many talented students and where they do not receive the individual care and attention they have come to expect (Education and Training Committee, 2009; Regional Policy Advisory Committee, 2013).

Whilst there are many studies highlighting the significance of costs, recent work on the role of credit constraints in Australian higher education using Probit model regression analysis show students who are likely to be credit constrained are not less likely to attend university (Cardak & Ryan, 2014). Credit constraint does influence participation, with higher attrition rates evident for credit constrained cohorts, particularly those with a low Australian Tertiary Admissions Rank (ATAR); see (Cardak & Vecci, 2016). This type of regression analysis has not previously been replicated for regional cohorts, but is integral to the analysis undertaken in this study.

Schooling

The work of Cardak and Ryan (2009) shows that eligibility for university attendance, in the form of high school completion and achievement, are critical in explaining university participation. These findings focus on the SES gradient in university attendance in Australia. In earlier related work, Le and Miller (2005) note explicitly that the differences in the university participation rates of students in rural and metropolitan areas are primarily the result of differences in schooling decisions made by students in Year 10. Data at the national level indicates that secondary education completion is significantly higher in metropolitan areas relative to regional and remote areas. In metropolitan areas 72 per cent of students complete secondary school compared to 65 per cent of regional students and 36 per cent of remote students (Productivity Commission, 2016).

A number of reasons have been advanced for differences in high school completion rates. Researchers have focused on the importance of socioeconomic factors arising from the distance from urban areas, essentially isolation. These include lack of access to institutions associated with the establishment of cultural capital (Campbell & Lindsay, 2014; Southern Cross University, 2009) including cultural facilities such as theatres and libraries and, more generally, the limited range of cultural experiences available in regional communities (Alloway et al., 2004).

Importantly, low levels of completion in regional areas can also stem from a low level of student engagement at high school. This is due to a range of factors including a lack of physical and financial resources in regional schools, high teacher turnover, a limited number of course and curriculum choices available to students, a lack of specialised services such as career and well-being counselling, and the greater likelihood of young or inexperienced teachers at regional schools (Alloway et al., 2004; James, Baldwin & McInnes, 1999; Office of Youth Affairs and Family, 1998; Senate Rural and Regional Affairs and Transport References Committee, 2009).

As an example of the differences in school resources and breadth of curriculum which can impact on student motivation and engagement, Lamb, Glover and Walstab (2014) show that

small regional schools of fewer than 500 enrolments have an average of 16 subjects available in senior years. This compares to an average of 30 senior year subjects available at large metropolitan schools of over 1500 students. Other studies also highlight that regional students have a smaller range of subjects from which to choose and that this influences student engagement with education (Black et al., 2000; Kenyon et al., 2001).

On a similar theme, Cresswell and Underwood (2004) report that students in regional schools face a range of educational disadvantages such as the poor physical condition of the buildings at their schools, a shortage of educational resources, a lack of instructional material and multimedia resources, and inadequate laboratory facilities.

Staffing is another important theme. Alloway et al. (2004) identify the difficulties of attracting and retaining quality teachers as a key cause of low levels of student engagement. They note that teacher education programs do not appear to adequately prepare graduates for regional teaching and as a consequence new teachers have little understanding of the specific issues they are likely to confront when teaching in regional locations. They also identify many of the factors that make teaching in regional and remote schools unattractive and limit the ability of schools and principals to attract quality teachers, including the higher cost of working in regional locations, the lack of social and cultural resources, the relative isolation from support structures and the limited opportunities available for participation in continuing education and professional networks (Yarrow et al., 1999). Staffing issues in regional schools will interact with policy reforms to initial teacher education currently being considered across Commonwealth and State jurisdictions.

Personal Characteristics and Motivations

There are significant differences between regional and metropolitan students on the level of importance placed on completing school and the reasons for staying on at school. Various studies have established large and statistically significant differences in the attitudes of regional and metropolitan students towards the benefits of higher education, and in the extent to which students perceive it as relevant to their own lives (Centre for the Study of Higher Education, 2008).

James et al. (1999a) find that regional students self-report a number of 'discouraging' factors, which are found to explain the underrepresentation in higher education of those living in regional or remote areas. Rural students are more likely to form the view that a university education is pointless since it is not relevant to the job to which they aspire. Further, regional students are more likely to be worried about the overall cost of attending university and to consider that their family would be unlikely to afford the cost of university. They note that it is not only discouraging factors but also the lack of 'encouraging' factors which lead to disparate educational outcomes.

The disparity in educational aspirations between regional and metropolitan students has been noted by Khoo and Ainley (2005) who conclude that students from non-metropolitan locations had lower expectations of completing the final year of high school. Similarly, Williams et al. (1993) contend that differences in educational outcomes are primarily due to family and community characteristics, arguing that differences in student attitudes toward higher education are shaped by the level of importance attributed to education by the student's family and local community. They contend that there are subtle differences between regional and metropolitan families and communities concerning the value placed on education rather than work, and concerning the educational expectations of parents in metropolitan and regional areas, and that these differences can account for observed

differences in educational outcomes. This is further supported by Polesel et al. (2013) who found marked differences between the expectations of metropolitan and regional parents in respect to their children's post-school destinations. Approximately 72 per cent of metropolitan parents in New South Wales expect their children to attend university compared to approximately 58 per cent of parents in regional New South Wales.

Using data from *Growing Up in Australia: The Longitudinal Study of Australian Children*, Baxter, Gray and Hayes (2011) conclude that there are marked differences between the educational attainment expectations of parents in urban and in regional areas for their eight to nine year old children. In major cities, 78 per cent of parents expect their daughters to obtain a university-level qualification, compared with 59 per cent of parents in outer regional areas. Expectations for males are lower again, with 62 per cent of metropolitan parents expecting their sons to have a university-level qualification compared with 40 per cent for outer regional areas.

Many researchers identify the crucial role of social capital as a key factor in the differences in educational aspirations and motivation between regional and metropolitan students (Alloway & Dalley-Trim, 2009; Kilpatrick & Abbott-Chapman, 2002). For example, Alloway and Dalley-Trim (2009) find that family and social networks in country areas are more focused on helping young people find work in the local area rather than on providing the impetus and motivation for further study after secondary school. Importantly, they also note that regional youth often do not have the role models from whom they can draw inspiration for further education, and who can provide advice on the value, importance and benefits of higher education. This theme is reinforced by Kenyon et al. (2001) who state:

Role models in the education, training and employment sectors are scarce, limiting the capacity to challenge attitudes and belief about the value of education and employment.

Kilpatrick and Abbott-Chapman (2002) also find that social capital, especially the role of family networks are critical in providing the knowledge and identity which are central in aspiration development and motivation for higher education. They find that family networks and knowledge, which are limited and unevenly distributed in regional areas, limit young people's desire and aspiration towards higher education. Instead, young people focus on 'settling' for a job, irrespective of whether that job is consistent with their interests, skills and career aspirations. Fleming and Grace (2015) refer to this lack of role models and its impact on aspiration development as 'unimagined futures' and observe that those without the 'lived experience' of higher education face pressure, uncertainty and self-doubt when trying to justify to themselves and others their educational and occupational aspirations.

The discussion set out above points to the crucial role of family background and family attitudes in shaping educational and career aspirations. Researchers have consistently identified the level of education of family members and especially the mother as a key predictor of higher education aspirations (Baxter, 2002; Homel et al., 2012; Kilpatrick & Abbott-Chapman, 2002). In this context, Alloway et al. (2004) highlight that the proportion of family members with higher education qualifications is lower in regional areas than in metropolitan areas. This limits opportunities for young people in regional areas to build expectations and aspirations associated with higher education.

Previous research has also shown that emotional concerns associated with social and family dislocation experienced by regional students limits the attractiveness of higher education for

such students (Education and Training Committee, 2009; Regional Policy Advisory Committee, 2013). Where students need to move away from home in order to attend university, the loss of social and family networks can cause severe stress and adjustment anxiety which will impact negatively on their aspiration and persistence in university study (Gale et al., 2010).

Factors such as social and cultural capital of regional students influence their propensity to relocate. Regional students receiving places in regional universities are more likely to accept their offers than those receiving offers from metropolitan universities. Harvey et al. (2012), for example, find that 70 per cent of regional students accepting an offer at university in Bendigo were enrolled in the following year. In contrast, only 57 per cent of students from Bendigo who received an offer from a metropolitan university were enrolled at that university the following year. They conclude that:

While demographic and educational factors are clearly important mediators of aspiration, the extent of local course provision appears to be an even more significant factor in determining preferences. In almost every case where a local course is offered, that course is preferred by the majority of locally based applicants.

Awareness and Structure of Post-Compulsory Education Opportunities

The level of awareness of the educational opportunities available is identified in the literature as a driver of differing educational outcomes between regional and metropolitan students. Both international and Australian studies have shown that various equity groups, including low SES and regional students, have lower levels of awareness of the opportunities available to them once they complete secondary education.

Krause et al. (2009) find that low SES and regional students have limited career and post-school education information. This limits students' ability to make informed decisions about post-school education. They also find that school-based guidance and advice is influenced by a perception, prevalent among teachers and careers counsellors, that low SES and regional students are more likely to fail and are therefore discouraged from pursuing higher education. This is compounded by educator perceptions of a lack of family interest in higher education and by limited cultural capital.

Golding et al. (2007) find that regional students in general had limited information about the education and career options available to them. In particular, regional students display a limited theoretical and practical knowledge of university as well as TAFE. Many were not aware of the location of the closest university or TAFE, and had only superficial knowledge of the importance and nature of higher education entry scores.

Research also indicates that exposure to higher education institutions has a positive impact on students' visions and aspirations (PhillipsKPA, 2009). As Alloway et al. (2004) observe:

The presence of TAFE colleges and nearby university campuses – the investment in career markets and expositions – the dedication demonstrated particularly by regional universities in mentoring 'out-of-town' students and students from the bush, all featured as strategies that sustained students in their quest to broaden their visions and pursue their ambitions.

These findings are echoed in a submission by Charles Sturt University to the 2009 *Inquiry into Rural and Regional Access to Secondary and Tertiary Education Opportunities*, which notes that:

- (i) Where a regional university has a physical presence in a particular location there is an increase in educational aspirations and in overall participation in higher education in the regional areas surrounding the university campus.
- (ii) The range of courses offered by a regional university has a positive impact on the rate of participation in higher education in surrounding areas.

The implication, Charles Sturt University concludes, is that the interaction between regional communities and universities located near these communities provides external benefits, increasing higher education aspirations and improving student awareness of the educational opportunities available to them (Charles Sturt University, 2009).

In a similar vein, Drummond, Halsey and van Breda (2011) find that for many regional areas, the lack of community capital (including natural capital, human capital, social capital, and institutional capital) that comes with proximity to a university can limit the aspirations of young people and reduce their educational attainment.

3. RESEARCH QUESTIONS

There are significant gaps in the knowledge base of factors driving low participation and attainment in regional Australia. Vital components in addressing this participation and completion imbalance and central to the research questions posed within this study are:

- (i) the need for a more nuanced understanding of patterns of regional student participation in Australian higher education
- (ii) the need for a better understanding of the importance of cost as a determinant of regional student participation
- (iii) the need for a more nuanced understanding of factors influencing choice of study location, including choice to remain close to one's region of origin or to relocate to other regional or metropolitan locations
- (iv) the impact of the demand driven funding system and HEPPP on patterns of regional student participation, mobility and relocation
- (v) the efficacy of current indicators of regional student participation in understanding issues of student social origin and social mobility.

These issues area addressed by examination of:

Longitudinal Study of Australian Youth (LSAY) Data

This research builds upon the existing literature of credit constraints in Australian higher education by Cardak and Ryan (2009) and Cardak and Vecchi (2016). It adopts the techniques used in these papers, using LSAY data, to address the question of whether the role of credit constraints differs between regional and urban students. This work is complemented with information on student ability from early literacy and numeracy tests along with school sector, family background and income support payments for university students. The research exploits many questions asked of LSAY respondents relating to satisfaction with study and life progress, and relating to reasons for dropping out. Our approach generates insights into the different motivations of regional and metropolitan students for various educational choices.

Department of Education and Training (DET) – Higher Education Data Collection

This research is based on unpublished DET data which enabled the examination of differences in regional status of permanent home address at commencement and term address. These differences are cross tabulated with variables that include state, field of education, socioeconomic status, disability status, Indigenous heritage, age, study mode, study load, and basis of admission. The use of commencing permanent home address and current term address provides an aperture and alternative indicator of regional student participation. It also provides a reference point through which patterns of regional student mobility can be understood. The DET data covers the years 2008, 2011 and 2014, and enables analysis of changes in patterns of student mobility pre- and post-introduction of demand driven funding.

4. FACTORS INFLUENCING THE PARTICIPATION OF REGIONAL YOUTH

Credit Constraints, Regional Students and University Participation

As discussed above, this part of the report focuses on the role of credit constraints in the higher education choices of students from regional origins and the differences from metropolitan students. Previous research (Cardak & Ryan, 2014) has found that Australian students likely to be credit constrained are no less likely to attend university than their peers with similar high school achievement. The research in this part of the report builds on the findings of earlier research that student perceptions about costs, and the very real relocation, travel and social costs faced by regional students undertaking university study, may be drivers of lower levels of university participation rates among regional and remote students.

Understanding the Data

This report uses data from the 2006 cohort of the Longitudinal Survey of Australian Youth (hereafter LSAY06). The first wave of LSAY06 comprises Australian students who participated in the 2006 Programme for International Student Assessment (PISA), conducted by the Organisation for Economic Co-operation and Development (OECD). The Australian Council for Educational Research (ACER) expands on the minimum requirements set by PISA to ensure each of Australia's jurisdictions is represented in the cross section. This is done by a two-stage stratified sample, first choosing which schools will be sampled and second, randomly choosing 50, 15 year old students within those schools. This process leads to a wave one sample of 14,170 students. At the time of the PISA testing, these students were asked to respond to a survey, providing a range of demographic information about them. This includes information about their families, schools, teachers and peers, along with education and vocational attitudes and aspirations. Students are surveyed annually until they turn 25, with an emphasis on post-school education and labour market outcomes and experiences. As a consequence, this analysis focuses on school leavers, their behaviours and choices. While this is the widest form of Australian student transition to undergraduate higher education, there is a large number of students taking an increasingly wide range of pathways into higher education which we do not investigate here with the LSAY06 data; see Harvey et al. (2016) for some discussion of these alternative pathways to higher education.

The LSAY data has traditionally experienced high attrition rates. By 2015, wave 10 of LSAY06 retained 25 per cent of the original sample. The issue of LSAY attrition has been studied in various cohorts by Rothman (2007) and Lim (2011) and further analysed by Homel et al. (2012) and Polidano and Ryan (2016), with consistent findings that application of LSAY attrition weights provide robust results with the samples that typically remain in LSAY. We follow this approach and apply LSAY sample and attrition weights to ensure the representativeness of the sample.

Our focus is on university attendance and completion and the differences between regional and metropolitan students, with a particular focus on the role of credit constraints. The LSAY06 data includes information that allows us to analyse these issues and we in turn explain how we work with the data to capture each aspect relevant to this study.

Credit Constraints

As discussed above, the cost of education (tuition and study materials), relocation and living expenses have been considered as important factors that limit university attendance and graduation for students from regional locations. These concerns must be viewed in the context of the costs faced by students and institutional arrangements in place to support them.

Since 1989, Australian university students have faced a tuition charge. However, this tuition charge can be paid through an income-contingent loan for the full tuition amount, available to all domestic students with a Commonwealth Supported Place (CSP). The income-contingent loan scheme is called the Higher Education Contribution Scheme (HECS) and though it has undergone some changes over the years, the basic principles of the HECS remain unchanged.⁵

To help with living expenses, students may be eligible for government payments with the most common one being AUSTUDY.⁶ While all students can apply for these payments, eligibility is income contingent with parental income being the largest determinant of entitlements. Parental income can, however, be excluded from an assessment of eligibility if the student (i) is aged 22 or older; or (ii) has worked a sufficient amount in the past to meet a definition of independence (some students may take time off study in order to work and satisfy this definition). Further, a student may be deemed independent—and their parent's income excluded from an assessment of eligibility—if the student can prove that it is unreasonable for them to live at home due to the distance between the family home and place of study, or due to issues of family breakdown. The amount the student receives depends on a number of factors, including their place of residence, their income and assets, and whether they have children.

Given that Australian students have access to the income-contingent HECS loan scheme and means tested income support, we would not expect credit constraints to adversely affect participation of students eligible for university. It has been shown that students expected to suffer from short term credit constraints are not less likely to attend university (Cardak & Ryan, 2014). However, there is some evidence that these students are more likely to drop out of university, especially among those with lower levels of high school achievement (Cardak & Vecci, 2016).

The main question in this study relates to credit constraints faced by regional students. This is particularly salient because of the additional costs of relocation faced by students from regional locations. In order to address this issue we combine data on credit constraints and location of residence to refine previous findings.

Our approach to identifying potentially credit constrained students applies the same technique used by Cardak and Vecci (2016) and Cardak and Ryan (2014) with earlier LSAY cohorts. This approach exploits the fact that 35 per cent of Australian school students attend private (non-government) schools. Private school attendance requires families to pay tuition costs and demonstrates an ability and willingness to pay for education. This is taken as an

⁵ See Chapman (1997) for a discussion of the details of HECS. The HECS was revised and renamed the Higher Education Loan Program (HELP) in 2005.

⁶ Students who are aged 24 or under can receive similar payments, but under a different name: Youth Allowance.

indication that the student and their family do not face credit constraints with respect to education. Since there is a wide range of private schools in terms of price, the private school choice is complemented with data on individual socioeconomic status and on the average socioeconomic status of the school attended. This credit constraint concept is operationalised by forming three groups.

- (i) *Unlikely credit constrained*: A group of students unlikely to face educational credit constraints. These students attend a private school, the average SES of the surveyed students attending their school is in the top quartile of private schools, and the student's own SES is in the top quartile of all students.
- (ii) *Likely credit constrained*: A group of students likely to face credit constraints. These students attend any school, the average SES of the surveyed students attending their school is in the bottom quartile of all schools and the student's own SES is in the bottom quartile of all students.
- (iii) *Potentially credit constrained*: A group of all students who do not fall into one of these previous two categories. These students are described as potentially constrained but any constraints faced are not as acute as those faced by group (ii) above.

Indicator variables are created for membership of each group with the unlikely constrained group treated as the base case and with the potentially and likely constrained indicators included in the models below to gauge the effects of credit constraints on university outcomes.

Regional Students

The other important aspect of this study is the geographical location of students, which is based on the geographical location of the school attended in the first year of the survey. This is classified using the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) regional classification. This classification converts the Australian Bureau of Statistics' (ABS) Accessibility/Remoteness Index of Australia (ARIA) into three categories: (i) metropolitan zones, major cities with a population over 100,000; (ii) regional zones, cities with a population less than 100,000 and an ARIA average score equal or less than 5.92; and (iii) remote zones, for regions with an ARIA average score greater than 5.92. Of the 14,170 students in wave one of LSAY06, 9,574 (68 per cent) attended schools in metropolitan zones, 4,153 (29 per cent) attended schools in regional zones and 443 (three per cent) attended schools in remote zones. Given the small number of remote students in the sample, we pool the regional and remote students in the LSAY06 analysis below and typically refer to this group as regional students. This locational data is used in conjunction with credit constraint indicators to identify whether the effects of credit constraints differ between metropolitan, regional and remote students.

As highlighted in Bradley's review (Bradley et al., 2008), a regional student gradient exists alongside an SES student gradient, where regional students are underrepresented at university in Australia. A range of policy responses has been developed to mitigate the challenges faced by students in regional locations.

One of these responses concerns university admissions and a bias against regional students in the calculation of raw ATAR scores. Universities operate bonus point schemes that adjust student ATARs to correct for educational disadvantage. Most universities allocate bonus points to correct for disadvantages faced by regional students, though this varies from institution to institution and is evolving in dynamic response to factors such as demand driven funding (Harvey et al., 2016). However, students are typically not aware of the bonus

points awarded to them and bonus points are likely to vary across institutions so in the LSAY06 data, students report their actual ATAR without any information on bonus points provided.

Explanatory Variables

In addition to our credit constraint and metropolitan/regional/remote variables, we employ a number of other demographic characteristic controls collected in the first wave of the LSAY data. These include parental SES, highest level of education completed, gender, Indigenous status, type of school attended, state of residence, whether student came from a single parent (mother only) household, and whether the student was born in Australia. We also make use of data pertaining to student motivation at school and expected occupation. In order to reflect student academic ability, we employ the average of each student's reading and mathematics performance in the PISA when modelling high school outcomes and each student's self-reported Equivalent National Tertiary Entrance Rank (ENTER) score when modelling university attendance and graduate/dropout/slow finishing. Summary statistics for these variables are included in Table 1.

Dependent Variables

The key questions we address in this study are differences in university attendance and completion between regional and remote students that are related to credit constraints. As the literature highlights the importance of aspirations and school completion for post-secondary education, we also analyse these outcomes in order to establish the timing of emerging differences between metropolitan and regionally located students. Summary statistics for these variables are also provided in Table 1 but as they are the key outcomes of interest, we provide some more detailed descriptive analysis below.

Data on aspirations for university education are based on responses to the question, "*What do you plan to do in the year immediately after you leave school?*" We focus on the response, "*Go to university*", creating a dichotomous variable that is used to model student plans and aspirations at the age of 15. In preliminary analysis, we find that regional and remote students have, on average, a 10 per cent lower probability of planning to attend university than metropolitan students after controlling for SES.⁷ We also present a non-parametric estimate of this variable by SES for both metropolitan students (solid blue curve) and regional (red dashed curve, pooled with remote) students in panel (a) of Figure 1. The figure shows that remote and regional students have lower aspirations to attend university across the range of SES. In recent and related analysis, Cooper, Baglin and Strathdee (2017) find a similar strong relationship between student aspirations and regional location using the 2009 cohort of LSAY. Their analysis makes an important contribution regarding distance from nearest university on higher education aspirations. However, as the survey subjects were first interviewed in 2009, their study is unable to investigate the links between distance, university participation and completion in the manner we do below, due to the lack of opportunity to commence and/or complete university at this point in time.

High school completion is also modelled as it is a critical requirement for school leaver admission to university. We find that regional and remote students are, on average, seven

⁷ This is based on a marginal effects from a Probit model of plans to attend university against SES and an indicator of regional and remote status. The marginal effect is significant at the 0.1 per cent level.

per cent less likely to complete high school than their metropolitan counterparts after controlling for SES. In panel (b) of Figure 1 we show with a non-parametric estimate of high school completion by SES for both metropolitan students (solid blue curve) and regional (red dashed curve, pooled with remote) that metropolitan students are more likely to complete high school at all SES levels.

Table 1: Summary Statistics for Variables Used in Estimation of Models

Variable	Minimum	Median	Maximum	Mean	Std. dev.	#Obs.
Plans to attend university	0	0	1	0.427	0.495	14170
Completed year 12	0	0	1	0.458	0.498	14170
Participated in university	0	0	1	0.284	0.451	14170
University						
Dropout	0	0	1	0.172	0.377	3033
Incomplete	0	0	1	0.200	0.400	3033
Complete	0	1	1	0.628	0.483	3033
Ability (average maths and reading PISA scores)	64.279	517.794	806.354	512.425	89.919	14170
ENTER	30	80	99.95	77.284	15.754	4298
Financially constrained?						
Unlikely constrained	0	0	1	0.088	0.283	14170
Potentially constrained	0	1	0	0.798	0.401	14170
Likely constrained	0	0	1	0.114	0.318	14170
Socioeconomic Status	-3.902	0.215	997	5.082	69.656	14064
Catholic school	0	1	1	0.610	0.488	14170
Public School	0	0	1	0.226	0.418	14170
Independent school	0	0	1	0.165	0.371	14170
Expected occupation	16	60	90	56.614	18.037	11416
Male	0	1	1	0.508	0.500	14170
Indigenous Australian	0	0	1	0.076	0.265	14170
Father completed high school	0	0	1	0.471	0.499	13356
Mother completed high school	0	0	1	0.450	0.497	13324
Student Enjoys School	1	3	4	2.815	0.715	13622
Only lived with mother	1	1	3	1.151	0.372	14170
Born in Australia	0	1	1	0.907	0.290	13900
Father born in Australia	0	1	1	0.703	0.457	13828
Mother born in Australia	0	1	1	0.717	0.450	13959
Perception of overall ability	1	4	5	3.600	0.838	13671
Motivation	0	11	15	10.660	2.437	14170
Region						
Metro	0	1	1	0.676	0.468	14170
Regional	0	0	1	0.293	0.455	14170
Remote	0	0	1	0.031	0.174	14170
State						
ACT	0	0	1	0.070	0.254	14170
NSW	0	0	1	0.238	0.426	14170
VIC	0	0	1	0.160	0.367	14170
QLD	0	0	1	0.170	0.375	14170
SA	0	0	1	0.112	0.316	14170
WA	0	0	1	0.105	0.306	14170
TAS	0	0	1	0.091	0.288	14170
NT	0	0	1	0.054	0.227	14170

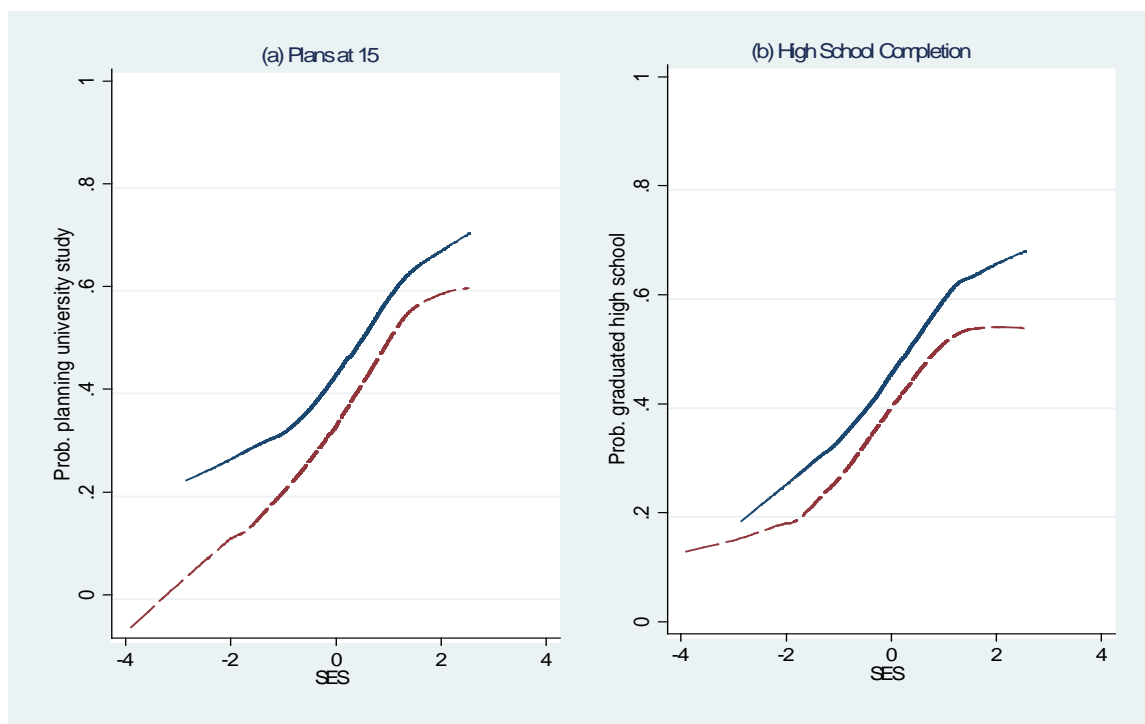


Figure 1: Non-parametric estimates of the relationship between post-school plans and SES in panel (a) and high school completion and SES in panel (b) for both metropolitan students (solid blue curve) and regional students (dashed red curve, pooled with remote students).

University attendance is the third outcome variable we model and is based on students who attend university within the first two years of completing high school. In this case, we find that regional and remote students are, on average, 4.7 per cent less likely to attend university than their metropolitan counterparts after controlling for ENTER score.⁸ We also present a non-parametric estimate of University attendance by ENTER score for both metropolitan (solid blue curve) and regional students (red dashed curve, pooled with remote) in panel (a) of Figure 2. The figure shows across most of the range of ENTER scores that regional and remote students are less likely to attend university than metropolitan students. This difference is smaller at very high ENTER scores; very high achieving regional students are almost equally likely to attend university as very high achieving metropolitan students. The relationship is reversed at low ENTER scores, with a greater proportion of regional students with low ENTER scores choosing to attend university, relative to metropolitan students.

⁸ This is based on a marginal effects from a Probit model of university attendance against ENTER and an indicator of regional and remote status, with the marginal effect significant at the 0.1 per cent level.

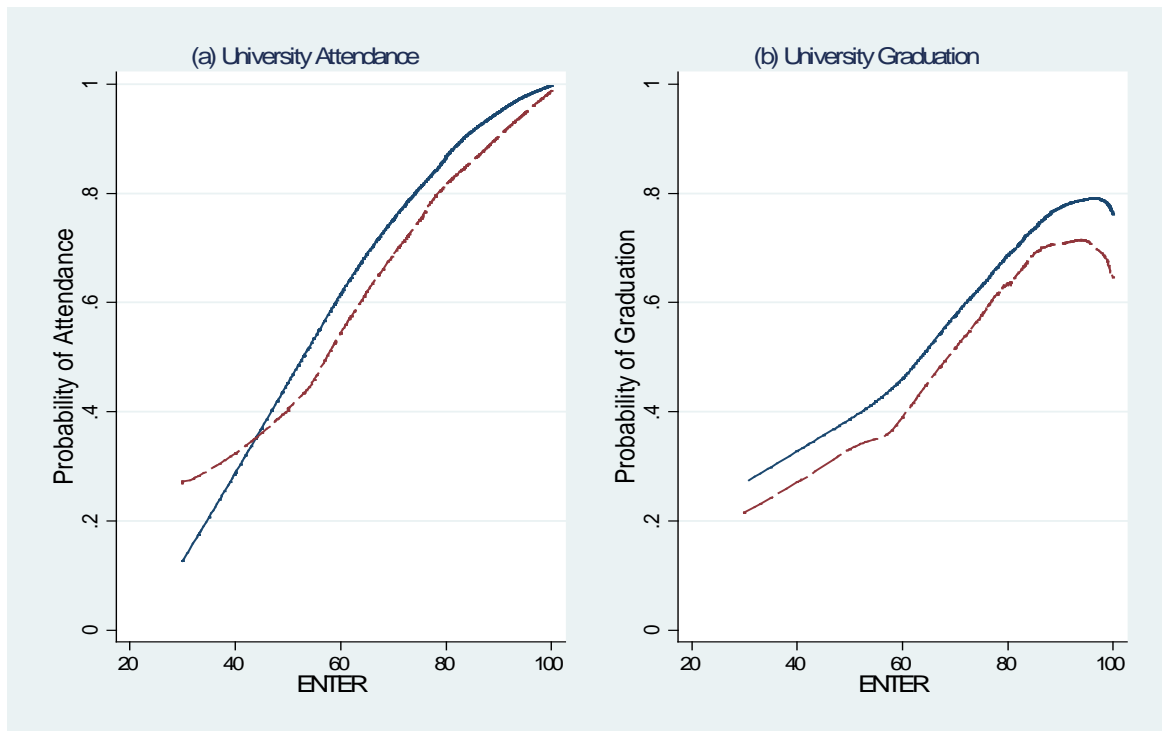


Figure 2: Non-parametric estimates of the relationship between university attendance and ENTER score in panel (a) and university graduation and ENTER score in panel (b) for both metropolitan students (solid blue curve) and regional students (dashed red curve, pooled with remote students).

The fourth variable we model is university outcome; that is, graduate, slow finishing or dropout. This is a discrete variable based on outcomes by the end of the survey. Graduate refers to students who graduate at any point in the survey period. Similarly, dropout refers to students who have dropped out of university at any point in the survey period. Slow finisher refers to students who remain in the sample at the last wave and state that they are still undertaking a program of university study. To confirm that they are slow finishers, we restrict this group to students who report that they expect to finish their planned study before 2014 (wave nine), the last wave of the 2006 cohort observed in our sample.

A similar pattern of differences is observed for graduation, with regional and remote students being on average 5.8 per cent less likely than metropolitan students to graduate from university.⁹ Non-parametric estimates of university graduation by ENTER score for both metropolitan (solid blue curve) and regional students (red dashed curve, pooled with remote) are presented in panel (b) of Figure 2. The figure shows that across the range of ENTER scores, regional and remote students are less likely to graduate from university given the same ENTER score as a metropolitan student.

This preliminary analysis indicates a pattern of educational underperformance of students of regional and remote origin relative to metropolitan students. It highlights differences in the raw data that motivate much of the preceding literature and analysis. We build on this work by investigating the impact of credit constraints on university outcomes and how these

⁹ This is a marginal effect from a Probit model of university graduation against ENTER and an indicator of regional and remote status, with the marginal effect significant at the one per cent level.

impacts differ between regional and remote students and metropolitan students. We now turn to explaining our estimation methodology and presenting our results.

Method

To investigate the correlation between original place of residence (metropolitan or regional), plans at age 15 for university study, high school completion, university commencement and university outcomes, we use four separate models.¹⁰

University Study Plans, High School Completion and University Participation

Our focus is on the effects of regional residential origin on post-school study plans, high school completion and university participation. Given the binary nature of these outcomes, we estimate the effects of regional residence using a Probit model. The naïve specification takes the form:

$$U_i = 1(\alpha Region_i + \gamma G_i + X_i' \beta + \varepsilon_i > 0) \quad (1)$$

where U_i is the probability of observing one of our three educational outcomes of interest (e.g. high school completion), X_i is a vector of individual and household characteristics expected to influence outcome U_i , and $Region_i$ includes indicator variables for whether the student is of regional or remote residential origin, with metropolitan origin being the excluded category. Credit constraint group membership is denoted by the vector G_i where the potentially constrained group is the excluded category and ε_i is an independent disturbance term.

Graduation, Dropout and Incomplete

Students who have enrolled at university may, (i) graduate with a degree, (ii) still be undertaking university study towards a degree, or (iii) drop out of university study. Given these three possible outcomes, we employ a multinomial logit model to estimate the effects of various factors, including region of origin and credit constraints, on these outcomes. Student utility is given by:

$$U_{ij} = \alpha_j Region_i + \beta_j G_i + \gamma_j X_i + \varepsilon_{ij}, \quad i = 1, \dots, N, j = 1, \dots, m. \quad (2)$$

where U_{ij} denotes student i 's utility under choice or outcome j , with sample size given by N , the number of choices given by $m=3$ in this case (graduate, dropout or incomplete) and all other variables as defined above. Students choose the outcome that provides the greatest utility, $U_{ij} > U_{ik} \quad \forall k \neq j$, with the model to be estimated given by:

$$P(Y_i = j | Region_i, G_i, X_i) = \frac{\exp(\alpha_j Region_i + \beta_j G_i + \gamma_j X_i)}{\sum_{j=1}^m \exp(\alpha_j Region_i + \beta_j G_i + \gamma_j X_i)}, \quad j = 1, \dots, m, \quad (3)$$

¹⁰ The description of the estimation method presented below draws on the presentations in Cardak and Vecchi (2016) and Cardak and Ryan (2014).

where parameters $(\alpha_j, \beta_j \text{ and } \gamma_j)$ are set to zero for a reference outcome, e.g. $j = 1$, in order to ensure model identification.

In the results presented below we report the average marginal effects of covariates $Region_i$, G_i and X_i rather than the parameter estimates $(\alpha_j, \beta_j \text{ and } \gamma_j)$ in order to make interpretation of results clearer. The marginal effects for X_i are computed as:

$$\frac{\partial p_{ij}}{\partial X_i} = p_{ij}(\gamma_j - \hat{\gamma}), \quad (4)$$

where $p_{ij} = P(Y_i = j | Region_i, G_i, X_i)$, $j = 1, \dots, m$, and $\hat{\gamma} = \sum_l p_{il} \gamma_l$ is a probability weighted average of the parameter estimate across the $j = 1, \dots, m$ different choices or outcomes. This marginal effect is then interpreted in the usual way, reflecting the effect of a unit increase or decrease in the covariate X_i on the probability of choice j ; see Woolridge (2009) Chapters 15 and 16 for more detail.

Interaction Between Residence and Credit Constraint Group

The aim of this report is to understand the outcomes of regional students, in particular, whether credit constrained regional students have different educational outcomes relative to otherwise similar unconstrained students or students of metropolitan origin. To examine this we implement the following interactions, presented in a general specification, in the Probit and multinomial Logit models outlined above:

$$U_i = \beta_0 + \beta_1 regional_i + \beta_2 G_i + \beta_3 regional_i \times G_i + \beta_4 X_i' + \varepsilon_i, \quad (5)$$

The key difference between equations (1), (2) and (5), is the interaction term

$$\beta_3 regional_i \times G_i.$$

When such specifications are employed, care must be taken in the interpretation of the overall effect of the variable $regional_i$ or G_i , for example. The point of the exercise is that the effect of credit constraint group membership, G_i , may vary between regional and metropolitan students. As we are employing non-linear Probit and multinomial Logit models, we compute average marginal effects, which in our specific cases of interest, $regional_i$ or G_i , are for dichotomous variables. The STATA command *margins* is used and for dichotomous variables computes predicted probabilities for each observation (student) at each value (zero and one) of the variable of interest, with all other values as observed in the data, yielding the marginal effect of those variables as the difference in predicted probabilities. We are also interested in the specific marginal effects of credit constraints among regional and metropolitan students separately, so we separately calculate and present marginal effects for these distinct groups. Similarly, we also calculate the marginal

effect of regional origin among the different credit constraint groups. This is all achieved through the use of the *margins* command in STATA.

Results

The summary statistics presented above highlighted differences between regional and metropolitan students in their probability of planning to attend university, graduating from high school, attending university and graduating from university. This analysis does not, however, take into account the relative importance of typically important factors such as gender and parental education on education outcomes among regional and metropolitan students. In this section we present results from the estimation of various models of student outcomes, outlined above, after taking into account a full range of factors that might explain differences in educational outcomes. The results are presented in a series of tables that include parameter estimates and marginal effects of the variables of interest on the probability of planning to attend university, graduating from high school, attending university and graduating from university.

In order to understand the effects of variables of interest, reader attention is drawn to the figures in the marginal effects columns. These figures tell us how a unit change in the explanatory variable affects the outcome of interest, e.g. how gender affects plans to attend university (e.g. males are on average 6.8 per cent less likely to have plans to attend university, as per Table 2, column (2)). In addition, readers should focus on the levels of significance, denoted by asterisks (*), where the one per cent level of significance is denoted by ***, five per cent level of significance denoted by **, and * denotes 10 per cent levels of significance, e.g. the 6.8 per cent lower average probability of males planning to attend university is significantly different from zero at the one per cent level, ***. In all tables, standard errors are included in parentheses below estimates.

The tables provide estimates for baseline models where no variables have been interacted, typically with parameter estimates and marginal effects in columns (1) and (2) respectively; these are estimates from a model similar to that presented in equations (1) and (2). This is complemented with parameter estimates and marginal effects from a similar model where we have interacted credit constraint group membership and regional origin, as described in equation (5). This allows us to identify if the effects of credit constraints differ between students from regional and metropolitan locations.

The key findings below are that regional credit constrained students do not seem less likely to attend university and are in fact more likely to graduate from university if they gain a place. The key determinant of university admission is high school achievement, as measured by ENTER score. Low regional student representation at university seems to be a result of earlier educational outcomes. Regional students at age 15 are less likely to have plans to attend university and are, to a lesser extent, less likely to complete high school.

High School Outcomes

Results for our models of student plans to attend university after high school are presented in Table 2. In columns (1) and (2), we present coefficients and marginal effects respectively for our baseline model of plans to attend university after high school, corresponding to the model specification in equation (1). Compared to the average marginal effect of 10 per cent mentioned in our description of the data, after controlling for a range of factors, the marginal effect of regional origin suggests regional students are 3.9 per cent ($p = 0.001$) less likely to have plans to attend university after high school. Other important results are that the credit constraint group indicators show that the potentially constrained group is 4.1 per cent ($p = 0.037$) more likely to have plans to attend university after high school while the plans of the likely constrained group do not differ from the unlikely constrained group. However, average literacy and numeracy test scores at age 15 have a strong positive effect on plans; a one standard deviation increase (0.835) in literacy and numeracy leads to a 9.35 per cent increase in plans to attend university.¹¹

In addition to these variables, we include a range of covariates as controls and find positive correlations between plans at age 15 to attend university and SES (5.9%, $p = 0.000$), enjoy school (3.6%, $p = 0.000$), overseas born English speaking (11.9%, $p = 0.000$) and overseas born NESB (12.4%, $p = 0.000$), overseas born NESB mother (13.8%, $p = 0.000$), overseas born NESB father (13.2%, $p = 0.000$), own perception of ability (13.8%, $p = 0.000$), own motivation at school (13.8%, $p = 0.000$) and Catholic school attendance (13.8%, $p = 0.000$).¹² A negative marginal effect for males (-6.8%, $p = 0.000$) fits with typical findings in the literature. These results are largely in line with the findings in a recent and related study by Cooper, Baglin and Strathdee (2017) where study plans of the LSAY 2009 cohort are investigated using a *Psycho-Social University Intention Model* that does not include all of the controls included in our model in columns (1) and (2) of Table 2.

¹¹ The literacy and numeracy variable included in the university plans and high school completion models has been divided by 100. The range in the university plans estimating sample is 1.698-8.064, and in the high school completion estimating sample it is 2.083-7.836.

¹² A full set of state controls are included but omitted from the table. With NSW as the omitted category, a positive correlation with VIC (7.0%, $p = 0.000$) is found with QLD and NT exhibiting positive marginal effects and the ACT showing a negative marginal effect, all at the five per cent level of significance.

Table 2: Estimates and Marginal Effects from Models of Student Plans at Age 15 to Attend University After High School Completion

Model presented in columns (3) and (4) includes an interaction between regional origin and credit constraint group variables

Variable	(1) University Plans	(2) Marginal Effects	(3) University Plans	(4) Marginal Effects
Regional	-0.121*** (0.038)	-0.039*** (0.012)	-0.370** (0.170)	-0.045*** (0.013)
Potentially Constrained	0.129** (0.062)	0.041** (0.020)	0.109* (0.064)	0.056*** (0.021)
Likely Constrained	0.034 (0.097)	0.011 (0.031)	-0.011 (0.110)	0.023 (0.033)
Regional x Potentially Constrained			0.256 (0.174)	
Regional x Likely Constrained			0.309 (0.202)	
Literacy & Numeracy/100	1.380*** (0.205)	0.112*** (0.007)	1.378*** (0.205)	0.111*** (0.007)
(Literacy & Numeracy/100) ²	-0.097*** (0.019)		-0.097*** (0.019)	
SES	0.186*** (0.033)	0.060*** (0.010)	0.187*** (0.033)	0.060*** (0.010)
Male	-0.212*** (0.031)	-0.068*** (0.010)	-0.213*** (0.031)	-0.068*** (0.010)
Indigenous-TSI	0.098 (0.093)	0.031 (0.030)	0.092 (0.092)	0.029 (0.029)
Father's highest education				
High school	0.063 (0.094)	0.020 (0.030)	0.064 (0.094)	0.020 (0.030)
University	0.132 (0.089)	0.042 (0.028)	0.132 (0.089)	0.042 (0.028)
Mother's highest education				
High school	-0.001 (0.089)	-0.000 (0.028)	-0.003 (0.089)	-0.001 (0.028)
University	0.080 (0.085)	0.026 (0.027)	0.079 (0.085)	0.025 (0.027)
Enjoy school	0.113*** (0.032)	0.036*** (0.010)	0.114*** (0.032)	0.036*** (0.010)
Country of birth (Australia omitted)				
Student overseas English speaking	0.371*** (0.094)	0.119*** (0.029)	0.371*** (0.094)	0.119*** (0.029)
Student overseas non-English	0.384*** (0.075)	0.123*** (0.023)	0.386*** (0.075)	0.124*** (0.023)
Father overseas English speaking	-0.010 (0.056)	-0.003 (0.018)	-0.009 (0.056)	-0.003 (0.018)
Father overseas non-English	0.403*** (0.056)	0.131*** (0.018)	0.405*** (0.056)	0.132*** (0.018)
Mother overseas English speaking	-0.024 (0.055)	-0.008 (0.018)	-0.024 (0.055)	-0.008 (0.018)
Mother overseas non-English	0.423*** (0.058)	0.138*** (0.019)	0.423*** (0.058)	0.138*** (0.019)
Perception of ability	0.240*** (0.021)	0.077*** (0.007)	0.241*** (0.021)	0.077*** (0.007)
Motivation	0.082*** (0.017)	0.026*** (0.006)	0.082*** (0.017)	0.026*** (0.006)
Catholic school	0.106*** (0.038)	0.034*** (0.012)	0.105*** (0.038)	0.034*** (0.012)

Variable	(1) University Plans	(2) Marginal Effects	(3) University Plans	(4) Marginal Effects
Independent school	0.030 (0.049)	0.010 (0.016)	0.033 (0.050)	0.011 (0.016)
State indicators included	Yes	Yes	Yes	Yes
Constant	-7.075*** (0.566)		-7.044*** (0.566)	
Observations	10,021	10,021	10,021	10,021

Notes:

*** significant at one per cent level, ** significant at five per cent level, * significant at 10 per cent level.

As we are interested in how credit constraints may operate differently on regional students relative to metropolitan students, we estimate models with an interaction between regional location and credit constraint group variables. In columns (3) and (4) of Table 2 we present parameter estimates and marginal effects for models of plans at age 15 to attend university after completing high school. It is clear from the table that the results are largely unchanged. The key difference is with the interacted variables, though the qualitative findings are unchanged; regional students are on average 4.5 per cent ($p = 0.000$) less likely to have plans to attend university after high school while students from the potentially constrained group are 5.6 per cent ($p = 0.009$) more likely to have plans to attend university after high school than the unlikely constrained group. These effects are slightly larger and more statistically significant than for the model without interactions.

We also compute the marginal effect of credit constraint group membership for regional and metropolitan students, Table 3, and the marginal effects of regional origin for each credit constraint group, Table 4. In columns (1) and (2) of Table 3, we find that among regional students, potentially constrained students have an 11 per cent ($p = 0.022$) higher probability, relative to unlikely constrained students, of planning to attend university, while the same effect is weaker among metropolitan students (3.5%, $p = 0.088$). However, comparing regional with metropolitan students in columns (1) and (2) of Table 4, we find that among students unlikely to be credit constrained, regional students on average have a 12.4 per cent ($p = 0.034$) lower probability of planning to attend university with a smaller but statistically stronger effect among potentially constrained students (-3.7%, $p = 0.005$).

Table 3: Marginal Effects by Metropolitan and Regional Groups for all Estimated Models with Credit Constraint Group Regional Interaction.

Marginal effects are calculated relative to the unlikely credit constrained group either considering metropolitan students only or considering only regional students

	University Plans		High School Graduation		University Attendance	
	(1)	(2)	(3)	(4)	(5)	(6)
Group	Metropolitan	Regional	Metropolitan	Regional	Metropolitan	Regional
Potentially Constrained	0.035* (0.020)	0.111** (0.049)	-0.012 (0.023)	0.156 (0.116)	0.012 (0.027)	-0.016 (0.081)
Likely Constrained	-0.003 (0.035)	0.090 (0.056)	0.001 (0.033)	0.196 (0.121)	-0.092 (0.057)	-0.110 (0.109)
	University Dropout		University Incomplete		University Graduate	
	(7)	(8)	(9)	(10)	(11)	(12)
	Metropolitan	Regional	Metropolitan	Regional	Metropolitan	Regional
Potentially Constrained	-0.032 (0.037)	-0.078 (0.117)	-0.019 (0.037)	-0.088 (0.149)	0.051 (0.044)	0.166 (0.125)
Likely Constrained	-0.045 (0.066)	-0.107 (0.125)	-0.037 (0.099)	-0.280 (0.153)	0.082 (0.102)	0.387*** (0.136)

Notes:

*** significant at one per cent level, ** significant at five per cent level, * significant at 10 per cent level.

Table 4: Marginal Effects by Credit Constraint Groups for all Estimated Models with Credit Constraint Group Regional Interaction

Marginal effects are calculated for regional students relative to metropolitan students, focusing on each credit constraint group individually

	Regional		
Outcome	Unlikely Constrained	Potentially Constrained	Likely Constrained
University Plans	-0.124** (0.059)	-0.037*** (0.013)	-0.017 (0.031)
High School Graduation	-0.082 (0.059)	-0.029** (0.014)	-0.016 (0.048)
University Attendance	0.017 (0.035)	0.006 (0.019)	0.044 (0.090)
University Dropout	0.012 (0.056)	-0.020 (0.022)	-0.048 (0.067)
University Incomplete	0.088 (0.127)	0.012 (0.032)	-0.144 (0.103)
University Graduate	-0.100 (0.121)	0.008 (0.035)	0.193* (0.104)

Notes:

*** significant at one per cent level, ** significant at five per cent level, * significant at 10 per cent level.

These results suggest that among the unlikely constrained students, the aspirations of those from regional locations are lower relative to unlikely constrained metropolitan peers and are relatively low compared to regional students who are potentially constrained. However, no statistically significant differences are identified among students in the likely constrained group.

In columns (1) and (2) of Table 5, we present the coefficients and marginal effects for our baseline model of high school graduation. Compared to the average marginal effect of seven per cent mentioned in our description of the data, after controlling for a range of factors, the marginal effect of regional origin suggests regional students are three per cent ($p = 0.021$) less likely to graduate from high school. Students from the different credit constraint groups are equally likely to graduate from high school, implying that credit constraints do not affect high school completion. Average literacy and numeracy test scores at age 15 have a strong positive effect on high school completion; a one standard deviation increase (0.778) in literacy and numeracy leads to an 8.32 per cent increase in plans to attend university.

A similar set of controls to those for the post-secondary study plans are included in the high school completion model and we find the following positive marginal effects on high school completion; father's highest level of education being university (8.7%, $p = 0.007$), enjoy school (4.5%, $p = 0.000$), overseas born NESB father (4.5%, $p = 0.015$), overseas born NESB mother (6.8%, $p = 0.000$), own perception of ability (4.3%, $p = 0.000$), attend a Catholic school (4.0%, $p = 0.002$), attend an independent school (5.0%, $p = 0.007$).¹³ We also find that males (-6.6%, $p = 0.000$) have a lower probability of completing high school.

In columns (3) and (4) of Table 5, we present estimates of the same model of high school graduation where the credit constraint group variables are interacted with our regional variable. Once again, the results are almost identical to those for the model without an interaction. There are no significant differences between credit constraint groups and we find that the marginal effect of regional origin (-3.4%, $p = 0.016$) is slightly more negative and more statistically significant. We find no statistically significant differences when we consider differences between credit constraint groups within only regional and only metropolitan students respectively, see columns (3) and (4) of Table 3. When comparing regional to metropolitan students within each of the three credit constraint groups, second row of Table 4, we find the potentially constrained students of regional origin are 2.9 per cent ($p = 0.037$) less likely to complete high school than metropolitan potentially constrained students. Overall there is not strong evidence that credit constraints have a strong deterrent effect on the path of regional students to higher education.

¹³ A full set of state controls are included but omitted from the table. With NSW as the omitted category, a positive correlation with QLD (8.0%, $p = 0.000$) is found, with students from TAS (-5.9%, $p = 0.009$) exhibiting a negative marginal effect.

Table 5: Estimates and Marginal Effects from Models of High School Completion Graduation
Model presented in columns (3) and (4) includes an interaction between regional origin and credit constraint group variables

Variable	(1) High School Graduation	(2) Marginal Effects	(3) High School Graduation	(4) Marginal Effects
Regional	-0.161** (0.068)	-0.030** (0.013)	-0.794** (0.393)	-0.034** (0.014)
Potentially Constrained	0.029 (0.149)	0.005 (0.028)	-0.079 (0.155)	0.036 (0.039)
Likely Constrained	0.164 (0.199)	0.029 (0.036)	0.004 (0.222)	0.056 (0.045)
Regional x Potentially Constrained			0.644 (0.397)	
Regional x Likely Constrained			0.734* (0.431)	
Literacy & Numeracy/100	0.319 (0.430)	0.107*** (0.008)	0.307 (0.431)	0.106*** (0.008)
(Literacy & Numeracy/100) ²	0.027 (0.042)		0.028 (0.042)	
SES	0.104* (0.059)	0.019* (0.011)	0.108* (0.059)	0.020* (0.011)
Male	-0.359*** (0.058)	-0.066*** (0.010)	-0.357*** (0.058)	-0.065*** (0.010)
Indigenous-TSI	0.328* (0.171)	0.060* (0.031)	0.319* (0.168)	0.058* (0.031)
Father's highest education				
High school	0.305 (0.188)	0.056 (0.034)	0.303 (0.187)	0.055 (0.034)
University	0.475*** (0.177)	0.087*** (0.032)	0.473*** (0.177)	0.086*** (0.032)
Mother's highest education				
High school	-0.113 (0.181)	-0.021 (0.033)	-0.114 (0.181)	-0.021 (0.033)
University	-0.067 (0.173)	-0.012 (0.032)	-0.073 (0.173)	-0.013 (0.032)
Enjoy school	0.244*** (0.060)	0.045*** (0.011)	0.246*** (0.060)	0.045*** (0.011)
Country of birth (Australia omitted)				
Student overseas English speaking	0.195 (0.196)	0.033 (0.031)	0.198 (0.197)	0.034 (0.031)
Student overseas non-English	-0.105 (0.163)	-0.020 (0.032)	-0.091 (0.160)	-0.017 (0.031)
Father overseas English speaking	-0.154 (0.100)	-0.031 (0.021)	-0.154 (0.100)	-0.031 (0.021)
Father overseas non-English	0.264** (0.116)	0.045** (0.018)	0.272** (0.116)	0.046** (0.018)
Mother overseas English speaking	0.018 (0.101)	0.003 (0.019)	0.017 (0.101)	0.003 (0.019)
Mother overseas non-English	0.412*** (0.126)	0.068*** (0.019)	0.414*** (0.126)	0.068*** (0.019)
Perception of ability	0.236*** (0.041)	0.043*** (0.007)	0.235*** (0.041)	0.043*** (0.007)
Motivation	0.010 (0.034)	0.002 (0.006)	0.009 (0.034)	0.002 (0.006)

Variable	(1) High School Graduation	(2) Marginal Effects	(3) High School Graduation	(4) Marginal Effects
Catholic school	0.219*** (0.071)	0.040*** (0.013)	0.216*** (0.071)	0.039*** (0.013)
Independent school	0.275*** (0.103)	0.050*** (0.019)	0.284*** (0.105)	0.052*** (0.019)
State indicators included	Yes	Yes	Yes	Yes
Constant	-3.256*** (1.138)		-3.106*** (1.149)	
Observations	5,806	5,806	5,806	5,806

Notes:

*** significant at one per cent level, ** significant at five per cent level, * significant at 10 per cent level.

University Outcomes

Estimates of the university attendance baseline model without interactions are presented in Table 6, with parameter values and marginal effects in columns (1) and (2) respectively. The marginal effects of regional origin and the credit constraint group indicators are not statistically significant, implying no statistically significant differences between regional and metropolitan students' probabilities of university attendance and that potentially credit constrained students are not less likely to attend university than the base category of unlikely constrained students.

Consistent with previous findings in the literature, ENTER score has a very important positive impact on university attendance, with a marginal effect of 8.3 per cent for a 10 point increase in ENTER ($p=0.000$). All other variables are insignificant, with the exception of overseas born NESB mother which has a 6.9 per cent marginal effect ($p=0.004$).¹⁴

¹⁴ A full set of state controls are included but omitted from the table. With NSW as the omitted category, a negative marginal effect for QLD (-9.3%, $p=0.000$) is found.

Table 6: Estimates and Marginal Effects from Models of University Attendance
Model presented in columns (3) and (4) includes an interaction between regional origin and credit constraint group variables

	(1) University Attendance	(2) Marginal Effects	(3) University Attendance	(4) Marginal Effects
Regional	0.045 (0.089)	0.009 (0.017)	0.167 (0.371)	0.010 (0.017)
Potentially Constrained	0.054 (0.140)	0.010 (0.027)	0.067 (0.145)	0.006 (0.029)
Likely Constrained	-0.398* (0.238)	-0.087 (0.053)	-0.435* (0.258)	-0.096* (0.055)
Regional x Potentially Constrained			-0.139 (0.383)	
Regional x Likely Constrained			-0.020 (0.482)	
ENTER/100	2.002 (1.870)	0.833*** (0.043)	2.061 (1.869)	0.833*** (0.043)
(ENTER/100) ²	1.776 (1.369)		1.731 (1.367)	
SES	0.071 (0.083)	0.014 (0.016)	0.071 (0.083)	0.014 (0.016)
Male	-0.067 (0.075)	-0.013 (0.014)	-0.068 (0.075)	-0.013 (0.014)
Indigenous-TSI	0.235 (0.233)	0.045 (0.045)	0.242 (0.234)	0.046 (0.045)
Father's highest education				
High school	-0.023 (0.215)	-0.004 (0.041)	-0.024 (0.214)	-0.004 (0.041)
University	0.131 (0.207)	0.025 (0.040)	0.129 (0.207)	0.025 (0.039)
Mother's highest education				
High school	-0.113 (0.200)	-0.021 (0.038)	-0.110 (0.200)	-0.021 (0.038)
University	0.136 (0.196)	0.026 (0.037)	0.139 (0.196)	0.026 (0.037)
Enjoy school	0.046 (0.081)	0.009 (0.015)	0.045 (0.081)	0.009 (0.015)
Country of birth (Australia omitted)				
Student overseas English speaking	0.046 (0.238)	0.009 (0.045)	0.044 (0.238)	0.008 (0.045)
Student overseas non-English	0.224 (0.191)	0.040 (0.032)	0.229 (0.190)	0.041 (0.032)
Father overseas English speaking	-0.069 (0.135)	-0.014 (0.027)	-0.068 (0.135)	-0.013 (0.027)
Father overseas non-English	0.018 (0.136)	0.003 (0.026)	0.020 (0.137)	0.004 (0.026)
Mother overseas English speaking	0.082 (0.139)	0.016 (0.027)	0.080 (0.138)	0.016 (0.027)
Mother overseas non-English	0.383*** (0.142)	0.069*** (0.024)	0.382*** (0.142)	0.069*** (0.024)
Perception of ability	0.037 (0.054)	0.007 (0.010)	0.039 (0.054)	0.007 (0.010)
Motivation	0.038 (0.042)	0.007 (0.008)	0.039 (0.042)	0.007 (0.008)

	(1) University Attendance	(2) Marginal Effects	(3) University Attendance	(4) Marginal Effects
Catholic school	0.133 (0.089)	0.025 (0.017)	0.135 (0.088)	0.026 (0.017)
Independent school	0.039 (0.109)	0.007 (0.021)	0.039 (0.109)	0.007 (0.021)
State indicators included	Yes	Yes	Yes	Yes
Constant	-2.215*** (0.729)		-2.257*** (0.730)	
Observations	3,239	3,239	3,239	3,239

Notes:

*** significant at one per cent level, ** significant at five per cent level, * significant at 10 per cent level.

We are interested in how the effects of credit constraints vary by regional origin, as we hypothesise that credit constraints are likely to have a larger impact on students of regional origin because of extra costs of relocation and travel. To answer this question, we estimate a model of university attendance, where we have included interactions between regional origin and credit constraint group indicators, and present parameter estimates and average marginal effects in columns (3) and (4) of Table 6. The results are largely unchanged by the introduction of an interaction between regional origin and credit constraint groups. We do find that the likely constrained group of students are 9.6 per cent less likely to attend university though this is significant only at the 7.9 per cent level ($p = 0.079$). The marginal effects of credit constraint group membership by regional and metropolitan location are presented in columns (5) and (6) of Table 3. For example, the potentially constrained regional value in column (6) tells us the marginal effect of membership of the potentially credit constrained group relative to the unlikely constrained group, among students of regional origin. However, we find no statistically significant marginal effects by location. In the third row of Table 4, we present the marginal effects of regional location by credit constraint group and again find no significant differences.

These findings are consistent with the work of Cardak and Ryan (2009, 2014) and show that while a range of individual characteristics are important determinants of high school completion in Table 5, they do not impact directly on university participation but rather operate through high school achievement (ENTER) in their influence on university participation.¹⁵

We now turn to the baseline results for the university graduate/slow finisher/dropout outcomes. In this case, the marginal effects based on results of a multinomial Logit model of graduate, dropout or slow finisher are presented in columns (1)-(3) of Table 7; parameter estimates are omitted to save space.

¹⁵ Similar results are found by Marks (forthcoming) who shows that after controlling for achievement, SES plays a minor role in explaining education outcomes.

Table 7: Marginal Effects from Baseline Multinomial Logit Model (with no interaction terms) of University Dropout, Incompletion and Graduation

Variable	Marginal Effects		
	(1) University Dropout	(2) University Incomplete	(3) University Graduate
Regional	-0.019 (0.019)	0.008 (0.031)	0.010 (0.033)
Potentially Constrained	-0.034 (0.037)	-0.023 (0.039)	0.057 (0.044)
Likely Constrained	-0.053 (0.058)	-0.106 (0.075)	0.159* (0.082)
ENTER	-0.213*** (0.052)	-0.242*** (0.093)	0.455*** (0.097)
SES	-0.027 (0.021)	0.042* (0.023)	-0.014 (0.026)
Male	0.043*** (0.017)	0.064*** (0.022)	-0.108*** (0.023)
Indigenous-TSI	0.035 (0.035)	-0.035 (0.080)	-0.000 (0.082)
Father's highest education			
High school	0.010 (0.043)	-0.134* (0.069)	0.124* (0.070)
University	0.003 (0.040)	-0.129** (0.065)	0.126* (0.065)
Mother's highest education			
High school	-0.014 (0.036)	0.074 (0.064)	-0.060 (0.063)
University	-0.005 (0.035)	0.074 (0.062)	-0.069 (0.060)
Country of birth (Australia omitted)			
Student overseas English speaking	0.039 (0.051)	-0.050 (0.047)	0.011 (0.060)
Student overseas non-English	0.068 (0.057)	-0.032 (0.044)	-0.036 (0.057)
Father overseas English speaking	-0.000 (0.033)	0.014 (0.035)	-0.013 (0.040)
Father overseas non-English	-0.038 (0.027)	0.063* (0.035)	-0.025 (0.039)
Mother overseas English speaking	-0.038* (0.023)	-0.007 (0.038)	0.045 (0.038)
Mother overseas non-English	-0.012 (0.029)	-0.023 (0.034)	0.036 (0.039)
Perception of ability	0.000 (0.012)	0.000 (0.015)	-0.001 (0.016)
Motivation	0.005 (0.006)	-0.011 (0.008)	0.006 (0.009)
Catholic school	-0.031 (0.019)	-0.008 (0.027)	0.039 (0.028)
Independent school	-0.038 (0.025)	-0.028 (0.033)	0.067* (0.036)
Income support recipient	-0.032 (0.023)	0.057* (0.034)	-0.025 (0.037)
Income support recipient (independent)	-0.002 (0.029)	0.090*** (0.034)	-0.088** (0.039)
Share of part time study	0.155*** (0.032)	0.389*** (0.052)	-0.544*** (0.060)

Variable	Marginal Effects		
	(1) University Dropout	(2) University Incomplete	(3) University Graduate
Parents financially support	0.008 (0.018)	0.007 (0.022)	-0.016 (0.024)
State indicators included	Yes	Yes	Yes
Observations	2,005	2,005	2,005

Notes:

*** significant at one per cent level, ** significant at five per cent level, * significant at 10 per cent level. Marginal effects are based on a multinomial Logit model of university outcomes with all variables included only linearly except for a quadratic term for ENTER.

The key findings of these estimates are that regional origin or credit constraint group categories do not have a significant impact on university outcomes with the exception that students in the likely constrained group are 15.9 per cent ($p=0.053$) *more* likely to graduate than the base category of unlikely constrained students. We interpret this as evidence that financially disadvantaged regional students who have managed to gain a university place have strong academic capabilities and are more likely to succeed in university environments than their peers. This is similar to findings in Cardak and Vecchi (2016) where high achieving likely constrained students have a high probability of graduation.

High school achievement, as measured by ENTER, has the expected and highly significant effect, a 10 point increase in ENTER is correlated with graduate (4.5%, $p = 0.000$), dropout (-2.1%, $p = 0.000$) and incomplete (-2.4%, $p = 0.000$). Two other variables have a significant marginal effect on all three outcomes: males exhibit lower graduation (-10.8%, $p = 0.000$) and higher dropout (4.3%, $p = 0.010$) and incomplete (6.4%, $p = 0.003$) probabilities, while share of part time study has a negative correlation with graduation (-54.4%, $p = 0.000$) and a positive correlation with dropout (15.5%, $p = 0.000$) and incomplete (38.9%, $p = 0.000$). The findings for gender are not surprising and consistent with previous findings in education research while the share of part time study is quite intuitive, though we do ensure all students in the estimating sample expected to complete their degree by the 2014 wave.

Table 8: Marginal Effects from Multinomial Logit Model of Dropout, Incomplete and Graduate from University, where Model Includes Interactions between Regional and Credit Constraint Variables

Variable	Marginal Effects		
	(1) University Dropout	(2) University Incomplete	(3) University Graduate
Regional	-0.015 (0.021)	0.019 (0.036)	-0.004 (0.036)
Potentially Constrained	-0.041 (0.043)	-0.034 (0.048)	0.075 (0.048)
Likely Constrained	-0.058 (0.065)	-0.089 (0.089)	0.147 (0.090)
ENTER	-0.211*** (0.052)	-0.235** (0.092)	0.446*** (0.096)
SES	-0.027 (0.021)	0.040* (0.023)	-0.013 (0.026)
Male	0.043*** (0.017)	0.065*** (0.022)	-0.109*** (0.023)
Indigenous-TSI	0.034 (0.036)	-0.041 (0.081)	0.008 (0.084)
Father's highest education			
High school	0.007 (0.044)	-0.137** (0.067)	0.130* (0.068)
University	0.002 (0.041)	-0.131** (0.063)	0.130** (0.064)
Mother's highest education			
High school	-0.012 (0.037)	0.075 (0.062)	-0.063 (0.061)
University	-0.002 (0.036)	0.077 (0.059)	-0.074 (0.057)
Country of birth (Australia omitted)			
Student overseas English speaking	0.037 (0.048)	-0.051 (0.047)	0.015 (0.058)
Student overseas non-English	0.065 (0.057)	-0.033 (0.042)	-0.032 (0.055)
Father overseas English speaking	-0.001 (0.033)	0.015 (0.036)	-0.014 (0.040)
Father overseas non-English	-0.039 (0.027)	0.061* (0.035)	-0.022 (0.040)
Mother overseas English speaking	-0.038* (0.023)	-0.007 (0.038)	0.045 (0.038)
Mother overseas non-English	-0.011 (0.030)	-0.024 (0.034)	0.035 (0.040)
Perception of ability	0.001 (0.012)	-0.001 (0.015)	0.000 (0.016)
Motivation	0.005 (0.006)	-0.010 (0.008)	0.005 (0.009)
Catholic school	-0.031 (0.019)	-0.009 (0.027)	0.041 (0.028)
Independent school	-0.039 (0.025)	-0.030 (0.033)	0.070* (0.036)
Income support recipient	-0.033 (0.023)	0.055 (0.035)	-0.022 (0.037)
Income support recipient (Independent)	-0.002 (0.029)	0.090*** (0.034)	-0.088** (0.039)
Share of part time study	0.156*** (0.032)	0.389*** (0.051)	-0.545*** (0.058)

Variable	Marginal Effects		
	(1) University Dropout	(2) University Incomplete	(3) University Graduate
Parents financially support	0.008 (0.018)	0.007 (0.022)	-0.015 (0.024)
State indicators included	Yes	Yes	Yes
Observations	2,005	2,005	2,005

Notes:

*** significant at one per cent level, ** significant at five per cent level, * significant at 10 per cent level. Marginal effects are based on a multinomial Logit model of university outcomes with interactions between *regional* and *potentially constrained* and *regional* and *likely constrained*. The model also included a quadratic term for ENTER.

Other notable correlations include being an independent AUSTUDY recipient, which increases the probability of being incomplete (9.0%, $p = 0.009$) and reduces graduation (-8.8%, $p = 0.025$) probability. This result might indicate problems with the need to take time away from study to satisfy a work test in order to qualify as independent; it is in line with findings in Cardak and Vecci (2016). Father's level of education has the expected correlations, with father's highest education being high school (-13.4%, $p = 0.051$) and university (-12.9%, $p = 0.047$) both having a negative marginal effect on being incomplete and highest father's education being university having a positive effect on graduation probability (12.6%, $p = 0.053$).

We estimate our model of university outcomes with interactions between regional origin and credit constraint group indicators, presenting marginal effects based on results of a multinomial Logit model of graduate, dropout or slow finisher in columns (1)-(3) of Table 8. The introduction of the interaction terms does not markedly change the results. Regional origin is not statistically significant and all credit constraint groups are now insignificant, supporting the idea that the effects of credit constraints do not differ between regional and metropolitan students. However, the average marginal effects of both credit constraints have p -values close to 0.1 and investigating the marginal effects specifically for regional students may provide some useful insights.

The comparisons of credit constraint group membership within groups of metropolitan and regional students is presented for the cases of dropout, incomplete and graduate in columns (7)-(12) in Table 3. Both metropolitan and regional students in the potentially and likely constrained groups are no less likely (than peers in the unlikely constrained group) to drop out or be incomplete. However, regional students in the likely constrained group have a 38.7 per cent ($p = 0.004$) higher probability of graduation. While a little surprising, this result is interpreted as evidence that likely constrained regional students who managed to gain admission to university must have strong aptitude and motivation for university study (beyond that reflected in ENTER and other included controls) and manage to succeed at university given these characteristics. Another possible explanation is that universities are identifying regional students and providing appropriate learning support to ensure the academic progress and success of these students.

The comparisons within credit constraint groups between regional and metropolitan location are presented for the dropout, incomplete and graduate outcomes in rows (4)-(6) of Table 4.

There is no evidence of significant differences between regional and metropolitan students within each credit constraint group, with the exception that regional students from the likely constrained group are 19.3 per cent more likely to graduate than their metropolitan peers, albeit at a low level of significance ($p = 0.063$).

Again, this fits a pattern that relatively disadvantaged, or likely credit constrained, regional students, once having made the cut of university admission are much more likely to complete a program. This should be interpreted carefully as the data is based on enrolments before the introduction of the demand driven system; these students likely enrolled in 2009–10. We cannot claim that all regional students, if given a university place, are more likely to graduate but, rather, those gaining a university place rationed by ENTER at this time showed a strong aptitude to graduation beyond that reflected in their ENTER and other observed characteristics. The findings may be interpreted as support for the provision of bonus ENTER/ATAR points for students of regional origin. Again, this would need to be tested among students with lower high school achievement who may have gained places in the demand driven system, post 2012. This would require data from a new longitudinal survey with university enrolments commencing after 2012 or through the use of administrative enrolment data.

Summary

Overall, our findings regarding credit constraints among regional students are positive. We find no evidence that likely constrained regional students are less inclined to attend university than their unlikely constrained regional peers, nor are they less inclined to attend university than their likely constrained metropolitan peers. We surprisingly find that likely constrained regional students are much more inclined to graduate from university than their unlikely constrained regional peers and also have a higher probability of graduation than their likely constrained metropolitan peers. This all points to the idea that likely constrained regional students who make it to university are probably more talented and determined than might be expected. We also modelled high school outcomes. We find that unlikely and potentially credit constrained regional students (at age 15 years) are less likely to have plans to attend university than their metropolitan peers suggesting lower regional student aspirations, consistent with some of the earlier literature on the lack of educational role models, infrastructure and information supporting higher education, in regional locations. We also find evidence that regional students are less likely to complete high school; regional potentially constrained students are 2.9 per cent less likely to graduate from high school, which is a critical factor in eligibility for higher education (Cardak & Ryan, 2009).

Finally, high school achievement is a strong predictor of university admission and more importantly a strong predictor of university outcomes, indicating a greater likelihood to graduate and less likely to drop out/fail to complete with a higher ENTER. The policy implication is that a good way to improve higher education participation and graduation is to improve educational outcomes in regional schools.

5. MEASURING REGIONAL STUDENT RELOCATION TO MAJOR CITIES

The research team is grateful for the assistance of the Commonwealth Department of Education and Training (the Department) staff who assisted in scoping the parameters of what could be analysed through the Higher Education Statistics Collection and in extracting the data utilised in the following analysis. The support of Claire Sainsbury and Wayne Shippley in this process has been invaluable and is gratefully acknowledged.

Whilst the following data and its analysis represents a convergence of research and Departmental interest in the topic of regional student mobility, the funding associated with this research has allowed for an extension of scope to consider specific questions around the stability or otherwise of patterns of regional (and metropolitan) student mobility across the introduction of demand driven funding.

Understanding the data

The Higher Education Statistics Collection includes data collected from students on their enrolment declaration and subsequent engagement in higher education. This data includes a range of information about student background and characteristics, and their enrolment in higher education. Institutions report this data through the Higher Education Information Management System (HEIMS) to the Commonwealth.

The Higher Education Statistics Collection includes information about the postcode of a student's permanent home address (HEIMS element 320), and the postcode of their residential term address (HEIMS element 319). This information is updated annually. Information relating to student permanent home address allows the Department of Education and Training to assign information around low socioeconomic, regional and remote status, consistent with the Australian equity performance indicator framework. This framework was established in the early 1990s following the introduction of *A Fair Chance for All* (Department of Employment, Education and Training, 1990; Martin, 1994). Data on equity performance is published annually in the Higher Education Statistics Collection (particularly Appendix 2 and Appendix 5).

It was acknowledged in the design of the indicator framework that the use of home address would assign socioeconomic and regional status of younger students to that of their parents, whilst older students would have a socioeconomic and regional status that was more representative of their personal characteristics (Martin, 1994, p. 131). The significance of the distinction between 'social origin' and 'current circumstance' was not strongly contested within the design of the framework, and the indicator framework has been retained largely unchanged to this day.

The changes made to the indicator framework have been changes to the ways in which socioeconomic and regional status are assigned to students from their address information. These changes include the scope of the geographic area, with data now reported both on larger heterogeneous postcodes and address-generated statistical areas such as census collection districts and the Statistical Area Level 1 of the Australian Statistical Geography Standard (ASGS). Changes have also been made to accommodate the dynamic nature of the statistical geography. The status conferred on students will change over time as peri-urban areas become urbanised with major city population growth, and as an area's socioeconomic status changes as a result of urban renewal and gentrification. Time series

analysis needs to be mindful of changes to indicator reference points. As a consequence, new indicators such as those associated with the introduction of the ASGS are not routinely applied retrospectively.

The relevance of changes to equity indicators is evident in the data obtained through this research. Regional status using the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) is available for the years in which data was provided, 2008, 2011 and 2014. Whilst the MCEETYA indicator is now superseded by the ASGS, the ASGS data is available only for the years 2011 and 2014. There are slight differences between the scope of MCEETYA and ASGS indicators, but the patterns evident from 2011 to 2014 are generally consistent across both indicators.

The design of the indicator framework is important to the research undertaken in this project. The indicators for regional participation cited throughout many papers referenced in earlier sections of this document draw upon the Higher Education Data Collection and represent the current permanent home address of students. An exception is the cohort completion studies referenced earlier that draw upon the regional status of students tracked by their CHESSN. Regional students who relocate to metropolitan locations and update their permanent home address to a metropolitan location are reclassified and are no longer counted as regional. The reverse is true with students with metropolitan origins who update their home address to a regional location being classified as regional.

The number of students migrating between regional and urban areas, and the extent to which such migration is temporary or more enduring, is of continuing policy interest. Most medical programs, for example, reserve a sub-quota of places for students who have lived in a regional area for five years consecutively, or 10 years cumulatively from birth. The logic of this policy is recognition that regional communities have comparatively limited access to medical professionals, and that training students with a cultural affinity to regional areas is a mechanism by which to increase the number of medical graduates who go on to work in regional locations.

The representation of students with regional origins, but who have relocated to a metropolitan location, is not captured within the current higher education equity performance indicator framework. The representation of students who relocate from one regional location to another regional location is also not captured within the current framework. The current indicator framework provides limited insights into the mobility of students between regional areas. This gap in our knowledge has important policy implications for the design of subsidies and incentives that support regional or metropolitan delivery, and for student income support such as scholarships and relocation support.

To explore the patterns of student migration from a regional area to either a major city or to another regional address, this report utilises data provided by the Department. The Department computed the numbers of domestic students across a variety of personal, geographic and cohort based characteristics by two key variables:

- the student's permanent home address when first enrolling in higher education (commencing permanent home address)
- the student's current term address for the year in question (term address).

For each of the sample years (2008, 2011 and 2014) the region of the student's commencing permanent home address (HEIMS element 320) and current term address

(HEIMS elements 319) was calculated and tabulated by the Department using MCEETYA and ASGS classifications relevant reference year. This approach recognises that postcodes change their regional classification across time.

The sample years were selected for their relevance to the demand driven funding system and related equity interventions such as HEPPP – providing perspectives on a 2008 baseline, 2011 transition point and 2014 full implementation.

The earliest year for which permanent home address can be associated with a student commencement was 2005. In the overwhelming majority of students, the earliest available postcode was the same as that recorded in their current course of study. In a small proportion of students, 2005 data may be representative of a 2005 home address that differs from a student's social and geographic origin.

Through comparison of region of origin and region of current term address, a novel indicator of regional student participation and mobility is made available. The region of commencing postcode is assumed to be a more reliable indicator of geographic origin than the current indicator framework's use of region of current home address. Differences between region of origin and region of term address provide insights into regional student mobility.

This approach provides a different indicator of student background and mobility, but there remain significant limitations with the approach. Student address details are based on information reported by the student and are not verified. There are known limitations of the accuracy of student address details, particularly for term address information. Some of these limitations are outlined in Table 9.

Table 9: Limitations and Implications of Commencing Student Permanent Home Address

Limitation	Explanation	Implication
Address of Convenience	Students move away from their permanent home address (e.g. parental home), but continue using address for formal correspondence.	May understate extent of mobility
Accuracy of Address	Students not updating term address details on enrolment forms or throughout their studies	Increases margin of error for region assigned to home and study
Validity	Address details based on data at point of higher education census data and may not accurately represent region of address	Increases margin of error for region assigned to home and study
Stability	Address at commencement and in year of study will not reveal patterns of mobility through intervening period	Increases margin of error for inferred level of mobility
Commuting Patterns	Region of term address may differ from region of campus address and does not take into account commuting patterns across regional boundaries	Increases margin of error for inferred level of mobility
Attribution	The underlying reason for having a different region for term and home address may relate to reasons other than study	Any inferences drawn from the data should come with appropriate caveat
Reclassification	Regional status of commencing home address is reclassified across sample years	Increases margin of error for inferred level of mobility

The data generally excluded students who were undertaking external or distance education, as this is perceived to be less relevant to decisions to change their address through the course of their studies and does not necessitate student attendance in specific geographic locations whilst studying.

Statistical Analysis Method

In our analysis of the population summary statistics below, we are interested in confirming that the rates of change over time are statistically significant. For example, in Table 10, we wish to verify that the growth in regional student numbers (38.78 per cent) is statistically significantly different from the growth in the overall population of students (33.13 per cent). Our approach is to apply a test of proportions at the start and endpoint of the data. In this example, we compare the proportion of regional students relative to all students in 2008 and 2014. Formally, we are testing the hypothesis of equality of two proportions $p_0 = p_1$. If we reject the null hypothesis of equality, then we conclude the growth rates are statistically significantly different. This test is based on a normally distributed test statistic given by:

$$z = \frac{\hat{p}_0 - \hat{p}_1}{\sqrt{\hat{p}\hat{q}(1/n_0 + 1/n_1)}} \quad (6)$$

where \hat{p}_0 and \hat{p}_1 are the proportions observed at time t_0 and t_1 respectively, and n_0 and n_1 are the typically the total number of students at these two points in time and

$$\hat{p} = \frac{r_0 + r_1}{n_0 + n_1} \text{ and } \hat{q} = (1 - \hat{p}) \quad (7)$$

where r_0 and r_1 are typically the number of regional students observed.

Results

National Trend

The number of students with a commencing regional permanent home address is markedly higher than the number of regional students routinely reported in the Higher Education Data Collection. For example, the data provided by the department highlighted 206,608 students with a commencing regional permanent home address using the ASGS indicator in 2014. This compares with a figure of 195,557 reported in Appendix 2 of the 2014 Higher Education Data Collection.

Some of this difference can be explained by differences in the technical specifications of data provided by the Department and in the Higher Education Data Collection. The departmental data had 991,364 students within scope for 2014 which compares to a figure of 1,013,831 reported in Appendix 2 of the 2014 Higher Education Data Collection. Differences in data specifications do not allow for direct comparison between departmental data and standard higher education statistics. The following results and interpretation focus primarily on differences of variables within the custom departmental data rather than with the Higher Education Data Collection. There are however, instances where comparisons are made to contextualise the insights derived from the departmental data.

The participation of students with a commencing regional permanent home address has increased by a greater proportion than domestic enrolments overall (Table 10). This difference in growth is significant at the one per cent level of significance for both the 2008-2014 and 2011-2014 periods. Throughout this section we focus on results from the MCEETYA classification and refer to the ASGS classification only if results differ from those for the MCEETYA.

Table 10: Enrolments and Enrolment Growth of All Domestic Students by Region of Permanent Home Address at Commencement

		2008	2011	2014	Growth 2008-2014	Growth 2011-2014
MCEETYA	Regional	137,412	161,338	190,705	38.78%***	18.20%***
	All students	748,925	862,343	997,025	33.13%	15.62%
ASGS	Regional	-	176,318	206,608	-	17.18%***
	All students	-	855,785	991,364	-	15.84%

Note:

Tests are of difference between proportions of starred category (regional) relative to all students, where ** and *** denotes significance at the five per cent level and one per cent level respectively.

The data obtained from the Department also included data on metropolitan and remote students. There are differences in patterns of participation between regional and remote student populations that are not well served by conflating these groups. To illustrate, enrolments of students with a remote commencing home address also increased from 2008 to 2014 and 2011 to 2014, but the increase was lower than the overall growth in domestic enrolments. This difference was significant at the one per cent level from 2008 to 2014, and five per cent level from 2011 to 2014. The migration of students is not just from regional to metropolitan locations, with the data revealing that there are significant numbers of students with a metropolitan commencing permanent home address and regional term address.

Whilst student migration occurs in both directions, there is a larger absolute number and proportion of students moving from the regions to the cities. The focus of this study is on regional participation and does not examine in depth patterns of mobility for remote or metropolitan students. Subsequent publications may replicate elements of this analysis for metropolitan and remote student participation and mobility.

Growth in regional participation evident through the use of the commencement regional status indicator provides a different perspective to that generated by the conventional regional indicator. For example, the Commonwealth's higher education options paper, *Driving Innovation and Fairness and Excellence in Australian Higher Education* (Department of Education and Training, 2016a), suggests that the participation rate of regional students is falling. Table 11 highlights regional access and participation numbers using the conventional indicator for Table A providers. Regional student participation growth is in fact *lower* than growth in overall student numbers, and for the 2011-2014 period this difference is statistically significant at the one per cent level, consistent with the narrative of static and marginal declines in regional participation since the introduction of demand driven funding. We do, however, find some evidence of higher growth in regional student access relative to total growth in access with the difference between regional and overall access for the 2008-2014 period statistically significant at the one per cent level. This difference is not as large as the differences evident in Table 10.

What is of note when considering the standard data collection is that regional access growth is higher than growth in regional participation. Access growth that is higher than participation growth can be explained by a range of factors that include student attrition. An additional explanation is supported by data described in Table 10, i.e. that students categorised as regional at commencement are subsequently categorised as metropolitan in cases where they relocate to cities for study and update their home address to metropolitan locations. This research helps to quantify the extent to which students of regional origin are later categorised as non-regional across their interactions with the higher education system. This finding suggests that the impacts of policy interventions targeting the access and participation of regional students are masked by a higher education indicator framework that emphasises a student's current permanent home address.

Table 11: Access and Participation Numbers and Growth of All Domestic Students, Table A Providers

	2008	2011	2014	Growth 2008-2014	Growth 2011-2014
Regional MCEETYA - Participation	130,175	150,404	171,363	31.64%	13.94%***
Regional ASGS - Participation	-	166,698	188,234	-	12.92%***
All Students - Participation	719,462	820,720	943,828	31.19%	15.00%
Regional MCEETA - Access	50,223	61,026	71,622	42.61%***	17.36%
Regional ASGS - Access		68,173	79,505		16.62%
All Students - Access	263,303	313,859	368,227	39.85%	17.32%

Notes:

Tests are of difference between proportions of starred category (regional) relative to all students, where *** denotes significance at the one per cent level.

Access is defined as commencing student enrolments.

Participation is defined as the sum of commencing and continuing student enrolments.

Source: Appendix 5, Higher Education Data Collection.

Region of Term Address

The majority of students with a regional home address at commencement have a regional term address, and are ostensibly retained as students within regional Australia. However, there is a difference in the growth of numbers of students with a commencing regional permanent home address and those with a regional or metropolitan term address (Table 12). The growth in participation of students with a regional commencing permanent home address and a regional term address is statistically significantly lower than the growth of the number of all students. Conversely the growth in the number of students with a regional commencing permanent home address and metropolitan term address is statistically significantly higher than the growth of the number of all students.

The consequence of this is the changing proportion of students with a regional commencing permanent home address and a metropolitan term address, which is increasing significantly (Table 13). The change appears likely to be influenced by the introduction of demand driven funding and other equity interventions. The proportion of regional students relocating to metropolitan locations increased by one percentage point from 2008 to 2011, and by nearly five (4.75) percentage points from 2011 to 2014.

Table 12: Enrolments and Enrolment Growth of All Domestic Students with Regional Commencing Permanent Home Address (CPHA) by Region of Term Address (TA)

		2008	2011	2014	Growth 2008-2014	Growth 2011-2014
MCEETA	Regional TA	107,401	124,531	137,941	28.44%***	10.77%***
	Metro TA	29,145	35,812	51,391	76.33%***	43.50%***
	Total	137,412	161,338	190,705	38.78%	18.20%
ASGS	Regional TA	-	141,426	155,339	-	9.84%***
	Metro TA	-	33,925	49,940	-	47.21%***
	Total	-	176,318	206,608	-	17.18%

Note:

Tests are of difference between proportions of starred category (Regional TA or Metro TA) relative to total, where *** denotes significance at the one per cent level.

Table 13: Enrolments and Enrolment Proportion of All Domestic Students with Regional Commencing Permanent Home Address (CPHA) by Metropolitan Region of Term Address (TA)

		2008	2011	2014
MCEETA	With Metro TA	29,145	35,812	51,391
	Total Regional CPHA	137,412	161,338	190,705
	Proportion Metro	21.21%***	22.20%***	26.95%
ASGS	With Metro TA	-	33,925	49,940
	Total Regional CPHA	-	176,318	206,608
	Proportion Metro	-	19.24%***	24.17%

Note:

Tests are of difference between proportions, starred proportion relative to 2014 proportion, where *** denotes significance at the one per cent level.

Whilst the data indicates an increase in the number of students relocating to metropolitan locations from around 30,000 to over 50,000 from 2008 to 2014, it is important to reiterate the nature and limitations of the data. The region of a student's commencing permanent home address may not represent an enduring connection with regional Australia. The data considers students with a commencing regional permanent home address as regional, even if the student's relationship with regional Australia is transient. The data considers the region of term address as indicative of the student's current circumstances, but this may differ from the region of their permanent home address or enduring connection.

The increase in the proportion of students with a regional commencing permanent home address and metropolitan term address can be attributed to an increase in students migrating to major cities for study. Additional research may be required to quantify the extent to which this represents an enduring move away from regional areas, or whether these students do eventually return to regional Australia. Subsequent sections consider the significance of other student characteristics and variables associated with the participation of students with a regional commencing permanent home address.

Readers should note that Tables 10, 12 and 13 include departmentally generated data for all domestic students and provide a sector wide perspective on patterns of student mobility. Later sections and tables exclude students undertaking external study. This approach is

taken because external studies were not perceived as a primary factor in relocation in the Department's initial analysis. However, as demonstrated by Table 14, there has been rapid growth in students with a regional commencing permanent home address and metropolitan term address undertaking external and multi-modal study. These differential growth rates by mode of study are consistent with sector trends toward use of digital technology and pedagogy. These growth rates are at least double the growth rates evident in the standard Higher Education Data Collection (Table 15). It can be inferred from observed patterns of growth by mode of study that students who are relocating to metropolitan locations favour flexible modes of delivery. The drivers of this behaviour may include the pursuit of economic opportunities more readily available in metropolitan locations, and the potential need to generate an income to offset the costs associated with relocation.

Table 14: Enrolments and Enrolment Growth of Domestic Students with Regional Commencing Permanent Home Address and Metropolitan Term Address by Mode of Study

Mode of Study	2008	2011	2014	Growth 2008-2014	Growth 2011-2014
Internal	23,268	28,191	36,488	56.81%***	29.43%***
Multi-Modal	2,504	3,253	6,248	149.52%***	92.07%***
External	3,373	4,368	8,655	156.59%***	98.15%***
All study modes	29,145	35,812	51,391	76.33%	43.50%

Note:

Tests are of difference between proportions of starred category relative to all study modes, where *** denotes significance at the one per cent level.

Table 15: Enrolments and Enrolment Growth of All Domestic students by Mode of Study, Higher Education Data Collection (Source: Department of Education and Training, 2016b)

Mode of Study	2008	2011	2014	Growth 2008-2014	Growth 2011-2014
Internal	588,032	665,696	720,431	22.52%***	8.22%***
Multi-modal	66,119	77,272	112,475	70.11%***	45.56%***
External	117,419	143,237	192,485	63.93%***	34.38%***
All Study Modes	771,570	886,205	1,025,391	32.89%	15.71%

Note:

Tests are of difference between proportions of starred category relative to all study modes, where *** denotes significance at the one per cent level.

State

The proportion of students with a regional commencing permanent home address who have a metropolitan term address is consistent with the demography and regional population share of each state (Table 16). Whilst there are statistical differences in the changing proportion of students by state, particularly from 2008 to 2014 for the MCEETYA indicator and from 2011 to 2014 for the ASGS indicator, these changes do not suggest that the propensity to relocate from regional to metropolitan locations is disproportionately influenced by state.

Table 16: Proportion of Internal and Multi-Modal Domestic Students with Regional Commencing Permanent Home Address and Metropolitan Term Address by State

State	MCEETYA			ASGS	
	2008	2011	2014	2011	2014
NSW	30.5%***	32.0%	31.8%	35.9%***	34.5%
VIC	24.4%***	23.6%	23.3%	22.9%***	22.1%
QLD	25.9%***	23.9%	23.6%	22.6%**	23.4%
WA	7.7%***	9.4%	9.4%	7.8%	7.7%
SA	6.7%***	6.0%	6.1%	5.8%	5.8%
TAS	2.9%***	3.2%***	3.7%	3.3%***	4.5%
NT	1.8%**	1.8%***	2.1%	1.6%***	1.8%
ACT	0.1%	0.1%	0.1%	0.1%***	0.1%
Students	25,772	31,444	42,736	29,661	41,381

Note:

Tests are of difference between proportions in each state relative to 2014, where ** and *** denote significance at the five per cent and one per cent level respectively.

There is some variation in the extent to which regional students who relocate to metropolitan areas remain within their state. In New South Wales, Tasmania and the Northern Territory there is a consistent net loss of students with a permanent regional home address to metropolitan locations in other states. All other states observe a net increase in students (Table 17). Whilst plausible attributions for state-based differences can be made (e.g. relocation from Tasmania to the mainland to pursue programs not available in Tasmania, and relocation from regional districts of New South Wales adjacent to the Australian Capital Territory, Queensland and Victoria) the departmental data provides limited capacity to test these attributions. Whilst the propensity to relocate from regions to metropolitan locations does not appear to be disproportionately influenced by state, the propensity to relocate to a metropolitan location in another state does appear to be influenced by more localised state-based factors.

Table 17: Net Loss/Gain of Internal and Multi-Modal Students with Regional Commencing Permanent Home Address and Metropolitan Term Address by State (MCEETYA)

State	MCEETYA			ASGS	
	2008	2011	2014	2011	2014
NSW	-2775	-3313	-4435	-3104	-4157
VIC	409	739	1700	1203	2578
QLD	1214	1461	1955	1022	1260
WA	77	79	143	157	363
SA	276	314	459	320	532
TAS	-417	-497	-847	-966	-1869
NT	-475	-557	-899	-462	-762
ACT	1689	1775	1923	1831	2054

Note:

There are no major cities in Tasmania nor Northern Territory under the ASGS classification.

Demography

Age

There is evidence that regional students are more likely to be mature age, this being a function of a range of factors including poor rates of school completion and attainment in regional communities (Richardson, 2011). The dominant narrative is that high-achieving school leavers will move to the cities, with mature age students with family and other responsibilities more likely to be attending regionally delivered higher education. Much regional higher education policy focuses on breaking down the financial barriers faced by families in supporting their children's transition to city-based higher education. This narrative would suggest that an increase in the proportion of regional students relocating to major cities would be comprised of students from a younger age bracket.

Table 18 and Table 19 affirm that a regional commencing permanent home address and metropolitan term address are more likely to be young, with 85 per cent of those relocating aged 24 or less. However, the strength of this relationship is decreasing. Growth in regional students relocating to the city in the period 2008 to 2014, and from 2011 to 2014 is strongest in the mature age 25–29 and 30–39 year groups. By 2014 the proportion of students with a regional commencing permanent home address and metropolitan term address aged 24 or less had reduced to 76 per cent. The proportion of those aged 25 and over with regional commencing permanent home address and metropolitan term address (24 per cent in 2014) remains well below the proportion of all students in Australian higher education aged 25 and over (39 per cent in 2015 DET 2016 – Higher Ed Stats – All students).

Table 18: Enrolments and Enrolment growth of Internal and Multi-Modal Domestic Students with Regional (MCEETYA) Commencing Permanent Home Address (CPHA) and Metropolitan Term Address (TA) by Age Group

		2008	2011	2014	Growth 2008-2014	Growth 2011-2014
19 years or less	Regional (CPHA) and Metro (TA)	9,204	10,170	11,367	23.50%***	11.77%
	Comparison Group	199,907	229,846	262,361	31.24%	14.15%
20-24 years	Regional (CPHA) and Metro (TA)	12,678	16,006	21,084	66.30%***	31.73%***
	Comparison Group	236,007	274,531	312,497	32.41%	13.83%
25-29 years	Regional (CPHA) and Metro (TA)	1,841	2,754	6,049	228.57%***	119.64%***
	Comparison Group	69,262	80,932	87,761	26.71%	8.44%
30-39 years	Regional (CPHA) and Metro (TA)	1,160	1,436	2,667	129.91%***	85.72%***
	Comparison Group	71,297	75,407	80,295	12.62%	6.48%
40 years or more	Regional (CPHA) and Metro (TA)	888	1,079	1,569	76.69%***	45.41%***
	Comparison Group	61,148	65,455	68,345	11.77%	4.42%
TOTAL	Regional (CPHA) and Metro (TA)	25,772	31,444	42,736	65.82%***	35.91%***
	Comparison Group	637,621	726,171	811,259	27.23%	11.72%

Note:

Tests are of difference between proportions of starred category relative to comparison group, where *** denotes significance at the one per cent level.

Comparison group is all Internal and Multi-Modal Domestic Students in the relevant subgroup.

Table 19: Enrolments and Enrolment of Internal and Multi-Modal Domestic Students with Regional (MCEETYA) Commencing Permanent Home Address (CPHA) and Metropolitan Term Address (TA) by Aggregated Age Group

		2008	2011	2014	Growth 2008-2014	Growth 2011-2014
24 years or less	Regional (CPHA) and Metro (TA)	21,882	26,176	32,451	48.30%***	23.97%***
	Comparison Group	435,914	504,377	574,858	31.87%	13.97%
25 Years or older	Regional (CPHA) and Metro (TA)	3,890	5,268	10,286	164.42%***	95.25%***
	Comparison Group	201,707	221,794	236,401	17.20%	6.59%

Note:

Tests are of difference between proportions of starred category relative to comparison group, where *** denotes significance at the one per cent level.

Comparison group is all Internal and Multi-Modal Domestic Students in the relevant subgroup.

Gender

Female representation exceeds male representation in Australian higher education (55 per cent to 45 per cent – 2015). The gender bias is stronger for regional students studying at regional campuses (Richardson, 2011). This gender bias remains evident for students relocating from regional to metropolitan areas, with females comprising around 58 per cent of regional students that relocate, and no significant differences between genders in the patterns of growth in the relocating cohort across time (Table 20).

Table 20: Enrolments and Enrolment Growth of Internal and Multi-Modal Domestic Students with Regional (MCEETYA) Commencing Permanent Home Address (CPHA) and Metropolitan Term Address (TA) by Gender

Gender		2008	2011	2014	Growth 2008-2014	Growth 2011-2014
Female	Regional (CPHA) and Metro (TA)	15,111	18,178	24,801	64.13%***	36.43%***
	Comparison Group	364,217	412,610	456,136	25.24%	10.55%
Male	Regional (CPHA) and Metro (TA)	10,660	13,267	17,935	68.25%***	35.19%***
	Comparison Group	273,404	313,561	355,123	29.89%	13.25%

Note:

Tests are of difference between proportions of starred category (gender) relative to comparison group, where *** denotes significance at the one per cent level.

Comparison group is all Internal and Multi-Modal Domestic Students in the relevant subgroup.

There is no statistically significant difference over time in the proportion of female students relocating compared to the proportion of male students relocating in each of the three years (Table 21).

Table 21: Proportion of Internal and Multi-Modal Domestic Students with Regional (MCEETYA) Commencing Permanent Home Address and Metropolitan Term Address by Gender

	2008	2011	2014
Proportion Female (%)	58.64	57.81	58.03
Proportion Male (%)	41.36	42.19	41.97

Socioeconomic Status

Data on the regional participation by socioeconomic status is not routinely reported in the Higher Education Data Collection, but a reference point to regional participation by socioeconomic status can be found in James et al. (2008). The socioeconomic distribution of students who relocate is broadly consistent with regional and remote access rates by socioeconomic status described in James et al. (2008), 3.4 per cent high SES, 65 per cent mid SES, and 31.6 per cent low SES. Whilst there was a statistically significant change in the proportion of students with a regional commencing permanent home address and metropolitan term address by low and mid socioeconomic status from 2008 to 2014 (Table 22) this change does not appear to signify a discernible trend in patterns of relocation by socioeconomic status.

Table 22: Enrolments, Enrolment Growth and Proportions of Internal and Multi-Modal Domestic Students with Regional (MCEETYA) Commencing Permanent Home Address and Metropolitan Term Address by Socioeconomic Status

	2008	2011	2014	Change 2008-2014	Change 2011-2014
High	1,252 (4.86%)	1,520 (4.83%)	2,084 (4.88%)	66.45%	37.11%
Medium	15,143 (58.76%)	18,703 (59.48%)	25,568 (59.83%)	68.84%***	36.71%
Low	9,169 (35.58%)	10,990 (34.95%)	14,788 (34.60%)	61.28%***	34.56%
Unknown	208 (0.81%)	231 (0.73%)	296 (0.69%)	42.31%*	28.14%
Total	25,772	31,444	42,736	65.82%	35.91%

Note:

Tests are of difference between proportions of starred category relative to total, where *, **, *** denote significance at the 10 per cent, five per cent and one per cent level respectively.

Disability

The increase in the number of regional students with disabilities with a regional commencing permanent home address and metropolitan term address is statistically significantly greater than increases in the number of all students with disabilities (Table 23).

Table 23: Enrolments and Enrolment Growth of Internal and Multi-Modal Domestic Students with Regional (MCEETYA) Commencing Permanent Home Address (CPHA) and Metropolitan Term Address (TA) by Disability Status

		2008	2011	2014	Growth 2008-2014	Growth 2011-2014
Disability	Regional (CPHA) and Metro (TA)	1,039	1,587	2,546	145.04%***	60.43%***
	Comparison Group	25,986	35,574	45,809	76.28	28.77%
No Disability	Regional (CPHA) and Metro (TA)	24,733	29,857	40,191	62.50%***	34.61%***
	Comparison Group	611,635	690,597	765,450	25.15%	10.84%

Notes:

Tests are of difference between proportions of starred category relative to comparison group, where *** denotes significance at the one per cent level.

Comparison group is all Internal and Multi-Modal Domestic Students in the relevant subgroup.

A statistically significant faster increase in students with disabilities relocating to major cities is interesting given the barriers faced by people with disabilities in accessing higher education (Brett, 2016). Potential explanations for the growth in students with disabilities include the progressive dismantling of barriers to participation and relocation, and increasing opportunities for students with disabilities to take up places in major cities following the introduction of demand driven funding.

There are limitations associated with the disability indicator of the higher education data collection that provides disability data in Table 23. The disability indicator relies on unverified

enrolment self-disclosure. There is a difference between the numbers of students identified as having a disability in Higher Education Statistics, 60,019 (Department of Education and Training, 2015b, Appendix 2), and the Survey of Disability Ageing and Carers, 101,600 (Australian Bureau of Statistics, 2015a). The Survey of Disability, Ageing and Carers also indicates there is a higher proportion of students with disabilities attending university in regional areas than major cities (Table 24). More analysis may be required to understand why mobility for students with disabilities is increasing. The increase in students with disabilities will have implications for support services and other institutional practices.

Table 24: Participation of Students with Disabilities by Accessibility/Remoteness Index of Australia (Source: Australian Bureau of Statistics, 2015)

	Currently attending University or other higher education		
	Has a disability (000)	All persons (000)	Participation Rate
Major Cities of Australia	79.2	1,071.7	7.4%
Inner Regional Australia	15.7	122.3	12.8%
Outer Regional Australia#	6.9	63.6	10.8%
Remote Australia#	0.3	10.0	3.0%
Total	101.6	1,267.0	8.0%

Note:

#Data in outer regional and remote Australia has a high standard error and should be treated with caution.

Totals differ from the sum of categories due to rounding.

Indigenous

Increases in the numbers of Indigenous students with a regional commencing permanent home address and metropolitan term address are statistically significantly higher than increases in the number of all Indigenous students (Table 25). This greater increase in Indigenous students relocating to major cities is consistent with a higher proportion of Indigenous persons residing in regional areas.

Table 25: Enrolments and Enrolment Growth of Internal and Multi-Modal Domestic Students with Regional (MCEETYA) Commencing Permanent Home Address (CPHA) and Metropolitan Term Address (TA) by Indigenous Status

		2008	2011	2014	Growth 2008-2014	Growth 2011-2014
Indigenous	Regional (CPHA) and Metro (TA)	307	498	824	168.40%***	65.46%***
	Comparison Group	7,033	8,507	10,707	52.24%	25.86%
Not Indigenous	Regional (CPHA) and Metro (TA)	25,465	30,946	41,912	64.59%***	35.44%***
	Comparison Group	630,588	717,664	800,552	26.95%	11.55%

Note:

Tests are of difference between proportions of starred category relative to comparison group, where *** denotes significance at the one per cent level.

Comparison group is all Internal and Multi-Modal Domestic Students in the relevant subgroup.

Enrolment

Type of Attendance

The majority of students with a regional commencing permanent home address and metropolitan term address are undertaking their studies full time, although the strength of this relationship is decreasing significantly (Table 26). This trend towards part time study runs counter to the pattern evident for all students, where the proportion of domestic students undertaking internal and multi-modal study on a full time basis is increasing (Table 27). As previously indicated, this may be explained by the growth in regional students relocating to metropolitan locations needing to work in order to pay for higher living costs.

Table 26: Enrolments, Enrolment Growth and Proportion of Internal and Multi-Modal Domestic Students with Regional (MCEETYA) Commencing Permanent Home Address (CPHA) and Metropolitan Term Address (TA) by Type of Attendance

	2008	2011	2014	Growth 2008-2014	Growth 2011-2014
Full time	21,961 (85.21%)	26,356 (83.82%)	34,790 (81.41%)	58.42%***	32.00%***
Part time	3,811 (14.79%)	5,089 (16.18%)	7,946 (18.59%)	108.50%***	56.14%***
Total	25,772	31,445	42,736	65.82%	35.91%

Note:

Tests are of difference between proportions of starred category relative to total, where *** denotes significance at the one per cent level.

Table 27: Enrolments, Enrolment Growth and Proportion of All Domestic Internal and Multi-Modal Students by Type of Attendance (Source: Department of Education and Training, 2016b)

	2008	2011	2014	Growth 2008-2014	Growth 2011-2014
Full time	472,904 (72.29%)	547,464 (73.69%)	627,873 (75.38%)	32.77%***	14.69%***
Part time	181,247 (27.71%)	195,504 (26.31%)	205,033 (24.62%)	13.12%***	4.87%***
Total	654,151	742,968	832,906	27.33%	12.11%

Note:

Tests are of difference between proportions of starred category relative to comparison group, where *** denotes significance at the one per cent level.

Course Level

The majority of students with a regional commencing permanent home address and metropolitan term address are undertaking their studies at an undergraduate level, although the strength of this relationship is decreasing significantly (Table 28). There is a significant increase in the proportion of students with a regional commencing permanent home address and metropolitan term address undertaking studies at the postgraduate level. The trend towards increasing postgraduate level study among regional students is different to the pattern evident for all students, where the proportion of domestic students undertaking postgraduate level study has decreased slightly from 2008 to 2014 (Table 29).

Postgraduate students make up a large fraction of the students who are relocating to metropolitan locations (5,001 of 16,964 students). This growth in postgraduate students is likely to be important in explaining growth of students relocating to metropolitan locations across other variables described in this report, including mode of study, age, and type of attendance. Undergraduate students continue to dominate patterns of relocation, accounting for 11,709 (around 70 per cent) of those relocating to metropolitan locations, and will continue to make student income support policy an important consideration in facilitating their participation.

Table 28: Enrolments, Enrolment Growth and Proportion of Internal and Multi-Modal Domestic Students with Regional (MCEETYA) Commencing Permanent Home Address (CPHA) and Metropolitan Term Address (TA) by Course Level

	2008	2011	2014	Growth 2008-2014	Growth 2011-2014
Postgraduate award	2,832 (10.99%)	4,111 (13.07%)	7,833 (18.33%)	176.56%***	90.51%***
Undergraduate award	22,824 (88.56%)	27,105 (86.20%)	34,533 (80.81%)	51.30%***	27.40%***
Enabling and non-award	116 (0.45%)	228 (0.73%)	371 (0.87%)	220.74%***	62.84%**
TOTAL	25,772	31,444	42,737	65.83%	35.91%

Note:

Tests are of difference between proportions of starred category relative to total, where *, **, ***, denote significance at the 10 per cent, five per cent and one per cent level respectively.

Table 29: Enrolments, Enrolment Growth and Proportion of All Domestic Internal and Multi-Modal Students by Course Level (Source: Department of Education and Training, 2016b)

	2008	2011	2014	Growth 2008-2014	Growth 2011-2014
Postgraduate award	134,000 (20.48%)	149,743 (20.15%)	162,019 (19.45%)	20.91%***	8.20%***
Undergraduate award	507,988 (77.66%)	577,248 (77.69%)	650,988 (78.16%)	28.15%***	12.77%***
Enabling and non-award	12,163 (1.86%)	15,977 (2.15%)	19,899 (2.39%)	63.60%***	24.55%***
TOTAL	654,151	742,968	832,906	27.33%	12.11%

Note: Tests are of difference between proportions of starred category relative to total, where *** denotes significance at the one per cent level.

Field of Education

Growth in students with a regional commencing permanent home address and metropolitan term address was statistically significantly higher than the comparison group across every Broad Field of Education from 2008 to 2014 and 2011 to 2014 (Table 30). This difference was significant at one per cent for all fields and time frames with the exception of Engineering from 2011 to 2014 which was significant only at five per cent. The growth in students with a regional commencing permanent home address and metropolitan term address does not appear to be disproportionately influenced by any specific area/s of study, though the health and education areas do have the highest growth rates.

Table 30: Enrolments and Enrolment Growth of Internal and Multi-Modal Domestic Students with Regional (MCEETYA) Commencing Permanent Home Address (CPHA) and Metropolitan Term Address (TA) by Broad Field of Education

		2008	2011	2014	Growth 2008-2014	Growth 2011-2014
Natural and Physical Sciences	Regional (CPHA) and Metro (TA)	3,370	4,053	5,269	56.35%***	30.00%***
	Comparison group	58,987	70,778	85,888	45.60%	21.35%
Information Technology	Regional (CPHA) and Metro (TA)	692	747	1,075	55.37%***	43.95%***
	Comparison group	20,106	20,939	24,497	21.84%	16.99%
Engineering and Related Technologies	Regional (CPHA) and Metro (TA)	2,604	3,125	3,631	39.43%***	16.20%**
	Comparison group	44,373	52,094	57,652	29.93%	10.67%
Architecture and Building	Regional (CPHA) and Metro (TA)	686	880	1,049	53.05%***	19.21%***
	Comparison group	17,953	20,678	20,867	16.23%	0.91%

		2008	2011	2014	Growth 2008-2014	Growth 2011-2014
Agriculture, Environmental and Related Studies	Regional (CPHA) and Metro (TA) Comparison group	665	685	833	25.31%***	21.67%***
	Regional (CPHA) and Metro (TA) Comparison group	11,022	11,708	11,259	2.15%	-3.83%
Health	Regional (CPHA) and Metro (TA) Comparison group	5,059	6,219	9,121	80.27%***	46.67%***
	Regional (CPHA) and Metro (TA) Comparison group	101,197	122,473	147,425	45.68%	20.37%
Education	Regional (CPHA) and Metro (TA) Comparison group	2,466	2,935	4,390	78.06%***	49.58%***
	Regional (CPHA) and Metro (TA) Comparison group	70,551	78,479	85,683	21.45%	9.18%
Management and Commerce	Regional (CPHA) and Metro (TA) Comparison group	3,803	4,312	5,571	46.49%***	29.19%***
	Regional (CPHA) and Metro (TA) Comparison group	132,866	135,466	141,896	6.80%	4.75%
Society and Culture	Regional (CPHA) and Metro (TA) Comparison group	6,740	8,189	10,972	62.80%***	33.99%***
	Regional (CPHA) and Metro (TA) Comparison group	169,929	195,772	218,415	28.53%	11.57%
Creative Arts	Regional (CPHA) and Metro (TA) Comparison group	2,409	3,093	3,987	65.48%***	28.90%***
	Regional (CPHA) and Metro (TA) Comparison group	55,745	65,694	70,921	27.22%	7.96%
TOTAL	Regional (CPHA) and Metro (TA) Comparison group	25,772	31,444	42,736	65.83%***	35.91%***
	Regional (CPHA) and Metro (TA) Comparison group	637,621	726,171	811,259	27.23%	11.72%

Note:

Tests are of difference between proportions of starred category relative to comparison group, where *, **, *** denotes significance at the 10 per cent, five per cent and one per cent level respectively.

Comparison group is all Internal and Multi-Modal Domestic Students in the relevant subgroup.

The data takes into account the coding of combined courses to two fields of education. As a consequence, counting both fields of education for Combined Courses means that the sum for all broad fields of education may be more than the total number of students.

Admissions

Basis of Admission

The growth in commencing bachelors degree students with a regional commencing permanent home address and metropolitan term address varied according to the basis of admission and time frame (Table 31). Consistent with other findings around increasing participation in this group by age, the proportion of students with a regional commencing permanent home address and metropolitan term address admitted on the basis of secondary education alone is declining, significant at one per cent from 2011 to 2014. This decrease in proportion is offset by increases in students admitted on the basis of a higher education course, mature age special entry, and TAFE award course.

Table 31: Enrolments, Enrolment Growth and Proportions of Internal and Multi-Modal Commencing Bachelors Domestic Students with Regional (MCEETYA) Commencing Permanent Home Address (CPHA) and Metropolitan Term Address (TA) by Basis of Admission.

		2008	2011	2014	Growth 2008-2014	Growth 2011- 2014
Secondary education	Regional (CPHA) and Metro (TA)	3,681 (60.25%)	4,048 (55.51%)	4,776 (45.91%)	29.75%	17.98%***
	Comparison group	84,799	100,048	108,919	28.44%	8.87%
Higher education course	Regional (CPHA) and Metro (TA)	1,463 (23.94%)	1,992 (27.31%)	3,537 (34.00%)	141.76%***	77.56%***
	Comparison group	34,325	42,786	49,703	44.80%	16.17%
Mature age special entry	Regional (CPHA) and Metro (TA)	126 (2.06%)	247 (3.39%)	436 (4.19%)	246.03%***	76.52%***
	Comparison group	7,995	10,453	13,997	75.07%	33.90%
TAFE award course	Regional (CPHA) and Metro (TA)	231 (3.78%)	369 (5.06%)	686 (6.59%)	196.97%***	85.91%***
	Comparison group	14,478	19,381	22,596	56.07%	16.59%
Professional qualification	Regional (CPHA) and Metro (TA)	13 (0.21%)	17 (0.23%)	31 (0.30%)	138.46%	82.35%
	Comparison group	670	629	775	15.67%	23.21%
Other basis	Regional (CPHA) and Metro (TA)	596 (9.75%)	619 (8.49%)	938 (9.02%)	57.38%***	51.53%***
	Comparison group	19,172	16,828	22,330	16.47%	32.70%
Total	Regional (CPHA) and Metro (TA)	6,110	7,293	10,403	70.26%***	42.64%***
	Comparison group	161,439	190,125	218,320	35.23%	14.83%

Note:

Tests are of difference between proportions of starred category relative to comparison group, where *, **, *** denotes significance at the 10 per cent, five per cent and one per cent level respectively. Comparison group is all Internal and Multi-Modal Domestic Students in the relevant subgroup.

ATAR Entry

Consistent with basis of admission data outlined above, the proportion of commencing bachelors students with a regional commencing permanent home address and metropolitan term address admitted on the basis of secondary education demonstrates a decline in those admitted via ATAR (Table 32). This is significant at five per cent for the 2011 to 2014 period. However, it is not statistically significant between 2008 and 2014.

When considering the ATAR range for students admitted on the basis of ATAR, there has been a statistically significant increase in students admitted with ATARs between 30 and 59 from 2011 to 2014 (Table 33), but this group represents a small proportion (0.5 per cent, see Table 12) of all students relocating to major cities and 6.4 per cent of all students admitted on the basis of ATAR (3,102). There was also a statistically significant drop in the proportion of students with an ATAR between 80 and 94 relocating to cities.

Table 32: Enrolments, Enrolment Growth and Proportions of Internal and Multi-Modal Commencing Bachelors Domestic Students Admitted on the Basis of Secondary Education with Regional (MCEETYA) Commencing Permanent Home Address (CPHA) and Metropolitan Term Address (TA) by Basis of Admission.

		2008	2011	2014	Growth 2008-2014	Growth 2011-2014
No ATAR	Regional (CPHA) and Metro (TA)	1,072 (29.12%)	1,363 (33.67%)	1,674 (35.05%)	56.08%	22.75%***
	Comparison group	19,610	27,650	29,523	50.55%	6.77%
ATAR	Regional (CPHA) and Metro (TA)	2,609 (70.88%)	2,685 (66.33%)	3,102 (64.95%)	18.89%	15.53%**
	Comparison group	65,189	72,398	79,396	21.79%	9.67%
TOTAL	Regional (CPHA) and Metro (TA)	3,681	4,048	4,776	29.72%	17.96%***
	Comparison group	84,799	100,048	108,919	28.44%	8.87%

Note:

Tests are of difference between proportions of starred category relative to comparison group, where *, **, *** denotes significance at the 10 per cent, five per cent and one per cent level respectively. Comparison group is all Internal and Multi-Modal Domestic Students in the relevant subgroup.

Table 33: Enrolments and Enrolment Growth of Internal and Multi-Modal Commencing Bachelors Domestic Students Admitted on the Basis of Secondary Education with Regional (MCEETYA) Commencing Permanent Home Address (CPHA) and Metropolitan Term Address (TA) by ATAR Range.

ATAR Range		2011	2014	Growth 2011-2014
30-59	Regional (HA) Metro (TA)	99 (3.69%)	198 (6.38%)	100.26%***
	Comparison group	4,166	5,993	43.86%
60-79	Regional (HA) Metro (TA)	927 (34.53%)	1,089 (35.11%)	17.43%
	Comparison group	25,061	27,419	9.41%
80-94	Regional (HA) Metro (TA)	1,208 (44.99%)	1,291 (41.2%)	6.86%***
	Comparison group	30,837	32,272	4.65%
95-100	Regional (HA) Metro (TA)	451 (16.80%)	524 (16.89%)	16.33%
	Comparison group	12,334	13,712	11.17%
Total	Regional (HA) Metro (TA)	2,685	3,102	15.53%**
	Comparison group	72,398	79,396	9.67%

Note:

Tests are of difference between proportions of starred category relative to comparison group, where *, **, *** denotes significance at the 10 per cent, five per cent and one per cent level respectively. Comparison group is all Internal and Multi-Modal Domestic Students in the relevant subgroup.

Summary

Many interesting results have been identified above using student numbers newly classified as regional based on commencing permanent home address. The key point is that while existing data on regional students suggests enrolments of regional students are either falling marginally or tracking in line with overall enrolment growth, focusing on commencing permanent home address paints a very different picture. Regional student enrolments have been growing much faster than overall student enrolments. The growth is particularly concentrated among regional students migrating to metropolitan university campuses, thereby helping to reconcile the anecdotal evidence of relatively low enrolment growth at regionally located universities with our evidence of strong growth among regional students. The data was sliced along many interesting dimensions, and without reiterating all findings, a dominant theme is that among almost all subgroups, regional student enrolment growth is outstripping metropolitan student enrolment growth, and in ways that differ from patterns of growth in the sector as a whole.

Growth is particularly strong in more flexible modes of study, for mature age groups, postgraduate students, students undertaking their study part time, Indigenous students and students with disabilities. These patterns of growth coincide with the introduction of demand driven funding and associated equity interventions. It would appear that increasing the availability of places in larger metropolitan locations is driving an increase in regional students moving to these locations. Notwithstanding our earlier analysis of credit constraints using the 2006 LSAY cohort, many of these students seem to be taking advantage of these new metropolitan opportunities while defraying the high costs of relocation through part time

study in order to find ways to pay these costs. This marks a significant shift in the competitive dynamic in Australian higher education and regional higher education. As a consequence, Australia's regional universities face new competitive challenges that are clearly starting to bite with an increasing regional outflow of students. The challenge is one for policy makers and the Commonwealth Government as well as universities.

6. MEASURING REGIONAL STUDENT RELOCATION TO OTHER REGIONAL AREAS

The previous section of this report focused on the relocation and mobility of students with a regional commencing permanent home address to major cities across a range of variables for the years 2008, 2011 and 2014. This section of the report considers the relocation and mobility of students from one regional area to another within a single year, 2014.

The following analysis focuses exclusively on students who satisfy two conditions:

- They have both a commencing permanent home address and a term address in a regional location (i.e. in a postcode classified as 'inner regional' or 'outer regional' under the ASGS regional classification).
- Their term postcode is different from their original permanent home postcode.

The aim is to examine the movement of students who remain in a 'regional' area, but who have moved from their original permanent home address. For the purposes of this report, the term 'regional movers' is used to refer to such students.

In this section of the analysis, the Department used a different methodology to classify individual students to regions. Each postcode is assigned to metropolitan, regional and remote areas on a fractional basis, with the total adding to one. For example, a postcode might be 0.6 metropolitan and 0.4 regional. For the purpose of the aggregated data set, a student has been assigned to a metropolitan or regional or remote category based on the regional classification of the majority of the postcode. This means that:

- A student with a postcode which has metropolitan weighting of greater than 0.5, is assigned to 'metropolitan'.
- A student with a postcode which has regional weighting of greater than 0.5, is assigned to 'regional'.
- A student with a postcode which has remote weighting of greater than 0.5, is assigned to 'remote'.
- In a limited number of cases, the weightings of some postcodes is 0.5 regional and 0.5 remote. In this case, students in this postcode have been assigned to 'regional'.

The data provided by the Department, and categorised by regional status, is not absolutely comparable to the data published in the standards Higher Education Statistics Collection. There is a small proportion of domestic students for whom regional status cannot be assigned, for reasons that include students having a post office box for an address.

Of the 206,608 students with a regional (ASGS) commencing permanent home address, 155,339 (75.2 per cent) also have a term address in a regional area. Of that group, 15,514 (10 per cent) have a term postcode that is different from their original permanent postcode. Those 15,514 regional movers make up 7.5 per cent of all students with a regional original permanent home postcode (Table 34).

Table 34: Students with a Regional Commencing Permanent Address, Broken Down by the Regional Classification of Term Address.

Term address	Metro	Regional (same postcode)	Regional (different postcode, same SA4)	Regional (different postcode, different SA4)	Remote	Total
Number	49,940	139,825	7,664	7,850	1,328	206,607
% of total	24.17%	67.68%	3.71%	3.80%	0.64%	100%

Overall, the data points to significant mobility of students who originate from regional areas. Almost one third of the students in 2014 with a regional permanent address had a term address in either a metropolitan area, a different regional postcode, or in a remote area. When focusing on regional movers in particular, there are clear patterns of movement in and out of particular regional locations, indicating regional students are exercising choice in study destination, driving mobility within regional areas.

The analysis examines regional movement by Statistical Area 4 (SA4), and by state. The key aim is to identify specific regional areas that perform well in terms of attracting large numbers of regional movers by term address, and to identify migration patterns between regional areas. Note that where SA4s are ranked on some performance measure, only the 34 SA4s with more than 50 per cent of population classified as regional are included in the analysis.

The following analysis comes with an important caveat. In focusing on ‘regional movers’, the analysis excludes the much larger group of regional students whose term postcode is the same as their permanent home postcode, as well as those students who migrate out of a regional area, e.g. who have a term address in a metropolitan area. This naturally affects movement patterns identified here. It is possible, for example, that regional SA4s that perform well in attracting regional movers would perform less well were one to take into account students lost to major cities.

Regional Students Gravitate Towards Regional Centres

The analysis reveals a pattern of regional students migrating to regional centres for study. The distribution of regional movers by permanent address is significantly wider than the distribution by term address, suggesting that migration results in a greater concentration of students in particular areas. The top 10 SA4s by the number of term students have 64 per cent of students by term address (and 28 per cent of Australia’s regional population). In contrast, the top 10 SA4s by the number of permanent address students have 51 per cent of students by permanent address (and 29 per cent of Australia’s regional population).

Consequently, few SA4s perform well in terms of having more regional movers by term address than by permanent home address. Of 34 regional SA4s, only 10 are ‘net gainers’, i.e. gaining more regional movers than they lose.¹⁶ The student flows and summary statistics

¹⁶ We concentrate on SA4s with more than 50 per cent of the population classified as regional. This approach excludes SA4s that are primarily remote but have significant regional populations (including Western Australia – Outback, South Australia – Outback and Northern Territory – Outback) and SA4s that are primarily major cities (including Ipswich, Sunshine Coast and Geelong).

of the top five SA4s by net student gain are presented in Table 35. Townsville has 2,645 regional movers by term address, 1,540 of whom have a permanent address outside of Townsville. Hobart is the only other SA4 with more than 1,000 regional movers by term address. Bendigo, Toowoomba and Ballarat also gain significant numbers of regional movers.

Table 35: High Performing Regional SA4s (sorted by ‘net gain’)

SA4	Net gain (difference between permanent and term address)	Students (by term address)	Students from other SA4’s
Townsville	1,318	2,645	1,540
Bendigo	466	941	623
Toowoomba	369	695	530
Ballarat	289	898	462
Hobart	272	1,861	555

Regional Movers Display a Preference for Travelling Shorter Distances to Study

Regional movers typically move relatively short distances to study. Just under half (49 per cent) of all regional movers have a term address in the same SA4 as their permanent address, and those that move to a different SA4 typically move to a neighbouring one. SA4s that perform well in terms of net gain appear to function as a regional hub, drawing students from neighbouring areas.

Townsville is the most striking example of this. Of the 1,540 regional students that move to Townsville, 1,117 (73 per cent) are from the neighbouring SA4s of Cairns, Mackay and Fitzroy. Similarly, most of the 623 students that move to Bendigo are from Shepparton, North West and Hume. It is possible to identify similar regional hubs along Australia’s eastern seaboard, with Toowoomba in southern Queensland, Richmond – Tweed and New England and North West in northern New South Wales; Riverina in southern New South Wales, Bendigo and Ballarat in Victoria, and Hobart in Tasmania.

Campus Scale Plays a Role in the Choice of Study Destination for Regional Movers

The distribution by term address of regional movers across SA4s underscores the importance of campus scale and reputation in informing student choices on where to study. What distinguishes the SA4s that attract large numbers of regional movers is the presence of a large campus: Townsville is home to James Cook University, Hobart to the University of Tasmania, Bendigo to La Trobe University’s largest regional campus, Ballarat to the Federation University of Australia and Toowoomba to the University of Southern Queensland. This suggests that course profile, reputation, and the amenity typically co-located with larger campuses plays a role in decisions on study destination, even for those who choose to remain in a regional area.

This is further evident in view of SA4s that do *not* attract many regional movers. For example, despite La Trobe University having a campus in the SA4 North West, only 27 per cent of those with permanent address in North West also have a term address there; more than half have a term address in either Bendigo (28 per cent) or Ballarat (24 per cent).

While there is a correlation between an SA4’s performance in attracting regional movers and the presence of a major city or town located in that SA4, this is likely a function of larger

campuses being located in larger population centres with campus locations therefore being endogenous. SA4s that house similar sized population centres have markedly different performance in attracting regional movers. While the towns of Bendigo and Mackay are of similar population size, and while their corresponding SA4s have similar numbers of regional movers by permanent address, Bendigo has 941 students by term address compared to Mackay's 153, and draws 623 from other SA4s compared to Mackay's 68.

SA4s Cannot be Sorted into 'Winners' and 'Losers' with Respect to their Capacity to Attract Regional Movers

As noted, there are SA4s that perform particularly well in drawing students from neighbouring regional areas. However, SA4s cannot be easily sorted into 'winners' and 'losers' with respect to their capacity to attract regional movers. Some SA4s that suffer a net loss of regional movers to other regions have a relatively high number of term address students. Cairns, for example, is ranked 33 out of 34 SA4s on the 'net gain' measure (suffering a loss of 376 students), but it is ranked five out of 34 for regional movers by term address (with 810 students); see Table 36 for summary statistics of all 34 SA4s considered. Cairns also draws 269 of those students from other SA4s (ranked nine out of 34).

Table 36: Enrolments of Regional Movers

This table presents data on all students who are regional movers as defined above. Column (1) presents total regional movers with commencing permanent home address (CPHA) in the respective SA4. Column (2) presents enrolments of regional movers with a term address (TA) in each respective SA4. Column (3) is the difference (2) – (1), providing net gain/loss of regional movers in each SA4. Column (4) presents the proportion of total regional mover enrolment in each respective SA4 originating from within the SA4¹⁷

Statistical Area Level 4, State and Proportion of Population that is Regional / Remote	(1) SA4 Enrolments (CPHA)	(2) SA4 Enrolments (TA)	(3) Net Loss /Gain	(4) % of Term Address from SA4
Hobart (Tas) 100 %	1589	1861	272	70%
Townsville (Qld) 100 %	1327	2645	1318	42%
Cairns (Qld) 100 %	1186	810	-376	67%
Launceston and North East (Tas) 100 %	742	702	-40	61%
Ballarat (Vic) 100 %	609	898	289	49%
Mackay (Qld) 100 %	574	153	-421	55%
Fitzroy (Qld) 100 %	566	337	-230	64%
Bendigo (Vic) 100 %	475	941	466	34%
Richmond – Tweed (NSW) 71.7 %	472	551	79	54%
North West (Vic) 100 %	425	208	-217	54%
Wide Bay (Qld) 100 %	425	199	-226	43%
Latrobe – Gippsland (Vic) 100 %	416	309	-107	72%
Shepparton (Vic) 100 %	400	153	-247	63%
Hume (Vic) 100 %	391	275	-116	45%
Mid North Coast (NSW) 100 %	370	204	-166	51%
Warrnambool and South West (Vic) 100 %	369	223	-146	63%
West and North West (Tas) 100 %	365	170	-195	55%
New England and North West (NSW) 100 %	350	439	89	32%
Central West (NSW) 100 %	346	344	-1	39%
Toowoomba (Qld) 100 %	326	695	369	24%
Coffs Harbour – Grafton (NSW) 100 %	305	243	-62	44%
Murray (NSW) 100 %	302	315	13	26%
Darwin (NT) 100 %	299	261	-38	58%
Darling Downs – Maranoa (Qld) 100 %	271	91	-181	31%
Riverina (NSW) 100 %	256	525	269	22%
Capital Region (NSW) 81.7 %	242	142	-100	51%
Sthn Highlands & Shoalhaven (NSW) 100 %	232	210	-22	57%
South Australia – South East (SA) 100 %	199	149	-48	76%
Hunter Valley exc Newcastle (NSW) 61.7 %	177	114	-63	63%

¹⁷ Note that this list includes only SA4s with more than 50 per cent population classified as regional. It thereby excludes 'South Australia – Outback', 'Western Australia – Outback', 'Geelong', 'Sunshine Coast', 'Ipswich', 'Adelaide – Central and Hills', 'Sydney – Baulkham Hills and Hawkesbury', 'Sydney – Outer South West', 'Moreton Bay – North' and 'Logan – Beaudesert', all having more than 10 per cent regional population.

Statistical Area Level 4, State and Proportion of Population that is Regional / Remote	(1) SA4 Enrolments (CPHA)	(2) SA4 Enrolments (TA)	(3) Net Loss /Gain	(4) % of Term Address from SA4
Bunbury (WA) 100 %	163	177	14	72%
Far West and Orana (NSW) 100 %	153	76	-78	32%
South East (Tas) 100 %	107	66	-41	15%
Barossa - Yorke – Mid North (SA) 100 %	88	79	-9	67%
Western Australia - Wheat Belt (WA) 100 %	70	42	-28	68%
All other SA4s	927	907	-20	45%
Total	15,514	15,514	n/a	n/a

While both lose similar numbers of students, the performance of Cairns differs markedly from that of Mackay. Mackay has a high number of regional movers by permanent home address (ranked six out of 34), but loses most to other SA4s when measured by term address (ranked 25 out of 34 by term address).

Other SA4s, such as Latrobe – Gippsland, have few regional movers to start with (i.e. by permanent home address) relative to the total population, due either to low overall participation rates, or to students from those SA4s migrating to metropolitan areas and therefore not being captured in the analysis of regional movers.

Regional Movers Typically Remain within their Home State

Regional movers typically remain in their home state: 88 per cent have the same permanent home and term state.

Queensland and Tasmania perform better than all other states in terms of retaining their regional movers: of regional movers with a permanent address in Queensland and Tasmania, roughly 935 have a term address in their respective states.

The Northern Territory performs worst on this measure, retaining only 51 per cent of its permanent home address regional movers. Western Australia and New South Wales retain 82 per cent and 83 per cent of their regional movers respectively.

Queensland has easily the highest number of regional movers by term address with 5,141, despite having a smaller regional population than New South Wales. This is likely a function of the areas classified as 'regional'. Since both Newcastle and Wollongong are classified as metropolitan, New South Wales students that migrate to those towns from surrounding regional areas are not captured in this analysis.

Queensland is also the only state that is a 'net gainer' of regional movers: all other states have fewer regional movers by term address than by permanent address. Much of the interstate migration of regional movers is between New South Wales and Victoria, and between New South Wales and Queensland. There is some movement between Victoria and Queensland, between Victoria and Tasmania, and between Tasmania and Queensland. Very few regional movers migrate in or out of South Australia and Western Australia.

Summary

The main conclusion we draw from this regional to regional mobility analysis is that regional students are willing to relocate to other regional locations in order to undertake higher education. Some strong themes are that students are more likely to relocate to nearby regional locations, rather than distant ones, consistent with evidence from the literature regarding the difficulties with regional student dislocation from family, friends and social networks when moving to university. We also find that only a small number of regional locations are net attractors of students. Consistent with the earlier findings on regional to metropolitan movement, larger regional centres seem to be at an advantage with only small numbers moving to more remote regional locations.

7. CONCLUSIONS

This report covers a wide range of the regional student experience in contemporary Australian higher education. The project contributes to the debate on costs uniquely facing students from regional locations. The findings are positive in that they reveal that eligible regional students likely to face credit constraints are no less likely to attend university. Likely credit constrained regional students are found to be more likely to graduate than their peers. Evidence on plans to attend university expressed by students at age 15 shows that regional students from likely credit constrained backgrounds are as likely to plan to attend university as their metropolitan peers. It was the unlikely and potentially constrained regional students who were less likely to plan at age 15 to attend university. Only regional potentially constrained students were less likely to graduate from high school than their metropolitan peers.

Using enrolment data from 2008-2014 with regionality defined by commencing permanent home address, our findings regarding regional student enrolment growth over this seven year period are surprising. Regional student enrolment growth has outstripped metropolitan and overall student enrolment growth over this period. This is in contrast to trends suggested in the existing indicator where regional status is based on term address rather than commencing home address, showing flat growth in regional student numbers relative to the overall numbers. Another important theme to emerge is the fast growth in the number of regional students relocating to metropolitan locations to undertake higher education, far outstripping growth in regional students taking up higher education places in regional locations.

Growth was identified as being particularly strong in more flexible modes of study, for mature age groups, postgraduate students, students undertaking their study part time, Indigenous students and students with disabilities. This coincided with the introduction of demand driven funding and associated equity interventions. Increasing the availability of places in larger metropolitan locations seems to be driving an increase in regional students moving to these locations. While the analysis of earlier cohorts using LSAY data suggests no effects of credit constraints, the expanded opportunities may be enticing more credit constrained regional students to participate in higher education at metropolitan locations. Indications from the DET data are that many of these students seem to be taking advantage of these new metropolitan opportunities while defraying the high costs of relocation through part time study in order to find ways to pay these costs. This marks a significant shift in the competitive dynamic in Australian higher education and regional higher education. As a consequence, Australia's regional universities face new competitive challenges that are clearly starting to bite with an increasing regional outflow of students. The challenge is one for policy makers and the Commonwealth Government as well as universities in a heavily regulated market.

Finally we investigated the mobility of regional students to other regional locations. Our findings showed a willingness among students to relocate from one regional location to another but there was a preference to stay 'close to home', even if moving to a new regional location. It was also found that higher education institutions based in larger regional locations were net attractors of regional students, and that universities and campuses based in smaller regional locations could not compete with institutions based in metropolitan or larger regional locations.

The findings are positive for regional access. Institutional arrangements in place to provide support for regional students seem to be effective. If anything, aspirations and school completion are where work is required in order to grow regional participation.

Notwithstanding these claims, the post-demand driven funding evidence suggests regional participation is growing quickly. Policy makers and the higher education sector face increasing challenges around competition between regional and metropolitan universities and the increasing demand for and willingness to migrate to metropolitan campuses among students from regional locations.

The authors anticipate that this study will be of interest to many stakeholders in regional higher education. We have deliberately avoided normative positions around whether the patterns of regional student participation and mobility are inherently positive or negative. This study is perhaps the first study of its kind in using a new indicator for student geographic origins, with potential applicability to regional and socioeconomic status related policy questions. From the authors' perspective it throws new light on a long-standing policy challenge, but also raises many additional questions. For example:

- What forms of school interventions will lead to improved regional school outcomes and higher education participation and success?
- Beyond the information on commencement and participation analysed here, how do patterns of geographical mobility vary across the student life cycle and post-graduation?
- Do student success and employment outcomes vary by patterns of geographic mobility and participation?
- How responsive are regional students to policy reforms such as scholarships and relocation grants that incentivise geographic mobility?

We would encourage those who engage with this report, or who undertake future research, to consider exploration around how this analytic approach can be used to progress the objectives of providing regional communities with better access to high quality tertiary education and an advanced skill base to drive social and economic development. The research team will continue to analyse the data underpinning this report and anticipates that research considering metropolitan to regional migration and remote to regional and metropolitan migration will be published in the near future. We welcome opportunities to collaborate with other researchers interested in this topic area.

References

- Alloway, N., & Dalley-Trim, L. (2009). 'High and dry' in rural Australia: Obstacles to student aspirations and expectations. *Rural Society*, 19(1), 49–59.
- Alloway, N., Gilbert, P., Gilbert, R., & Muspratt, S. (2004). *Factors impacting on student aspirations and expectations in regional Australia*. Canberra: Department of Education, Science and Training.
- Australian Bureau of Statistics. (2015). *Survey of disability, ageing and carers, Australia, 2015, detailed microdata. Table builder*. Accessed 12 December 2016, <http://www.abs.gov.au/ausstats/abs@.nsf/mf/4430.0.30.002>
- Baxter, J. (2002). *How much does parental education explain educational attainment of males and females in Australia?* [Negotiating the Life Course Discussion Paper Series – DP015]. Canberra: Australian National University.
- Baxter, J., Gray, M., & Hayes, A. (2011). *Families in regional, rural and remote Australia. Statistics from Growing Up in Australia: The Longitudinal Study of Australian Children* [Facts Sheet]. Melbourne: Australian Institute of Family Studies.
- Black, A., Duff, J., Siggers, S., & Baines, P. (2000). *Rural communities and rural social issues: Priorities for research*. Barton, ACT: Rural Industries Research and Development Corporation.
- Bradley, D., Noonan, P., Nugent, H., & Scales, B. (2008). *Review of higher education in Australia, final report*. Canberra: Australian Government.
- Brett, M. (2016). Disability and Australian higher education: Policy drivers for increasing participation. In A. Harvey, C. Burnheim & M. Brett (Eds.), *Student equity in Australian higher education* (pp. 87-108). Singapore: Springer.
- Campbell, S., & Lindsay, K. (2014). Lawyers of the future: Creating aspirations, forging connections and facilitating professional links in rural and regional contexts. *International Journal of Rural Law and Policy*, 2.
- Cardak, B. A., & Ryan, C. (2009). Participation in higher education in Australia: equity and access. *Economic Record*, 85(271), 433–448.
- Cardak, B. A., & Ryan, C. (2014). *Evidence on credit constraints, university attendance and income contingent loans* [Working Paper no. 24/14]. Melbourne: Melbourne Institute of Applied Economic and Social Research, University of Melbourne
- Cardak, B. A. & Vecchi, J. (2016). Graduates, dropouts and slow finishers: The effects of socioeconomic status on university educational outcomes. *Oxford Bulletin of Economics and Statistics*, 78(3), 323–346.
- Centre for the Study of Higher Education (CSHE). (2008). *Participation and equity: A review of the participation in higher education of people from low socioeconomic backgrounds and Indigenous people*. Melbourne: University of Melbourne.
- Chapman, B. (1997). Conceptual issues and the Australian experience with income contingent charges for higher education. *The Economic Journal*, 107(442), 738–751.
- Charles Sturt University. (2009). *Submission to the Inquiry into Rural and Regional Access to Secondary and Tertiary Education Opportunities*. Bathurst: Author.
- Committee on the Future of Tertiary Education in Australia, & Martin, S. L. H. (1965). *Tertiary education in Australia*. Canberra: Government Printer.

- Considine, G., & Zappalà, G. (2002). The influence of social and economic disadvantage in the academic performance of school students in Australia. *Journal of Sociology*, 38(2), 129–148.
- Cooper, G., Baglin, J., & Strathdee, R. (2017). *Access to higher education: Does distance impact students' intentions to attend university?* Perth: National Centre for Student Equity in Higher Education (NCSEHE), Curtin University.
- Cresswell, J. & Underwood, C. (2004). Location, location, location: Implications of geographic situation on Australian student performance in PISA 2000 [Australian Council for Educational Research Monograph No. 58]. Camberwell, ACT: Australian Council for Educational Research.
- Dawkins, J. (1988). *Higher Education: a policy statement*. Canberra: Australian Government Publishing Service.
- Department of Education and Training. (2014). *Selected higher education statistics – 2014 student data*. Accessed 12 December 2016, <https://www.education.gov.au/selected-higher-education-statistics-2014-student-data>
- Department of Education and Training. (2015a). *Completion rates of domestic bachelor students [2005–2012]: A cohort analysis*. Canberra: Author.
- Department of Education and Training. (2015b). *Selected higher education statistics – 2015 student data*. Accessed 12 December 2016, <https://www.education.gov.au/selected-higher-education-statistics-2015-student-data>
- Department of Education and Training. (2016a). *Driving innovation, fairness and excellence in Australian higher education*. Accessed 12 December 2016, <https://docs.education.gov.au/documents/driving-innovation-fairness-and-excellence-australian-education>
- Department of Education and Training. (2016b). *uCube*. Retrieved 12 December 2016, <http://higher-educationstatistics.education.gov.au>
- Department of Education and Training. (2017). *HEIMS online institution payment information*. Accessed 9 January 2017, <https://app.heims.education.gov.au/HeimsOnline/IPInfo>
- Department of Education, Employment and Training. (1990). *A fair chance for all: National and institutional planning for equity in higher education*. Canberra: Australian Government Publishing Service.
- Department of Education, Employment and Workplace Relations. (2010). *Regional participation: The role of socioeconomic status and access*. Canberra: Commonwealth of Australia.
- Department of Education, Employment and Workplace Relations. (2011). *Review of regional loading: Final report*. Accessed 9 January 2017, https://docs.education.gov.au/system/files/doc/other/regional_loading_final_report.pdf
- Dow, K. L. (2011). *Review of student income support reforms*. Canberra: Department of Education, Employment and Workplace Relations.
- Drummond, A., Halsey, R., & van Breda, M. (2011). The perceived importance of university presence in rural Australia. *Education in Rural Australia*, 21(2), 1–18.
- Education and Training Committee. (2009). *Inquiry into geographical differences in the rate in which Victorian students participate in higher education – Final report*. Melbourne: Author.

- Edwards, D., & McMillan, J. (2015). *Completing university in Australia: A cohort analysis exploring equity group outcomes*. Camberwell, Vic: Australian Council for Educational Research.
- Fleming, M. J., & Grace, D. M. (2015). Beyond aspirations: Addressing the unique barriers faced by rural Australian students contemplating university. *Journal of Further and Higher Education*, 1-13.
- Freeman, B., Klatt, M., & Polesel, J. (2014). *Deferring a university offer in regional Victoria. Final report*. Melbourne: Youth Affairs Council of Victoria.
- Gale, T., Hattam, R., Comber, B., Tranter, D., Bills, D., Sellar, S., & Parker, S. (2010). *Interventions early in school as a means to improve higher education outcomes for disadvantaged students*. Adelaide: National Centre for Student Equity in Higher Education.
- Godden, N. (2007). *Regional young people and youth allowance: Access to tertiary education*. Wagga Wagga, NSW: Centre for Rural Social Research.
- Golding, B., Barnett, C., Brown, M., Angus, L., and Harvey, J. (2007). *Everything is harder*. Melbourne: Parliament of Victoria.
- Harvey, A., Brett, M., Cardak, B., Sheridan, A., Stratford, J., Tootell, N., McAllister, R. & Spicer, R. (2016). *The adaptation of tertiary admissions practices to growth and diversity. Report for the Australian Government Department of Education and Training*. Melbourne: La Trobe University.
- Harvey, A., Burnheim, C., & Brett, M. (2016). Towards a fairer chance for all: Revising the Australian student equity framework. In A. Harvey, C. Burnheim & M. Brett (Eds.), *Student equity in Australian higher education* (pp. 3-20). Singapore: Springer.
- Harvey, A., Burnheim, C., Joschko, L., & Luckman, M. (2012). *From aspiration to destination: Understanding the decisions of university applicants in regional Victoria*. Deakin, ACT: Australian Association for Research in Education.
- Higher Education Infrastructure Working Group. (2016) *Higher Education Infrastructure Working Group Final report*. Canberra: Department of Education and Training.
- Homel, J., Mavisakalyan, A., Nguyen, H. T., & Ryan, C. (2012). *School completion: What we learn from different measures of family background* [Longitudinal Surveys of Australian Youth Research Report 59]. Adelaide: National Centre for Vocational Education Research.
- James, R., Baldwin, G., & McInnis, C. (1999a). *Which university?: The factors influencing the choices of prospective undergraduates* [Evaluations and Investigations Program Report 99/3]. Canberra: Department of Education, Training and Youth Affairs.
- James, R., Bexley, E., Anderson, A., Devlin, M., Garnett, R., Marginson, S., & Maxwell, L. (2008). *Participation and equity: A review of the participation in higher education of people from low socioeconomic backgrounds and Indigenous people*. Melbourne: Centre for the Study of Higher Education, University of Melbourne.
- James, R., Krause, K. & Jennings, C. (2010). *The first year experience in Australian universities: Findings from 1994 to 2009*. Melbourne: Centre for the Study of Higher Education, University of Melbourne.
- James, R., Wyn, J., Baldwin, G., Hepworth, G., McInnis, C., & Stephanou, A. (1999b). *Rural and isolated school students and their higher education choices: A re-examination of student location, socioeconomic background, and educational advantage and disadvantage* [Commissioned report]. Canberra : National Board of Employment, Education and Training, Higher Education Council.

- Kenyon, P., Sercombe, H., Black, A., & Lhuede, D. (2001). *Creating better educational and employment opportunities for rural young people*. Hobart: Australian Clearinghouse for Youth Studies.
- Khoo, S. T., & Ainley, J. (2005). *Attitudes, intention and participation* [LSAY research report no.41]. Melbourne: Australian Council for Educational Research.
- Kilpatrick, S., & Abbott-Chapman, J. (2002). Rural young people's work/study priorities and aspirations: The influence of family social capital. *Australian Educational Researcher*, 29(1), 43–67.
- Krause, K., Vick, M., Boon, H., Bland, D., & Clark, J. (2009). *A fair go beyond the school gate. Systemic factors affecting participation and attainment in tertiary education by Queensland students from LSES backgrounds*. Brisbane: Queensland Department of Education and Training.
- Lamb, S., Glover, S., & Walstab, A. (2014). *Session K – Educational disadvantage in regional and rural schools*. Paper delivered at ACER Research Conference 2014: Quality and Equality: What Does Research Tell Us?, Adelaide Convention Centre, 3–5 August.
- Le, A. T., & Miller, P. W. (2005). Participation in higher education: equity and access?. *Economic Record*, 81(253), 152-165.
- Lim, P. (2011). *Weighting the LSAY program of international student assessment cohorts*. Adelaide: National Council for Vocational Education Research.
- Marks, G. (forthcoming). Is SES really that important for educational outcomes in Australia? A review and some recent evidence. *Australian Educational Researcher*. doi:10.1007/s13384-016-0219-2
- Martin, L. M. (1994). *Equity and general performance indicators in higher education: Equity indicators; vol. 1*. Canberra: Australian Government Publishing Service.
- National Tertiary Education Union. (2011). *Submission to the Review of Student Income Support Reforms*. South Melbourne: Author.
- Naylor, R., Baik, C., & James, R. (2013). *A critical interventions framework for advancing equity in higher education* [Commissioned by the Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education]. Melbourne: Centre for the Study of Higher Education, University of Melbourne.
- Nelson, B. (2003). *Our universities: Backing Australia's future*. Canberra: Department of Education, Science and Training.
- New South Wales Legislative Council. (1850). *Votes and proceedings of the Legislative Council during the session of the year 1850. Vol. 1*. Sydney: Government Printing Office. Accessed 15 December 2016, <https://www.parliament.nsw.gov.au/hansard/Pages/Comprehensive-index-to-all-parliamentary-document.aspx>
- Office of Youth Affairs and Family. (1998). *Tasmania's rural and isolated young people: Issues, solutions and strategies: Report of a community consultation with young people, government, youth and community organisations, in rural and isolated communities*. Hobart: Author.
- PhillipsKPA. (2009). *A new national university in regional Australia – Feasibility study. Stage 1: Needs analysis*. Bathurst: Charles Sturt University.
- Polesel, J. (2009). Deferring a university offer in rural Australia. *Australian Journal of Education*, 53(1), 87–103.

- Polesel, J., Leahy, M., Gillis, S., Dulhunty, M., & Calvito, L. (2013). *Expectations and destinations of NSW senior secondary students: Research report*. Melbourne: University of Melbourne.
- Polidano, B. A., & Ryan, C. (2016). *What happens to students with low reading proficiency at 15? Evidence from Australia* [Working Paper No. 33/16]. Melbourne: Melbourne Institute of Applied Economic and Social Research, University of Melbourne
- Productivity Commission. (2016). *Steering Committee for the Review of Government Service Provision – Report on government services*. Canberra: Author.
- Regional Policy Advisory Committee. (2013). *Research into education aspiration for regional Victoria: Full report*. Melbourne: State of Victoria
- Richardson, S. (2011). Higher education & community benefits: The role of regional provision. *Joining the Dots Research Briefings*, 1(5).
- Robinson, L., & Lamb, S. (2009). *How young people are faring '09: The national report on the learning and work situation of young Australians*. Sydney: Foundation for Young Australians.
- Rothman, S. (2007). *Sampling and weighting of the 2003 LSAY cohort* [Longitudinal surveys of Australian youth technical paper 43]. Camberwell, Vic: Australian Council for Educational Research.
- Senate, Rural and Regional Affairs and Transport References Committee. (2009). *Rural and regional access to secondary and tertiary education opportunities*. Canberra: Author.
- Southern Cross University. (2009). *Submission to Senate Rural and Regional Affairs and Transport Committee Inquiry into Rural and Regional Access to Secondary and Tertiary Education Opportunities*. Lismore: Author.
- University Act 1904 (Vic)*. Accessed 18 December 2016, http://www.austlii.edu.au/au/legis/vic/hist_act/ua1904173
- University Act 1928 (Vic)*. Accessed 18 December 2016, http://www.austlii.edu.au/au/legis/vic/hist_act/ua1928173
- Williams, T., M. Long, P. Carpenter and M. Hayden (1993). *Year 12 in the 1980s*. AGPS: Canberra.
- Wooldridge, J. M. (2009). *Introductory Econometrics: A Modern Approach*. Mason, OH: South Western, Cengage Learning.
- Yarrow, A., Ballantyne, R., Hansford, B., Herschell, P., & Millwater, J. (1999). Teaching in rural and remote schools: A literature review. *Teaching and Teacher Education*, 15(1), 1–13.