

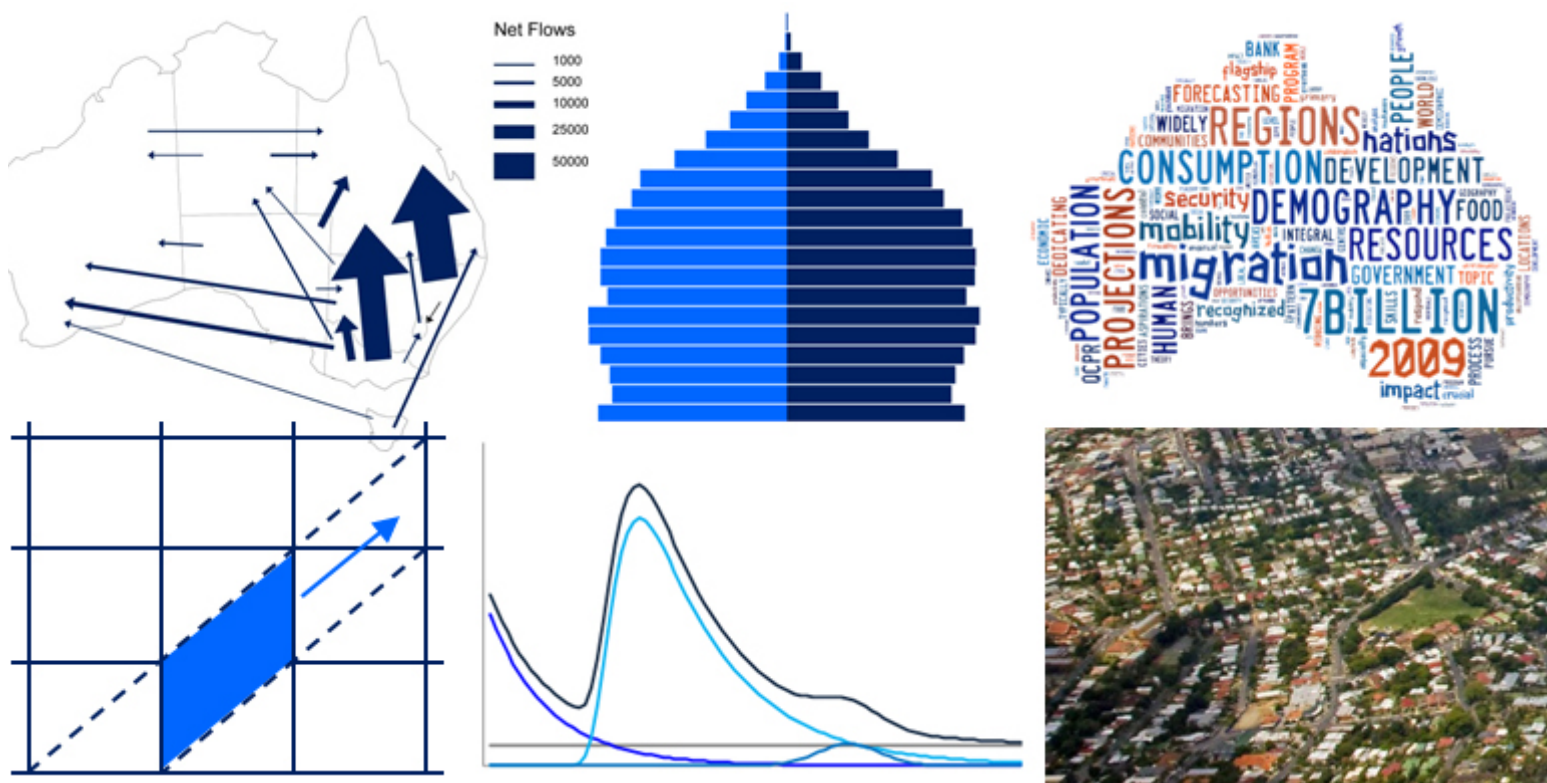
Queensland Centre for Population Research

Determinants of post-school choices of young people: The workforce, university or vocational studies?

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1. Research question and aims

Drawing on data from the 2003 Longitudinal Survey of Australian Youth (LSAY), this report addresses the second research question of the Australian Research Council (ARC) Linkage project (LP120100212): *What are the determinants of the transitions that underpin particular choices along these pathways?* Specifically, this report seeks to identify the factors that influence the post-school choices to (1) work; (2) enter university; or, (3) undertake vocational studies. Underlying the importance of this analysis, there is substantive evidence captured within (our) previous reports and research commissioned by Regional Development Victoria (RDV) that points to significant differences in educational attainment between young people brought up in metropolitan compared to those raised in regional Victoria (Rowe, Corcoran and Bell 2013; Rowe, Bell and Corcoran 2014). This research indicates that young people raised in regional Victoria are 1.13 times less likely to complete Year 12 (Regional Policy Advisory Committee 2013) and are 3.8 times less likely to complete a Bachelor degree than their metropolitan counterparts (for full details of this finding see Report 3: Rowe, Corcoran and Bell (2014b)). Conversely, regional students are 1.26 times more likely to not complete a post-school qualification (see Report 4: Rowe, Corcoran and Bell (2014a)) and 2.5 times more likely to enter full-time employment immediately after completing school than their metropolitan counterparts (DEECD 2012).

Through a review of the literature on educational attainment, prior research on Victoria has identified a range of individual, family, school and residential context factors with the potential to influence the post-school educational choices of young Victorians (Regional Policy Advisory Committee 2013). However, the relative significance of these factors has not been empirically explored in an integrated and rigorous statistical framework. Moreover, work on Victoria has yet to explore the differences in educational attainment between students who stay in regional Victoria after completing school and those who move to a metropolitan area after leaving school. This is despite evidence showing that there are significant differences in post-school educational qualification and occupational outcomes between regional stayers and regional movers (see Report 4: Rowe, Corcoran and Bell (2014a)). Young people who move from regional Victoria are 1.3 times more likely than those who stay in regional communities to enrol and complete a university qualification and to be employed in a managerial and professional occupation at the age of 23. These differences are likely to be shaped by a distinctive set of factors affecting the post-school decisions of these two groups. The significance of understanding these factors is underlined by the need to identify the key barriers and facilitators in the process of human capital development of regional students through university education. Allied to this, there is also a need to determine the extent to which factors influencing the post-school decisions of regional students differ from those affecting the post-school decisions of those living in metropolitan areas, as a result of their accessibility advantage to educational and employment opportunities.

This report aims to advance our existing knowledge by redressing these gaps in two ways: First, it seeks to determine the factors that influence the post-school educational choices of young people in an integrated multi-level analytical framework that simultaneously considers the relative importance of individual, family, school and residential-area factors on the decision to (1) undertake university studies (2) engage in vocational education or; (3), enter the workforce immediately after leaving school. Second, this report seeks to identify differences in the factors shaping the post-school educational choices of three groups of young people: regional movers, regional stayers and metropolitan stayers.

To these ends, we draw on previous literature to first develop a conceptual framework capturing the interplay of factors influencing the post-school education choices of young people. Next, we assess their relative importance by drawing on the 2003 cohort LSAY sample and multinomial logit regression models in a multilevel framework. While the original aim was to produce regression

estimates for Victoria, the data requirements of these models and small numbers of Victorian students in the LSAY sample necessitate that the analysis be based at the national level.¹

2. Conceptual framework

There is longstanding scholarly evidence that educational attainment is influenced by the combined effect of a wide range of factors (Baxter 2002; Garg et al. 2002; Booth and Kee 2009; Marks 2010). Pacione (1997) identifies factors that influence educational attainment across four dimensions: individual, family, school and residential area (Figure 1).

In regard to the first of these dimensions involving individual factors (i.e. the ‘student’), in Australia like other OECD countries, there is evidence to suggest that more intelligent, engaged and motivated students tend to achieve higher levels of educational attainment (OECD 2013; Regional Policy Advisory Committee 2013). Top performing students at school are more likely to achieve higher educational qualifications later in life than students with low school average scores (OECD 2013). Conversely, there is also evidence that students with an Aboriginal or Torres Strait Islander (ATSI) background and students who are less aware of post-educational opportunities tend to lack post-school educational aspirations, and as a result tend to achieve lower educational qualifications than non-ATSI and motivated students (Karmel et al. 2014). Gender has also been associated with differences in educational attainment; however, to date no consistent evidence has been put forward to indicate that males attain higher educational levels than females or *vice versa* (Lamb et al. 2004; OECD 2013). Peer influence have been identified as an important factor with the power to induce effects on a student’s educational attainment as undertaking a different post-school educational pathway than a peer group may involve the loss of social and emotional ties. The loss or reduction in an individual’s friendship network may result in adverse effects on the emotional health and wellbeing of students, with impacts on their educational success (Western Research Institute 2007). Government financial support to students is often seen as a major resource, assisting human capital development of young people. However, assessing the actual impacts of financial government programs on individual outcomes is complex because disentangling their effects is difficult, and because there is a lag in their manifestation (Intriligator, Bodkin and Hsiao 2002). In this report, we provide some evidence on the relationship between government support and post-school choices by exploring the influence of two government financial schemes: course fee support and living allowance financial support.

Allied to individual characteristics, family-related factors comprise a second dimension that play an important role in explaining differences in educational attainment. There is a large body of evidence that links socio-economic status to the educational attainment of students. This evidence shows that the educational level of the parent(s) is strongly correlated to that of their children (Baxter 2002; Le and Miller 2002). In Australia, particular focus has been placed on the strong association between a mother’s and children’s educational levels (Baxter 2002; Regional Policy Advisory Committee 2013). This is because students with mothers who possess a degree qualification have been found to be more likely to complete Year 12 and to undertake higher post-school educational qualifications (Frigo et al. 2007; Homel et al. 2012). It has also been proposed that parental educational aspirations may play a role in promoting further post-school education; however, it remains unclear whether it is aspirations that influence post-school achievement or achievement that influences aspirations (Frigo et al. 2007). Coupled to students’ home educational resources, the number of siblings has also been shown to represent a key factor influencing educational attainment, as a large number of siblings may limit the amount of resources available to pursue university studies (Booth and Kee 2009).

¹ Computing standard multinomial logit regressions, we were able to produce estimates on the sample of regional Victorian and Melbourne stayers, but their size and significance levels were unstable due to the exclusion/inclusion of variables. No estimates could be obtained for regional movers due to lack of convergence in the modelling algorithm. These issues provide strong reasons to base the analysis on the national sample.

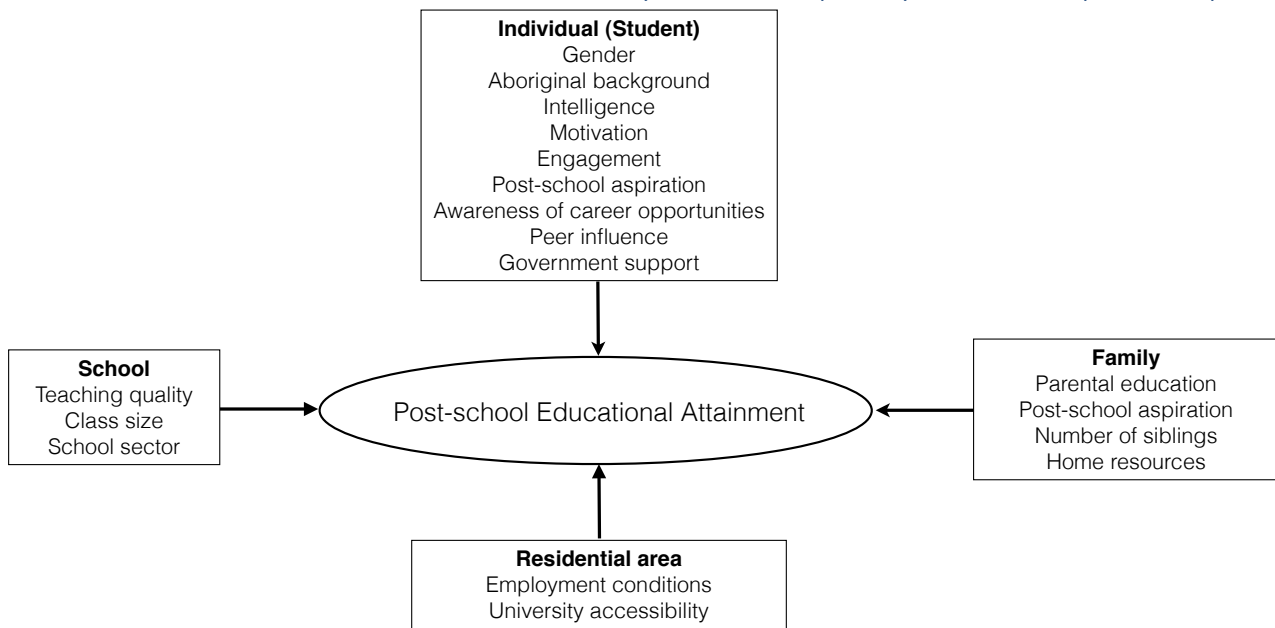


Figure 1. Factors influencing educational attainment. Adapted from Pacione (1997).

Overlapping the influence of individual and family factors, a third dimension involves school-related effects. School teaching quality and class size have been highlighted in previous literature as determinants of overall student performance. Schools with high-quality teaching and small class sizes are often associated with better school student performance which leads to higher educational attainment later on in life (Frigo et al. 2007). Additionally, Lamb and colleagues (2004) have indicated a consistent relationship between school sector and post-school choices. Here, students from government schools are found to have a lower tendency to study at university and VET institutions, but have been found to be more likely to undertake apprenticeships than students from Catholic and independent schools (Lamb et al. 2004). This association has in turn been traced to the differences in socio-economic background characteristics of the student population in government and non-government schools. Government schools tend to account for a larger share of students from low socio-economic backgrounds than Catholic and independent schools and these students tend to achieve lower academic scores (Lamb et al. 2004).

The fourth dimension is linked to the student's home. Here, regional areas have a strong tradition of early workforce participation and on-the-job training, rather than formal academic education (Western Research Institute 2007; Regional Policy Advisory Committee 2013). In part, this tradition has been attributed to lack of universities and employment options in regional areas, which limit opportunities to pursue educational qualifications that are geared towards the needs of local communities (McKenzie 2009).

This report investigates the factors that shape post-school choices of young people in Australia by assessing the relative importance of factors representing the four dimensions in a multilevel regression framework. It makes two major contributions to the existing literature on educational attainment in Australia. First, it contributes robust statistical evidence on a set of factors which have been identified as key determinants of post-school choices, but for which there is little or no empirical evidence capturing their relative importance. In addition to the traditional set of individual and family variables, such as school performance and parental education, we simultaneously assess the influence of parental and peer group aspirations, government support, employment and university accessibility on post-school choices by drawing on variables embedded in the LSAY. Second, we determine differences in the factors shaping post-school decisions for three groups of students: those who started off in a regional area and migrated to a metropolitan

area (regional movers), those who started off in and stayed in a regional area (regional stayers); and those who started off in and stayed in a metropolitan area (metropolitan stayers).

3. Methodology

3.1. Data

We draw on data from the 2003 LSAY cohort. Excluding individual records with incomplete information on place of residence and post-school choices (39.5% of records) leaves 6,276 observations. From this total, 2,719 (43%) students were identified as ‘regional movers’, 892 (14%) as ‘regional stayers’ and 2,665 (42%) as ‘metropolitan stayers’. The outcome variable ‘post-school choice’ was defined according to the post-school educational status of students one year after leaving school. Three mutually exclusive choices were defined: (1) to enter university; (2) to participate in the workforce; and, (3) to undertake vocational studies (i.e. apprenticeships/traineeships and TAFE education). In the regression modelling, four sets of explanatory variables were included to capture the influence of student, family, school and residential area-level factors. Table 1 lists and describes each of these variables.

3.2. Statistical analysis

To estimate the effects of the individual, family, school and residential area-level variables on students’ post-school choices, multilevel multinomial logistic regression models were computed. While we recognise the influence of factors at four different levels, the structure of the data only enables the specification of a three-level model. The small variability at the family level (i.e. few students from the same family in the LSAY) does not allow a four-level model. Family-level variables are incorporated at the individual level. Thus, individual and family characteristics are captured at Level 1, schools at Level 2 and residential areas at Level 3 in the multilevel multinomial logistic models (Figure 2).

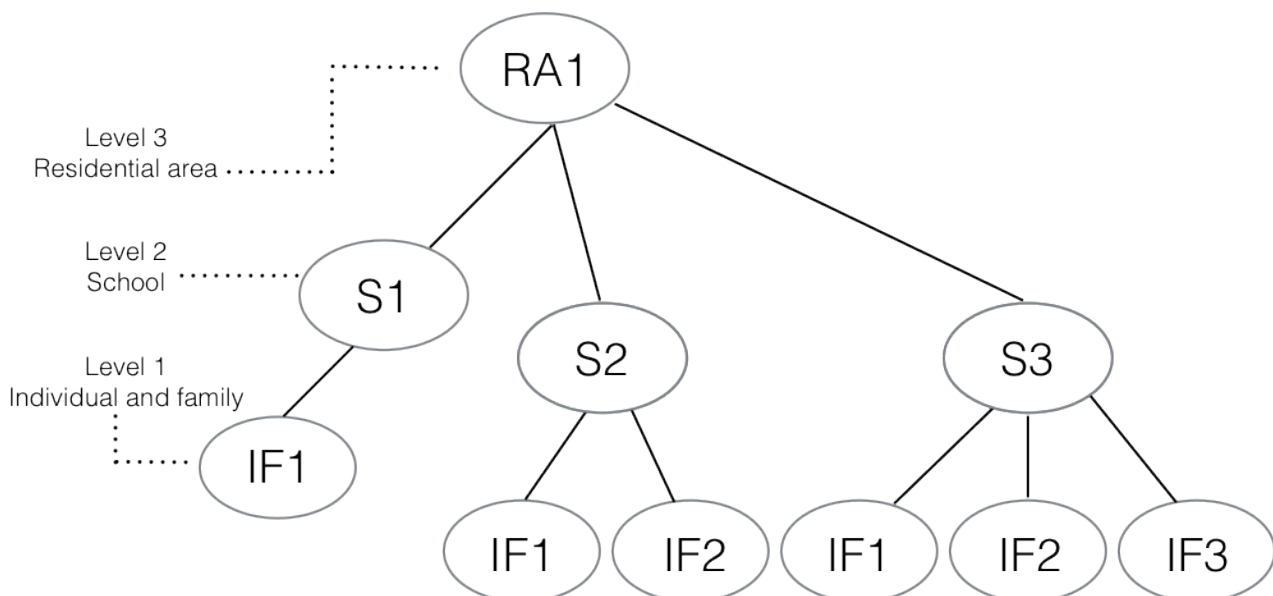


Figure 2: Multilevel structure of the data.

In addition to the observed covariates considered at each of the three levels, there are likely to be unobservable factors affecting the post-school choices of students, and these may operate at any level in the hierarchy. Failure to capture the existing hierarchical structure in the data is likely to lead to biased estimates of the observed covariates and underestimation of standard errors which severely prejudices interpretation. Multilevel modelling explicitly captures the existing hierarchical structure of the data in the estimation process, reducing the bias of estimates with the effect of overcoming these issues.

Table 1. Explanatory variables for the regression analysis.

| Variables | Description |
|------------------------------------|---|
| Student-level factors | |
| Individual variables | |
| Female | 1 if a student is female |
| ATSI | 1 if a student has Aboriginal or Torres Strait Islander origin |
| Performance | Student achievement. Following the methodology of OECD (2010), student PISA test scores are categorised into four levels of proficiency using average PISA plausible values for the areas of math, reading, science and problem solving. The four categories are: <ul style="list-style-type: none"> - Top performers: students in the 75th percentile of the average PISA score distribution. - Strong performers: students in the 50th to 75th percentile of the average PISA score distribution. - Moderate performers: students in the 25th to 50th percentile of the average PISA score distribution. - Lowest performers: students in the 0th to 25th percentile of the average PISA score distribution |
| School completion | 1 indicates whether a student completed year 12 |
| Educational engagement | This variable indicates students' engagement in education. It is measured by the average number of hours spent each week on homework or other study. |
| Student post-school aspiration | 1 indicates students aspiration to complete a university degree. |
| Awareness of career opportunities | 1 if a student was informed about educational and work opportunities by a career advisor. |
| Government financial support | |
| Course fee support | 1 if a student received government financial support to cover course fees. |
| Living allowance | 1 if a student received government financial support to cover living expenses. |
| Post-school aspirations of friends | This variable indicates a student perception of post-school aspirations to their friends. It is a categorical variable. 1 indicates post-school aspiration to work; 2 to undertake vocational studies; 3 to complete a university degree; and 0 (the base category) to perform other activities, such as travel and enter the military forces. |
| Family-level factors | |
| Mother's education level | This variable indicates a student's mother's educational level, measured on an ordinal scale from 0 to 3 according to the International Standard Classification of Occupations (ISCO) classification scheme of skills. 0 indicates primary or lower education; 1 secondary education; 2 short course of tertiary education; 3 graduate or postgraduate tertiary education. |
| Father's education level | This variable indicates a student's father's educational level and is measured as above. |

| | |
|---------------------------------|---|
| Parental post-school aspiration | This variable indicates the post-school aspiration of parents as to a student's future. It is a categorical variable: 1 indicates post-school aspiration of parents for a student to work; 2 to undertake vocational studies; 3 to complete a university degree; and 0 (the base category) to perform other activities, such as travel and enter the military forces. |
| Number of siblings | This variable indicates the number of a student's siblings |
| Home educational resources | This variable indicates home study conditions and corresponds to the PISA index of home educational resources (HEDRES) which is derived from responses to a number of items in a family's possession -desk, study area, calculators, textbooks and dictionaries. Positive values on this index indicate higher levels of home educational resources (NCVER 2012). |

School-level factors

| | |
|------------------|---|
| Teaching quality | This variable indicates students' perceptions of teaching quality. It corresponds to the average score in responses to questions on the teacher-student relationship: whether teachers get along with students, are interested in students' well-being, listen to students, provide extra help or treat students fairly. The variable is constructed based on the average score of responses to these questions which were coded on a Likert scale, ranging from 1 (low teaching quality) to 5 (high teaching quality). |
| Class size | This variable indicates the number of students in maths classes. |
| School sector | This variable indicates the sector of a school: 1 if government; 2 if Catholic; and 3 if independent. |

Residential area-level factors

| | |
|--------------------------|--|
| Employment accessibility | Number of jobs in the Statistical Area Level 4 (SA4) of residence. |
| University accessibility | Average distance from the Statistical Area Level 4 (SA4) of residence to university campuses within 100km. |

In addition to individual and family traits, post-school choices are also determined by school and residential area factors. Post-school choices of students from the same school and residential community are likely to be similar, since these students may have shared similar experiences during their childhood and schooling. Multilevel models explicitly accommodate factors acting across these different dimensions (levels) and their correlation. A three-level model is therefore employed to account for factors acting at the individual-family, school and residential-area levels. This modeling sophistication however comes at the expense of data requirements and computational costs in estimating the model. In this study, it requires an increase in the sample size and use of national data, with average processing time per model of 120 hours. By aggregating individual records, we increased the number of records from 82 for regional movers, 136 for regional stayers and 592 for metropolitan stayers with a starting location in Victoria to a national sample comprising 1,860 regional movers, 846 regional stayers and 2,515 metropolitan stayers. Appendix A shows how Statistical Areas Level 4 (SA4) were aggregated to represent Greater Capital City Statistical Areas (GCCSAs) using ABS concordance files.

The multilevel logit model estimated can be represented as follows:

$$\text{logit}(P_{ijk}) = x'_{ijk}\beta + if_{ijk} + s_{jk} + ra_k \quad (1)$$

where P_{ijk} denotes the probability of a student (i) from a school (j) nested within a residential area (k) choosing one of three post-school choices: (1) to participate in the workforce, (2) to undertake vocational studies, or (3) to enter university. $x'_{ijk}\beta$ represents a fixed component in which x symbolises the vector of explanatory variables described in Table 1 and β is the set of coefficients to be estimated. if represents a student-family-level random component assumed to follow type-1 extreme value distribution, and s_{jk} and ra_k denote the school- and residential area-level random components.

Models were estimated separately for each group of students i.e. regional movers, regional stayers and metropolitan stayers. A three-level model specification with random intercepts was estimated to measure the degree of between-school and between-residential area variance. An analysis of variance was conducted by comparing the variance estimates from a null model, in which no explanatory variables were incorporated, and a model with only individual-family-level variables, only school-level variables and only residential-area-level variables. This analysis enables us to estimate the degree of variability associated with each of these sets of variables: individual-family, school and residential-area factors.

Following Sundquist and Ahlen (2006), the proportion of school-level and residential area-level variance explained by their associated covariates was calculated as follows:

$$V_{EXPLAINED} = \frac{V_0 - V_1}{V_1} \times 100 \quad (2)$$

where V_0 is the school-level or residential area-level variance in the null model and V_1 is the school-level or residential area-level variance in the alternative models estimated.

We also measured the intra-class correlation (ICC); that is, the intra-school or intra-residential area correlation. This indicates the proportion of total variance at the school or residential area level, with values departing from zero pointing to greater similarity among the post-school choices of students within schools and residential areas. Various approaches have been suggested to estimate the ICC in a multilevel framework (Goldstein 2011). We employed the latent variable method which is typically used for multilevel logistic regressions (Snijders and Bosker 1999). The correlations between the probability of post-school choices among students from the same school and residential area are defined as:

$$ICC_s = \frac{V_{ra} + V_s}{V_{ra} + V_s + V_{if}} \text{ and } ICC_{ra} = \frac{V_{ra}}{V_{ra} + V_s + V_{if}} \quad (3)$$

V_s and V_{ra} represent the school and residential area variance respectively, and V_{if} denotes the individual level variance which is assumed to be $\pi^2/6$ in a multinomial logit context. All multilevel models were estimated using the Stata command: generalized structural equation model (gsem) estimation (StataCorp 2013). To facilitate interpretation of the modelling results, we report odds ratios. They indicate the estimated probabilities that students make a particular post-school choice relative to a base category. The base category for our dependent variable is 'university', and hence the reported odds ratios indicate the relative chances of a student choosing to participate in the workforce or to undertake vocational studies compared with entering university. An odds ratio greater than one indicates that a student is more likely to either participate in the workforce or to undertake vocational studies, rather than engaging in university education.

4. Results

Variance analysis

To provide a general understanding of the factors influencing post-school choices, we first conduct a variance analysis. This analysis indicates the variation in the data between groups and within groups. In this study, these groups are represented by the three levels: individuals and families (Level 1), schools (Level 2) and residential areas (Level 3). We are particularly interested in determining the degree of variation in post-school choices that can be attributed to each of these levels. This analysis will provide a general understanding of the set of factors that contribute to explain the post-school choices of students before we move into a modelling exercise which seeks to identify the individual factors shaping these choices.

Table 2 reports the variance components estimates from the null model related to residential areas (Level 3), schools (Level 2) and individuals and families (Level 1). The fourth column shows these components as a percentage of the total variance. These statistics estimate the proportion of the variance in post-school choices that can be attributed respectively to (1) students and their families, (2) schools and (3) residential communities. Averaging the figures in the fourth column of Table 2 indicates that three-quarters of the differences in students' post-school choices are due to individual and family attributes. Less than one-fifth is due to differences in schools and only around five per cent is attributable to differences in the residential context of students. These results indicate that differences between students and their families, such as aspirations, intelligence, family size and socio-economic status are the main source of variability in the post-school choices of young people.

Table 2. Variance component estimates.

| Random effect | Variance component | SE | Share of total variance (%) | Explained variance (%) | ICC |
|-----------------------------|--------------------|-------|-----------------------------|------------------------|------|
| Regional movers | | | | | |
| Individual-Family level | 1.645 | 1.000 | 78.1 | | |
| School level | 0.386 | 0.137 | 18.3 | 64.5 | 21.9 |
| Residential area level | 0.076 | 0.077 | 3.6 | 86.8 | 3.6 |
| Regional stayers | | | | | |
| Individual-Family level | 1.645 | 1.000 | 72.9 | | |
| School level | 0.508 | 0.209 | 22.5 | 40.6 | 27.1 |
| Residential area level | 0.102 | 0.122 | 4.5 | 38.2 | 4.5 |
| Metropolitan stayers | | | | | |
| Individual-Family level | 1.645 | 1.000 | 77.9 | | |
| School level | 0.293 | 0.089 | 13.9 | 38.9 | 22.1 |
| Residential area level | 0.173 | 0.075 | 8.2 | 30.1 | 8.2 |

Source: Authors' estimates based on 2003 cohort LSAY data.

While this profile reflects the dominant pattern for our three groups (i.e. regional movers, regional stayers and metropolitan stayers), there are important differences in the share of total variance. Regional movers display a smaller share of residential-area-level variability than metropolitan stayers and a smaller share of school-level variance than regional stayers; and also a lower ICC score at the residential area level. These results indicate that individual and family attributes contribute to explain most of the variability in the post-school choices of regional movers than of that of regional and metropolitan stayers. Additionally, the share of residential-area-level variance for metropolitan stayers is larger than for regional movers and regional stayers, indicating that of residential-area factors explain a larger proportion of the variance in post-school choices of metropolitan students than regional students.

To assess the explanatory power of school- and residential-area-level factors in students' post-school choices, we explore changes in the size of the variance component estimates after controlling for variables contributing to the variability at these levels. This analysis provides an estimate of the extent to which factors relating to schools and residential areas influence their post-school choices, rather than factors associated with students and their families. To this end, the variance component estimates (random coefficients) from the null model and two models incorporating only school-level variables or only residential-area-level variables are compared. The fourth column in Table 2 presents the results. For regional movers, the estimates show that the combined influence of class size, teaching quality and sector of school where they studied explains 65 per cent of the variance between schools, and the effects of employment and university accessibility from students' residential locations explain 87 per cent of variance between residential areas. These shares of explained variance are larger than those of regional and metropolitan stayers. For the latter two groups of students, these school-level and residential-area factors explain less than two-fifths of variability between schools and residential areas, pointing to the importance of other factors associated with schools and residential areas that are not considered in the model.

Taken together, these results indicate that while there are differences in the factors shaping the post-school choices of regional movers, regional and metropolitan stayers, individual-family factors explain most of the variability in post-school choices across all three groups. To identify the particular individual-family factors shaping the post-school choices of these students, we now examine the results from the multilevel multinomial logit model.

Regression results

Table 3 presents estimates from the regression model including variables for all three levels: individual-family, school and residential-area. The overall picture emerging from these estimates is that individual factors are more influential in explaining the post-school choices of young people than family, school or residential area attributes. Individual factors consistently display high levels of significance across the three groups of students and post-school choices. This evidence indicates that, rather than family characteristics, it is individual attributes that contribute most of the over three-quarters of individual- family-level variability in students' post-school choices reported in Table 2.

Table 3 also reveals that while the influence of individual-level and residential-area-level variables is consistent across regional movers, regional stayers and metropolitan stayers, family- and school-related factors operate in a very distinct manner in shaping the post-school decisions of these three groups. We first focus on similarities in the range of variables influencing the decision to undertake university education, enter the workforce or engage in vocational education, and then on differences across the three groups of students.

The results show that students with an ATSI background, high PISA exam scores and those who completed Year 12 display a higher probability of undertaking university education than entering the workforce or taking on vocational education. Similarly, students who spent more hours studying and manifested their intention to complete a university degree at school show a higher probability of choosing a university course over engaging in the workforce or vocational studies after leaving school. What is surprising from these results is the positive association between having a high probability of undertaking university studies and possessing an ATSI background, as this contrasts with existing literature (Biddle 2014; Mission Australia 2014). It well documented that ATSI students tend to achieve low levels of educational attainment and lack of post-school educational aspirations (Biddle 2014; Mission Australia 2014). Rather than conclusive, our finding is thought to be indicative due to the small sample size of ATSI students in the LSAY (Biddle 2014, p. 18).

Table 3. Odds ratios and variance component estimates for post-school choices: regional movers, regional stayers and metropolitan stayers.

| Variables (base category) | Regional movers | | Regional stayers | | Metro stayers | |
|---|-----------------|------------|------------------|------------|---------------|------------|
| | Workforce | Vocational | Workforce | Vocational | Workforce | Vocational |
| Student-level | | | | | | |
| Female | 0.750 | 0.452*** | 1.876* | 0.954 | 1.134 | 0.793 |
| ATSI | 1.366 | 1.114 | 1.074 | 0.774 | 1.216 | 1.698 |
| PISA student performance (Lowest) | | | | | | |
| Moderate | 0.427* | 0.499* | 0.574 | 0.826 | 1.070 | 1.060 |
| Strong | 0.266*** | 0.313*** | 0.769 | 0.886 | 0.523** | 0.548* |
| Top | 0.171*** | 0.158*** | 0.483 | 0.480 | 0.430*** | 0.308*** |
| Year 12 complete | 0.658* | 0.669* | 0.179* | 0.118** | 0.216*** | 0.276*** |
| Student engagement | 0.992 | 0.991 | 0.928* | 0.969 | 0.990 | 0.993 |
| Student post-school aspiration | 0.280*** | 0.217*** | 0.198*** | 0.132*** | 0.507*** | 0.380*** |
| Awareness of career opportunities | 1.142 | 1.176 | 1.094 | 1.023 | 0.995 | 1.132 |
| Government financial support | | | | | | |
| Course fee support | 0.143*** | 0.0836*** | 0.0303*** | 0.0234*** | 0.0939*** | 0.0378*** |
| Living allowance | 3.416*** | 1.915 | 3.808*** | 2.261* | 2.742*** | 2.771*** |
| Post-school aspirations of friends (Others) | | | | | | |
| Work | 1.766 | 1.488 | 1.124 | 0.932 | 1.275 | 1.273 |
| Vocational | 2.249 | 3.545** | 1.492 | 1.492 | 1.401 | 1.650 |
| University | 0.616** | 0.668 | 0.563* | 0.572 | 0.574*** | 0.619** |
| Family-level | | | | | | |
| Parental aspirations (Others) | | | | | | |
| Work | 1.081 | 0.904 | 0.966 | 1.595 | 1.221 | 1.320 |
| Vocational | 1.247 | 1.562 | 0.797 | 1.156 | 1.143 | 1.320 |
| University | 0.911 | 1.070 | 1.239 | 1.669 | 0.765 | 0.974 |

Table 3 Continues.

| | | | | | | |
|---|----------|---------|---------|-------|----------|-----------|
| Mother's education (Primary or education) | | | | | | |
| Secondary | 0.991 | 0.497 | 0.997 | 1.008 | 1.445 | 1.837 |
| Tertiary | 1.136 | 0.789 | 0.985 | 0.760 | 1.393 | 1.476 |
| Postgraduate | 1.369 | 0.717 | 1.423 | 1.217 | 1.571 | 1.111 |
| Father's education (Primary or education) | | | | | | |
| Secondary | 0.686 | 0.878 | 2.755 | 1.739 | 1.671 | 0.838 |
| Tertiary | 0.517 | 0.598 | 3.409 | 2.484 | 1.498 | 0.970 |
| Postgraduate | 0.549 | 0.600 | 2.782 | 2.210 | 1.509 | 0.815 |
| Number of sibilings | 1.200** | 1.137 | 0.990 | 1.042 | 1.047 | 0.948 |
| Home educational resources | 0.854 | 1.024 | 1.200 | 1.098 | 0.903 | 0.987 |
| School-level | | | | | | |
| Teaching quality | 1.113 | 0.847 | 1.461 | 3.521 | 0.474 | 0.224* |
| Sector (Government) | | | | | | |
| Catholic | 1.058 | 0.757 | 0.977 | 0.867 | 1.107 | 1.464* |
| Independent | 1.244 | 0.389** | 1.543 | 0.467 | 1.674** | 1.755* |
| Class size | 1.040 | 1.078* | 0.946 | 0.970 | 1.021 | 1.035 |
| Residential area-level | | | | | | |
| Employment accessibility | 0.773 | 0.719* | 0.812 | 0.693 | 0.981 | 1.040 |
| University accessibility | 0.954 | 0.964 | 0.888 | 1.101 | 0.884 | 1.002 |
| Intercept | 12.850 | 15.700 | 103.900 | 5.647 | 129.2** | 1117.1*** |
| Random effects: variance component | | | | | | |
| School level | 0.000 | | 0.643 | | 0.000 | |
| Residential area level | 0.179 | | 0.064 | | 0.079* | |
| N | 1,860.0 | | 846.0 | | 2,515.0 | |
| pseudo R-sq | 0.21 | | 0.27 | | 0.26 | |
| AIC | 3,098.7 | | 1,444.3 | | 4,039.4 | |
| Log likelihood | -1,484.3 | | -656.2 | | -1,954.7 | |

Estimates based on the 2003 LSAY cohort.

The results also reveal the significant influence of government financial support on students' post-school choices. Students receiving financial assistance to cover post-school education fees are more likely to transition into university after leaving school. These students are at least six times more likely to undertake university studies than to participate in the labour market or to engage in vocational education. Additionally, the results show that students who received Youth Allowance support at school are less likely to undertake university education. These students show a higher propensity to participate in the workforce or undertake vocational studies after leaving school, probably due to the loss of this source of income support after finishing their school studies. Together, these results point to the major role of government support in facilitating the transition of students from school into university.

In addition, the estimates reveal that post-school aspirations of friends are markedly more influential than post-school aspirations of parents on students' post-school career choices. Students with friends planning to go to university after leaving school have a consistently higher propensity to undertake university education than to transition into the workforce or vocational education. This strong relationship is, however, not present between parental post-school aspirations and students' likelihood to undertake university studies. While parental post-school aspirations appear to raise the chance of entering university after leaving school among metropolitan stayers, this does not occur among regional movers and stayers. Among regional stayers, the reverse relationship appears to be the dominant pattern, indicating that despite parental aspirations, students are more likely to enter the workforce or undertake vocational education. Rather than an unwillingness of students to study at university, this may reflect the scarce career opportunities in regional areas of Australia.

Our results also suggest that the educational level of parents is not a significant determinant of their children's post-school choices. There is no strong correlation between the parental level of education and the decision to undertake university education. Regardless of the father's educational attainment, regional stayers appear less likely to attend university than to participate in the labour force or to undertake vocational studies. In contrast, regional movers are more likely to undertake university studies than to enter the workforce or engage in vocational education despite their father's education level. This probably reflects the role played by migration as a mechanism to access higher university education.

Table 3 also shows that there is a higher chance that students with mothers who have postgraduate qualifications will enter the labour force or undertake vocational education than enrol in a university course. This is unexpected and seems to contrast with previous work as higher levels of educational attainment among mothers are typically linked to higher educational attainment among their children (Baxter 2002; Frigo et al. 2007). A careful investigation of the LSAY data provides a logical explanation. Consistent with previous LSAY-based research (Lumsden and Stanwick 2012), over seventy five per cent of students with a mother holding a postgraduate qualifications have a gap year, spending one year in the workforce prior to enrolling in a university course.

While school-level factors are less influential than individual-level attributes, these factors appear to exert a significant effect on the post-school choices of regional movers and metropolitan stayers to undertake vocational education, rather than university studies. For regional movers, studying in a small class and in an independent non-government school significantly increase the probability of entering university over that of enrolling in a vocational course. For metropolitan stayers, it is high teaching quality and having studied in a government school that elevate the propensity to transition into university over vocational education. These results indicate that the school sector has a very different effect on students from regional locations and metropolitan areas, perhaps pointing to the higher teaching quality of government schools in metropolitan areas (Lamb et al. 2004).

Residential-area-level factors also play an important role in shaping post-school choices. Results suggest, however, that these factors are less influential than individual-level variables and only exert significant effects on the post-school choices of regional movers, specifically the decision to enrol in university or vocational education. Regional movers starting off in areas with high

employment accessibility display a higher probability of studying at university compared to a vocational institution. This is consistent with our previous findings that young people starting off in a regional location and moving to a metropolitan area are more likely to undertake university education, rather than vocational studies. Vocational education is a more common post-school pathway among those students who stayed in regional areas (see Report 4: Rowe, Corcoran and Bell (2014a)). In addition, this finding suggests that it is students starting off in large regional centres with higher access to employment who are more likely to enrol in university, as opposed to students brought up in smaller regional towns with low employment accessibility.

University accessibility has also been indicated as a key factor that influences post-school choices (McKenzie 2009; Regional Policy Advisory Committee 2013). While our estimates indicate that the influence of university accessibility is not significant, they display a logical result. They point to a higher probability of undertaking university education over vocational studies for regional movers from areas at a greater average distance from university campuses, and a lower likelihood of undertaking university education over vocational studies for regional stayers from areas with low university accessibility. These results are likely to reflect the limited supply of university education in regional Australia, and the fact that most students raised in regional areas need to migrate to gain access to university education.

Table 4 provides a summary of the factors that were found to significantly influence the educational decision of regional movers, regional stayers and metropolitan stayers after leaving school. Factors with a positive (or negative) influence on the probability to study a university course are denoted by a plus sign (or a negative sign). One sign is used to indicate odds ratios that are significant at a p-value of less than five per cent, and two signs to denote odds ratios that are significant at a p-value of less than five per cent and that are two times the base category.

Table 4 reveals that a distinctive range of factors determine the post-school choices of regional movers, regional stayers and metropolitan stayers. While the post-school choices of all three groups of students are shaped by individual-level attributes, only the post-school decisions of regional movers are significantly influenced by both school and residential-area-level factors. Among metropolitan stayers, in addition to individual attributes, it is school-level variables that emerge as significant factors influencing their decision to go to university after leaving school.

The determinants of students' post-school choices tend to act in very similar ways in influencing their decision to transition into university after leaving school for regional movers, regional stayers and metropolitan stayers. Thus, for instance, having completed Year 12, aspiring to complete a university degree after leaving school, and receiving government financial support to cover school course fees are all factors that raise the probability of studying a university course over undertaking vocational studies or entering the workforce.

However, particular individual and school-level factors exert a very distinct impact on the post-school decisions of our three groups of students. Gender and school sector affect the probability of regional movers, regional stayers and metropolitan stayers in different ways. Being female increases the probability of studying a university degree over a vocational qualification among regional movers, but it decreases the probability of entering university relative to that of participating in the workforce among regional stayers, suggesting that female students are more likely to engage in the labour market when they do not migrate and stay on in regional areas after leaving school.

Taken together, the results of the regression analysis suggest that the post-school choices of regional movers, regional stayers and metropolitan stayers are influenced by a distinctive set of factors. While individual, family, school and residential area factors all contribute to shape post-school choices, individual characteristics emerge as the most influential determinants, whereas family attributes appeared as the least significant factors.

Table 4. Summary table of the factors that influence post-school choices of regional movers, regional stayers and metropolitan stayers.

| Variables (base category) | Regional movers | | Regional stayers | | Metro stayers | |
|---|-----------------|------------|------------------|------------|---------------|------------|
| | Workforce | Vocational | Workforce | Vocational | Workforce | Vocational |
| Student-level | | | | | | |
| Female (Male) | | ++ | -- | | | |
| PISA student performance (Lowest) | | | | | | |
| Moderate | ++ | ++ | | | | |
| Strong | ++ | ++ | | | + | + |
| Top | ++ | ++ | | | ++ | ++ |
| Year 12 complete | + | + | ++ | ++ | ++ | ++ |
| Student engagement | | | + | | | |
| Student post-school aspiration | ++ | ++ | ++ | ++ | + | ++ |
| Government financial support | | | | | | |
| Course fee support | ++ | ++ | ++ | ++ | ++ | ++ |
| Living allowance | -- | | -- | -- | -- | -- |
| Post-school aspirations of friends (Others) | | | | | | |
| Work | | | | | | |
| Vocational | | -- | | | | |
| University | + | | + | | + | + |
| Number of siblings | - | | | | | |
| School-level | | | | | | |
| Teaching quality | | | | | | ++ |
| Sector (Government) | | | | | | |
| Catholic | | | | | | - |
| Independent | | ++ | | | - | - |
| Class size | | + | | | | |
| Residential area-level | | | | | | |
| Employment accessibility | | + | | | | |

Note: +: factors increasing the probability to study a university course with a p-value < 5%. ++: factors increasing the probability to study a university course with a p-value > 5%. -: factors decreasing the probability to study a university course with a p-value < 5%. --: factors decreasing the probability to study a university course with a p-value > 5%.

5. Discussion and conclusions

Education and skills are critical for local economic growth and regional development. As such, metropolitan areas and regional communities around the world are seeking to reinforce their local human capital base. However rates of educational attainment tend to be lower in regional areas than metropolitan centres. In Victoria, compared to metropolitan-based students, their regional counterparts tend to be less likely to complete a university degree and more likely to transition into the workforce or undertake vocational education after leaving school. There is a group of young regional Victorians, however, who have displayed better educational and employment outcomes. Regional Victorians who move to a metropolitan area after leaving school tend to achieve higher levels of educational attainment than those who remain in regional localities. Students migrating from regional areas after leaving school are more likely to have complete Year 12 and to finish a Bachelor-level qualification than their counterparts who remain in regional Victoria after leaving school.

To identify the factors underlying these differences in students' educational attainment, this report investigated individual, family, school and residential-area-level variables influencing the post-school choices of three groups of students: regional movers, regional stayers and metropolitan stayers. Using the 2003 cohort LSAY data, we examined the factors that influence the probability of participating in the labour force, entering university and undertaking vocational education in a three-level multinomial logit regression framework.

The evidence assembled from the analysis presented in this report indicates that the post-school choices of regional movers, regional stayers and metropolitan stayers are shaped by a distinctive combination of factors. Individual attributes are the only significant factors influencing the decision of regional stayers to undertake university education. In addition to individual attributes, the post-school choices of metropolitan stayers are also shaped by school-level factors. The post-school choices of regional movers are determined by the combined effect of individual, school and residential-area-level factors. The influence of residential-area-level characteristics on regional movers' post-school choices is associated with employment accessibility. Regional movers starting off in regional areas with relatively high employment accessibility are more likely than those starting off in regional localities with limited access opportunities to undertake university studies, rather than vocational education. This appears to be counterintuitive as higher accessibility may be expected to increase the chances of taking up a job and not undertaking education. However, this result suggests that higher access to job opportunities is a surrogate for opportunities in a more general sense, indicating that students from more marginalised areas are less likely to undertake university studies. These areas are home to some of the most socio-economically disadvantaged groups of the Australian population and thus less capable to afford university fees. This identifies disadvantage group of people that could represent a key target of government policy.

Our results also reveal that individual characteristics are the most significant determinants of students' post-school choices, whereas family attributes appear to exert the least significant influence. Although less important than individual characteristics, school and residential-area level factors also appear as significant variables shaping the post-school decision of students to enter university, over other pathways transitioning into the workforce or vocational education. While most individual-level factors influence students' post-school choices in very similar ways, school and residential-area-level attributes operate in a distinctive manner shaping the post-school choices of regional movers and metropolitan stayers. Here, it is studying in a small class and in non-government independent schools that significantly increase the probability of undertaking university education among regional movers. Meanwhile, studying in a government school and high teaching quality are the key factors elevating the propensity to study a university degree among metropolitan stayers, pointing thus to the higher teaching quality of government schools in metropolitan areas compared to those in regional locales (Lamb et al. 2004).

Generally, our findings that highlight the influence of individual and school-level attributes are consistent with existing published evidence (e.g. Lamb et al. 2004; Marks 2010; DEECD 2012). Students with a 12 Year qualification, high performance scores, aspirations to attend university, strong study engagement and having completed studies in a high-quality teaching school have a higher probability of undertaking university education after leaving school. However, in contrast to previous studies (Frigo et al. 2007), our results indicate that family and residential attributes seem to exert only a modest influence on shaping post-school choices. Specifically, parental education and aspirations on student post-school attainment did not appear to significantly influence the post-school choices of their children, while previous studies have suggested that these factors are likely to comprise key determinants (Carpenter and Western 1984; Garg et al. 2002). Similarly, whereas prior work has indicated that having limited university accessibility is a major factor that prevents non-metropolitan students from undertaking university education (Regional Policy Advisory Committee 2013; Monash University 2006), our results revealed that its influence is not statistically significant. Consistent with our other findings, this indicates that the lack of local universities *per se* does not determine the post-school decisions of students but social remoteness more generally.

As an addition to the existing literature, we examined the effects of friendship aspirations and government financial support on shaping students' post-school choices. These factors have remained underexplored in empirical studies despite well-established theoretical links to post-school choices (e.g. Frigo et al. 2007), perhaps due to a lack of data capturing this dimension. Surprisingly, our findings indicated that government financial support and the post-school plans of friends are more influential than parental aspirations in shaping the post-school choices of students. Students with friends planning to enter university and receiving government financial support are more likely to undertake university education than vocational studies or work.

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Appendix A. Concordance Statistical Area Level 4 to Greater Capital City.

| SA4 CODE | SA4 NAME | GCC CODE | GCC_NAME |
|----------|--|-------------|-------------------|
| 101 | Capital Region | 1RNSW | Rest of NSW |
| 102 | Central Coast | 1GSYD | Greater Sydney |
| 103 | Central West | 1RNSW | Rest of NSW |
| 104 | Coffs Harbour - Grafton | 1RNSW | Rest of NSW |
| 105 | Far West and Orana | 1RNSW | Rest of NSW |
| 106 | Hunter Valley exc Newcastle | 1RNSW | Rest of NSW |
| 107 | Illawarra | 1RNSW | Rest of NSW |
| 108 | Mid North Coast | 1RNSW | Rest of NSW |
| 109 | Murray | 1RNSW | Rest of NSW |
| 110 | New England and North West | 1RNSW | Rest of NSW |
| 111 | Newcastle and Lake Macquarie | 1RNSW | Rest of NSW |
| 112 | Richmond - Tweed | 1RNSW | Rest of NSW |
| 113 | Riverina | 1RNSW | Rest of NSW |
| 114 | Southern Highlands and Shoalhaven Sydney - Baulkham Hills and | 1RNSW | Rest of NSW |
| 115 | Hawkesbury | 1GSYD | Greater Sydney |
| 116 | Sydney - Blacktown | 1GSYD | Greater Sydney |
| 117 | Sydney - City and Inner South | 1GSYD | Greater Sydney |
| 118 | Sydney - Eastern Suburbs | 1GSYD | Greater Sydney |
| 119 | Sydney - Inner South West | 1GSYD | Greater Sydney |
| 120 | Sydney - Inner West | 1GSYD | Greater Sydney |
| 121 | Sydney - North Sydney and Hornsby | 1GSYD | Greater Sydney |
| 122 | Sydney - Northern Beaches | 1GSYD | Greater Sydney |
| 123 | Sydney - Outer South West Sydney - Outer West and Blue | 1GSYD | Greater Sydney |
| 124 | Mountains | 1GSYD | Greater Sydney |
| 125 | Sydney - Parramatta | 1GSYD | Greater Sydney |
| 126 | Sydney - Ryde | 1GSYD | Greater Sydney |
| 127 | Sydney - South West | 1GSYD | Greater Sydney |
| 128 | Sydney - Sutherland | 1GSYD | Greater Sydney |
| 201 | Ballarat | 2RVIC | Rest of Vic. |
| 202 | Bendigo | 2RVIC | Rest of Vic. |
| 203 | Geelong | 2RVIC | Rest of Vic. |
| 204 | Hume | 2RVIC | Rest of Vic. |
| 205 | Latrobe - Gippsland | 2RVIC | Rest of Vic. |
| 206 | Melbourne - Inner | 2GMEL | Greater Melbourne |
| 207 | Melbourne - Inner East | 2GMEL | Greater Melbourne |
| 208 | Melbourne - Inner South | 2GMEL | Greater Melbourne |
| 209 | Melbourne - North East | 2GMEL | Greater Melbourne |
| 210 | Melbourne - North West | 2GMEL | Greater Melbourne |
| 211 | Melbourne - Outer East | 2GMEL | Greater Melbourne |
| 212 | Melbourne - South East | 2GMEL | Greater Melbourne |
| 213 | Melbourne - West | 2GMEL | Greater Melbourne |
| 214 | Mornington Peninsula | 2GMEL | Greater Melbourne |
| 215 | North West | 2RVIC | Rest of Vic. |
| 216 | Shepparton | 2RVIC | Rest of Vic. |
| 217 | Warrnambool and South West | 2RVIC | Rest of Vic. |
| 301 | Brisbane - East | 3GBRI | Greater Brisbane |

| | | | |
|-----|--------------------------------|-------|------------------------------|
| 302 | Brisbane - North | 3GBRI | Greater Brisbane |
| 303 | Brisbane - South | 3GBRI | Greater Brisbane |
| 304 | Brisbane - West | 3GBRI | Greater Brisbane |
| 305 | Brisbane Inner City | 3GBRI | Greater Brisbane |
| 306 | Cairns | 3RQLD | Rest of Qld |
| 307 | Darling Downs - Maranoa | 3RQLD | Rest of Qld |
| 308 | Fitzroy | 3RQLD | Rest of Qld |
| 309 | Gold Coast | 3RQLD | Rest of Qld |
| 310 | Ipswich | 3GBRI | Greater Brisbane |
| 311 | Logan - Beaudesert | 3GBRI | Greater Brisbane |
| 312 | Mackay | 3RQLD | Rest of Qld |
| 313 | Moreton Bay - North | 3GBRI | Greater Brisbane |
| 314 | Moreton Bay - South | 3GBRI | Greater Brisbane |
| 315 | Queensland - Outback | 3RQLD | Rest of Qld |
| 316 | Sunshine Coast | 3RQLD | Rest of Qld |
| 317 | Toowoomba | 3RQLD | Rest of Qld |
| 318 | Townsville | 3RQLD | Rest of Qld |
| 319 | Wide Bay | 3RQLD | Rest of Qld |
| 401 | Adelaide - Central and Hills | 4GADE | Greater Adelaide |
| 402 | Adelaide - North | 4GADE | Greater Adelaide |
| 403 | Adelaide - South | 4GADE | Greater Adelaide |
| 404 | Adelaide - West | 4GADE | Greater Adelaide |
| 405 | Barossa - Yorke - Mid North | 4RSAU | Rest of SA |
| 406 | South Australia - Outback | 4RSAU | Rest of SA |
| 407 | South Australia - South East | 4RSAU | Rest of SA |
| 501 | Bunbury | 5RWAW | Rest of WA |
| 502 | Mandurah | 5GPER | Greater Perth |
| 503 | Perth - Inner | 5GPER | Greater Perth |
| 504 | Perth - North East | 5GPER | Greater Perth |
| 505 | Perth - North West | 5GPER | Greater Perth |
| 506 | Perth - South East | 5GPER | Greater Perth |
| 507 | Perth - South West | 5GPER | Greater Perth |
| 508 | Western Australia - Outback | 5RWAW | Rest of WA |
| 509 | Western Australia - Wheat Belt | 5RWAW | Rest of WA |
| 601 | Hobart | 6GHOB | Greater Hobart |
| 602 | Launceston and North East | 6RTAS | Rest of Tas. |
| 603 | South East | 6RTAS | Rest of Tas. |
| 604 | West and North West | 6RTAS | Rest of Tas. |
| 701 | Darwin | 7GDAR | Greater Darwin |
| 702 | Northern Territory - Outback | 7RNTE | Rest of NT |
| 801 | Australian Capital Territory | 8ACTE | Australian Capital Territory |