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Mobility: Why do University Students Move?

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1. Introduction

In 1999 approximately 11 per cent of students under 20 years old who enrolled at Australian universities moved to undertake study. In this paper we try to establish why these students moved. Is it simply because there is no university nearby or are there other reasons? This question goes to the importance of geographic access to a university and whether access drives higher education decisions. It also goes to the question of whether providing more campuses in regional Australia would entice more of the region's students to remain at home.

Even a cursory examination of the pattern of movement of young students entering university in 1999 indicates that factors other than access are likely to be important. In that year over 63,200 students, who were 19 years of age or less, enrolled at Australian universities. As Table 1 indicates 7,100 students changed their location to attend university. However, only about 2,600 of these students did not have a university within 50km of their home and just under half of all movers had a university within 25 kilometres of their home.

Table 1 Students who moved - distance to nearest university for students prior to moving

Distance to closest campus	Metropolitan based movers	Percentage of metropolitan based movers	Non-metropolitans based movers	Percentage of non-metropolitan based movers
5km or less	818	42.6	568	11.0
6 to 10km	525	27.3	239	4.6
11 to 15km	220	11.5	337	6.5
16 to 25 km	223	11.6	423	8.2
26 to 50km	119	6.2	970	18.8
51 to 75km	0	0.0	707	13.7
76 to 100km	16	0.8	615	11.9
101 to 125km	0	0.0	300	5.8
126 to 150km	0	0.0	292	5.7
More than 150km	0	0.0	704	13.7
Total	1921	100.0	5155	100.0

This study will disentangle the factors that influence the decision to stay in a region or to move to attend university. The factors included in the study are: geographic access to institutions, academic ability of the student, socio-economic status of the home region as well as personal characteristics of the student.

The main findings

Overall the findings of this study suggest that access to institutions is important but other factors are more important. In particular subject choice and academic

ability, as measured by the student's University Admissions Index (UAI), are more important than access in the student's decision to move to undertake study.

For both metropolitan students and non-metropolitan based students subject choice is a very significant factor in the decision whether or not to move. The analysis suggests that students move to study subjects, such as medicine and dentistry, that are offered at relatively few campuses. They also move to campuses that have recognised expertise in particular subjects. For non-metropolitan students a further factor is the concentration of subjects in metropolitan campuses. For example, well over 90 per cent of commencing places in economics in 1999 were in city campuses. Overall it would appear that the decision to move is not so much about access but about access to particular courses.

The impact of high UAI scores is the same for both the metropolitan and non-metropolitan student populations in that high scores are associated with a higher than average probability of moving. At the lower end of the distribution, however, metropolitan and non-metropolitan students behave differently. Metropolitan students with UAI scores in the bottom decile of the distribution have the highest propensity to move. On the other hand non-metropolitan students with a low score are half as likely to move to attend university as their counterparts in the top decile. The most interesting feature of the analysis is that even where non-metropolitan students with high UAI scores have good access to an institution they still have a higher than average propensity to move to attend university.

The influence of socio-economic circumstances such as economic resources, education and occupation structure and unemployment rate of the area are reasonably significant factors in the decision to move. However, these factors are not as important as subject choice and academic ability and the results of the analysis are not clear cut. The same holds true for gender and language background.

Overall, the implication of these findings is that greater provision of places in non-metropolitan areas will not prevent students from leaving country areas. However, there is room for optimism in that some regional universities are attractive in niche areas. The overall message for regional universities is they must focus on being attractive to local students.

¹ Students enrolled on the basis of successful completion of secondary education course at school or TAFE in the previous year were included only if completion of secondary school occurred in the last two years.

² Students were also excluded if the postcode recorded on the student enrolment file 1999 could not be validated against the 1996 census data postcode list, used in the calculation of access variables.

2. Data/Population

The information used in this study is drawn from the 1999 higher education student statistics collection. For our purpose, which is to explain why students move to undertake study, we have limited the student population to commencing students in the age group 17 to 19 years old. The rationale for this is that such students are likely to be moving for educational purposes while older students may have more varied and complicated reasons for moving.

The student population used in this study includes all commencing (new to higher education), full-time, non-overseas undergraduate students who study on-campus and enrolled in a higher education course between January and March 1999¹. The population does not include students undertaking non-award courses

At enrolment each student is asked for the postcode of their permanent home address and postcode of their semester address. A student is deemed to have moved if they reported different postcodes for these two addresses. Students who failed to record a location code for semester/term residence are not included in the study because it could not be determined whether they had moved².

Obviously any analysis on patterns of student movement has to focus on campuses rather than institutions. For example, La Trobe University has its main campus at Bundoora but also has another two metropolitan and five non-metropolitan campuses. It is the distance from a student's

permanent address to these campuses which is relevant. A list of universities and their campuses included in this study are at Appendix 1³. While the higher education data on students are for 1999, information on campus size, in equivalent full-time student units (EFTSU), is only available for 1996. Due to closures and amalgamations of some campuses over the 1996 to 1999 period some adjustments have been made. The adjustments are detailed in Appendix 1.

In total the data base for this study includes information on just over 63,200 students and approximately 160 campuses. These data are used to develop a model of student mobility. The modelling and presentation of the results are in Section 3. The results are discussed in detail at Section 4.

³ The following institutions have been excluded because they are small and run only specialised courses: Australian Film and Radio School, National Institute of Dramatic Art, Avondale College, Batchelor College, Australian Maritime College and Marcus Oldham Farm Management School.

⁴ These x,y coordinates are developed from 1996 census data compiled in the map information package attached to the Cdata96 application.

3. Modelling Student Mobility

Any student's decision to move will depend on the physical presence of institutions and also on individual student characteristics. In broad terms we expect an individual's decision to depend upon:

- access to a university;
- academic ability;
- subject choice;
- socio-economic characteristics; and
- personal characteristics such as gender and language background.

Logistic regression analysis is used to model the impact of these five groups of explanatory variables and to determine the probability of the mutually exclusive events of moving or staying in a region to study. On the basis that the decision to move or not to move is likely to be different for metropolitan and non-metropolitan students, separate logistic regressions are performed for metropolitan and non-metropolitan populations. The rationale for the precise form of the model is discussed in this section.

Access

Our initial assumption is that the further away an individual lives from universities the greater the likelihood that they will move to attend university. The approach taken here is similar to that in Stevenson et al. (2000). We assume that overall access is a function of the size of a university's campus, and that a large campus offers greater access than a small campus in the same location. Therefore, access to university for a potential student depends on the size of all university campuses (positively) and distance to all university campuses (negatively). Distance is measured from the student's home postcode to the postcode of university campuses and is calculated from the latitude and longitude coordinates for every postcode and campus⁴.

The overall access variable is defined as:

$$Access_i = \sum_j \frac{EFTSU_j}{D_{ij}^2}$$

where
i = Student's permanent home location
j = Campus location

Two adjustments are made to the measure of access. First, the access measure increases without limit as the distance approaches zero and the size of the

⁵ That is a saturation point of 550 on the access variable maximised the goodness of fit of the model.

⁶ Throughout this paper the prestige of universities is taken from *The Good Universities Guide, Australian Universities Courses and Campuses in 1999* by Ashenden and Milligan.

campuses increase. This would obviously cause difficulties in measuring access for students adjacent to large universities. To overcome this problem the minimum distance is set at 5 km on the basis that travel of this distance does not impose any constraints on attending a university. Second, the access variable in the metropolitan model is capped at 550. This value was chosen as the saturation point on the basis that the access values above 550 added nothing to the explanatory power of the model⁵.

A more sophisticated measure of access could take into account the perceived calibre of nearby universities⁶. For example, all other things being equal, good access to a university perceived as being prestigious should reduce the likelihood of moving to undertake study. For the purposes of this study we have assigned university campuses to one of five categories ranging from 1 (high prestige) to 5 (low prestige). The prestige of universities is based on the prestige ranking assigned to campuses in *The Good University Guide Australian Universities Courses and Campuses in 1999* (Ashenden and Milligan, 1999). The access to universities (classified by prestige level) is measured in a similar way to overall access and is defined as:

where

$$\text{Access}_k = \sum_j \frac{\text{EFTSU}_j \delta_{jk}}{D_{ij}^2}$$

Prestige

i = Student's permanent home location

j = Campus

k = Prestige level

where $\delta_{jk} = 1$ if campus *j* is of prestige level *k*, 0 otherwise

The prestige access variable is only included in the regression analysis for non-metropolitan students since the measure of access to universities according to their perceived prestige appears to have no influence on whether or not a metropolitan student moves to undertake study. Intuitively this makes sense since in metropolitan areas students have good access to the full range of institutions.

Subject choice

The subject that the student chooses to undertake is likely to have a significant impact on whether a student moves or not. For certain disciplines, such as veterinary science, it is highly likely that a student would need to move to undertake the course since it is offered at only a small number of universities. *Which University? The factors influencing the choices of prospective undergraduates* (James et al, 1999) which is based on a study of applications to universities in 1998, supports the view that field of study preferences are a dominant factor in deciding which institution

⁷ This involved converting the 6-digit field of study format used in DETYA's student enrolment file into the 30 subject categories used in *The Good University Guide, 2000*.

to attend. The perceived quality of a course matters to students and students may also move to those universities which have good reputations in particular fields of study.

The 30 subject choice variables used in this study are drawn from the *Good Universities Guide*⁷ and are presented in Table 2.

Table 2 Subject choice variables

Accounting	Languages
Agriculture	Law
Architecture	Mathematics
Built environment	Medicine
Business and management	Nursing
Communications	Para-legal studies
Computing and IT	Pharmacy
Creative arts	Psychology
	Rehabilitation
Dentistry	Sciences
Economics	Social work
Education and training	Sport and leisure
Engineering and technology	Surveying
Environmental studies	Tourism and hospitality
Health services and support	Veterinary science
Humanities and social science	

Academic ability

Generally speaking students with higher UAI scores have more choice than those with lower scores. We expect, therefore, that students with high scores are more likely to move. In this study we group students into deciles according to their score. Decile 1 contains students with the highest UAI scores and decile 10 contains students with the lowest scores. Students without a UAI are treated as a separate group.

Socio-economic characteristics

Social and economic circumstances are likely to have significant implications for mobility. From Stevenson et al. (2000) we know that economic resources and education and occupation status of the region have a significant effect on participation in higher education. These two socio-economic variables are represented in the analysis by the index of economic resources and the index of education and occupation which are drawn from a set of 5 socio-economic indexes produced by the Australian Bureau of Statistics (ABS). The index of economic resources captures income, expenditure, home ownership, dwelling size and car ownership of families in the regions. High index values indicate that the region has a higher proportion of families on a high income, a lower proportion of low

⁸ These two indexes were chosen from the 5 socio-economic indexes produced by the ABS. The other three indexes were excluded because they incorporate both education and income variables in the one index.

⁹ Unemployment data for SLAs were obtained from the Department of Employment, Workplace Relations and Small Business, "Occupational structure of the economy, Queensland, 1996" (Canberra, 1996). High index values indicate that a region of postcode to SLA was obtained from the ABS.

would have a high concentration of persons with higher education qualifications or undergoing further education and people being employed in higher skilled occupations⁸.

In terms of student mobility we could expect that those who are well off financially have greater scope to relocate relative to those who are less well off. On the other hand, students from relatively well off homes may be reluctant to swap relative comfort for a more frugal student lifestyle. Another consideration might be that income support to defray the costs of moving may not be readily available to reasonably well off families. Since we also know that high education and occupation status of parents tends to increase the chances of their children attending university (Stevenson et al. 2000), it is reasonable to assume that a high education and occupation status will also increase serious consideration of where and what to study.

Given that many students depend on part-time work it could be expected that availability of part-time work might influence the probability of moving. The unemployment rate is used here as a proxy for the availability of part-time employment. The rates are the unemployment rates for Statistical Local Areas (SLAs). There are approximately 1300 SLAs nationally and the SLA is the smallest geographic unit for which unemployment rates are available⁹. Using this data we can allocate an unemployment rate to each postcode. It should be noted that the unemployment rate associated with each postcode is taken as representative of its SLA and is the same as all other postcodes in that SLA.

Gender and language background

Gender and language background have consistently been found to influence behavior and outcomes in higher education and hence are included in the model. For this study we use the higher education data set standard definition: a student is said to have a non-English speaking background if they arrived in Australia less than 10 years ago and live in a home where a language other than English is spoken.

4. Discussion

The metropolitan population contains just over 49,700 students, of which approximately 1,900 (almost 4 per cent) moved to undertake study. The students from non-metropolitan communities totalled over 13,500 of which nearly 5,200 (approximately 38 per cent) moved.

The results of the regression are presented in Appendix 2. To better understand the results of the logistic regression, we have converted the regression parameters into adjusted probabilities. The adjusted probability of moving measures the probability of moving associated with a particular factor, in isolation from the impact of other factors (that is, assuming average values for all other variables).

For continuous variables (eg access) we substitute values at the 10th percentile and 90th percentile to gauge how the probability of moving varies across the range of these variables. The predicted probabilities are presented in Table 3a (metropolitan) and Table 3b (non-metropolitan).

¹⁰ The adjusted probability of the regression using mean values (2.8 per cent) differs from the proportion of movers relative to the total population (3.9 per cent). This discrepancy exists due to the non linearity of the regression model.

Table 3a Adjusted predicted probability of moving, metropolitan (per cent)

Parameter	Adjusted Probability	Adjusted Probability at the 10th percentile	Adjusted Probability at the 90th percentile
Intercept	2.8 ¹⁰		
Access		7.4	1.4
Subject choice			
Accounting	1.8		
Agriculture	15.2		
Architecture	1.6		
Built environment	1.1		
Business studies	2.0		
Communications	4.7		
Computing and IT	1.8		
Creative arts	3.0		
Dentistry	8.4		
Economics	2.9		
Education	2.6		
Engineering and technology	3.0		
Environment	2.2		
Health	3.5		
Humanities and social science	2.8		
Languages	1.4		
Law	1.5		
Mathematics	2.2		
Medicine	6.5		
Nursing	2.5		
Para legal	7.3		
Pharmacy	3.2		
Psychology	2.7		
Rehabilitation	4.0		
Science	3.9		
Social work	2.0		
Sports science	3.2		
Surveying	3.4		
Tourism	2.7		
Veterinary science	9.7		
Academic ability			
No UAI	7.5		
UAI decile 1	3.1		
UAI decile 2	2.7		
UAI decile 3	2.7		
UAI decile 4	2.3		
UAI decile 5	2.3		
UAI decile 6	2.4		
UAI decile 7	2.0		

UAI decile 8	2.2		
UAI decile 9	2.6		
UAI decile 10	3.8		
<hr/>			
Socio economic status			
Economic resources		5.4	1.3
Education and occupation		1.3	6.7
Unemployment rate		2.5	3.1
<hr/>			
Gender			
Female	2.8		
Male	2.7		
<hr/>			
Language background			
English speaking background	3.0		
Non English speaking background	2.2		

Table 3b Adjusted predicted probability of moving, non-metropolitan (per cent)

Parameter	Adjusted Probability	Adjusted Probability at the 10th percentile	Adjusted Probability at the 90th percentile
Intercept	35.9		
<hr/>			
Access			
Prestige access 1		41.0	33.0
Prestige access 2		36.4	36.1
Prestige access 3		36.6	36.2
Prestige access 4		36.3	35.8
Prestige access 5		37.1	34.5
<hr/>			
Subject choice			
Accounting	28.9		
Agriculture	30.9		
Architecture	28.6		
Built environment	48.3		
Business studies	29.0		
Communications	34.1		
Computing and IT	28.4		
Creative arts	39.1		
Dentistry	100.0		
Economics	49.0		
Education	33.6		
Engineering and technology	41.3		
Environment	35.3		
Health	35.4		
Humanities and social science	38.6		
Languages	51.0		
Law	31.2		
Mathematics	42.4		
Medicine	49.8		
Nursing	30.3		

Para legal	33.3	
Pharmacy	49.8	
Psychology	30.7	
Rehabilitation	48.3	
Science	45.5	
Social work	29.8	
Sports science	35.9	
Surveying	38.0	
Tourism	27.8	
Veterinary science	62.0	
<hr/>		
Academic ability		
No UAI	35.9	
UAI decile 1	57.3	
UAI decile 2	52.4	
UAI decile 3	45.3	
UAI decile 4	42.4	
UAI decile 5	36.5	
UAI decile 6	36.8	
UAI decile 7	29.7	
UAI decile 8	27.7	
UAI decile 9	26.9	
UAI decile 10	27.1	
<hr/>		
Socio economic status		
Economic resources	39.2	32.4
Education and occupation	40.7	31.1
Unemployment rate	36.9	34.7
<hr/>		
Gender		
Female	33.2	
Male	37.7	
<hr/>		
Language background		
English speaking background	35.8	
Non-English speaking background	37.2	

Access

Access to a campus is clearly a factor in a metropolitan based student's choice to move to attend university. The likelihood of a student moving away is inversely related to their level of access. that is, the better their access the more likely a student is to stay at home. The regression results indicate that the probability of moving for the metropolitan population decreases from 7.4 per cent to 1.4 per cent as the access value increases from the 10th percentile to the 90th percentile.

As indicated earlier the regression analysis for the non-metropolitan students includes a measure of access which takes into account the perceived prestige of universities. The results for the five prestige access variables indicate that the likelihood of moving decreases as access to any category of university increases. Thus access matters overall. The largest effects are in respect of access to

universities perceived to be the most prestigious. The probability of moving fell from around 41 per cent to just 33 per cent as the level of access to these institutions improved from the 10th to the 90th percentile. The impact of the other access variables is fairly marginal.

Nevertheless, many of the metropolitan and non-metropolitan based students who did move, moved even though they had reasonable access to a campus. Indeed for metropolitan students the vast majority moved even though they had good access to a university campus. Table 4 categorises students according to their distance to the nearest university campus prior to moving. Of the metropolitan based students who move, almost 70 per cent did so even though they had a campus within 10kms of their home address. In 1999 nearly one third of students originally based in non-metropolitan areas moved even though they had access to a campus within 25km and just under half moved although they had access to a campus within 50km of their home.

Table 4 Distance to nearest university for students prior to moving

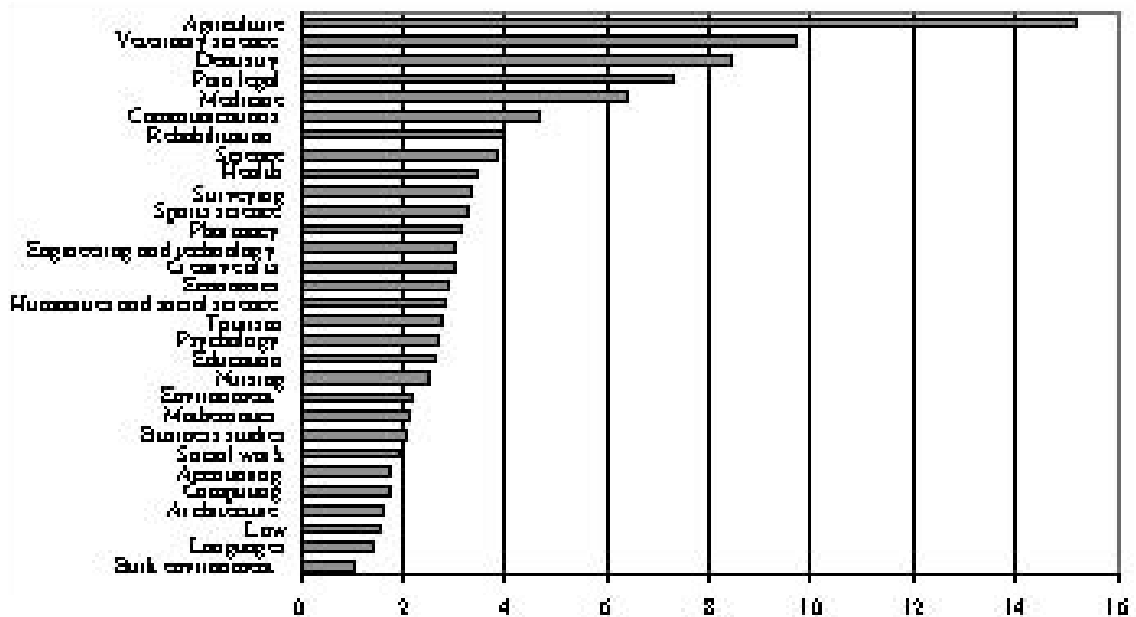
Distance to closest campus	Metropolitan based movers	Per cent of metropolitan based movers	Non-metropolitan based movers	Per cent of non-metropolitan based movers
5km or less	818	42.6	568	11.0
6 to 10km	525	27.3	239	4.6
11 to 15km	220	11.5	337	6.5
16 to 25 km	223	11.6	423	8.2
26 to 50km	119	6.2	970	18.8
51 to 75km	0	0.0	707	13.7
76 to 100km	16	0.8	615	11.9
101 to 125km	0	0.0	300	5.8
126 to 150km	0	0.0	292	5.7
More than 150km	0	0.0	704	13.7
Total	1921	100	5155	100

Subject choice

The regression results indicate that subject choice has a significant and relatively large impact on whether a student moves to undertake study. The adjusted probabilities of moving by field of study for metropolitan students are presented in Figure 1.

¹The distribution of campuses is taken from the Good University Guide (1999)

Figure 1 The predicted probability of moving for metropolitan students by subject choice



It is not surprising that the highest probabilities of moving for metropolitan based students are associated with agriculture, veterinary science and dentistry, since agriculture campuses are mainly located in country areas, veterinary science is only offered at four campuses and dentistry at five campuses. A number of other subjects associated with a high probability of moving also have restricted distribution. Of the 150 or so campuses across Australia medicine and pharmacy are available at only 10 campuses, surveying at 13 campuses and rehabilitation at 17. As recognised in our earlier discussion students wanting to study courses available at relatively few campuses are likely to have to move to do so¹¹.

Many of the other subjects associated with relatively high probabilities of moving have good distributions of courses with subjects available at a number of campuses and in most capital cities. For example, para-legal studies is offered at over 30 campuses and is available in most capital cities. Other subjects with higher than average probabilities of moving are similarly well catered for. These include communications (over 60 campuses), science (over 70), engineering (approximately 60 campuses), health services and support (around 50) creative arts (over 90), sports (nearly 40) and economics (around 60).

One likely reason for the high probability of moving is that students are moving to attend campuses that have recognised expertise in a particular subject. Metropolitan students from all UAI groups are likely to move to such a campus irrespective of whether the campus is in the country or the city. Examination of the raw data indicates that, to some extent, this is the case for communications, health services and para-legal studies where city students are attracted to particular country campuses.

A second possible reason is that broad subject names such as engineering, science

¹² The location of commencing places was derived from DETYA's higher education enrolment statistics for 1999.

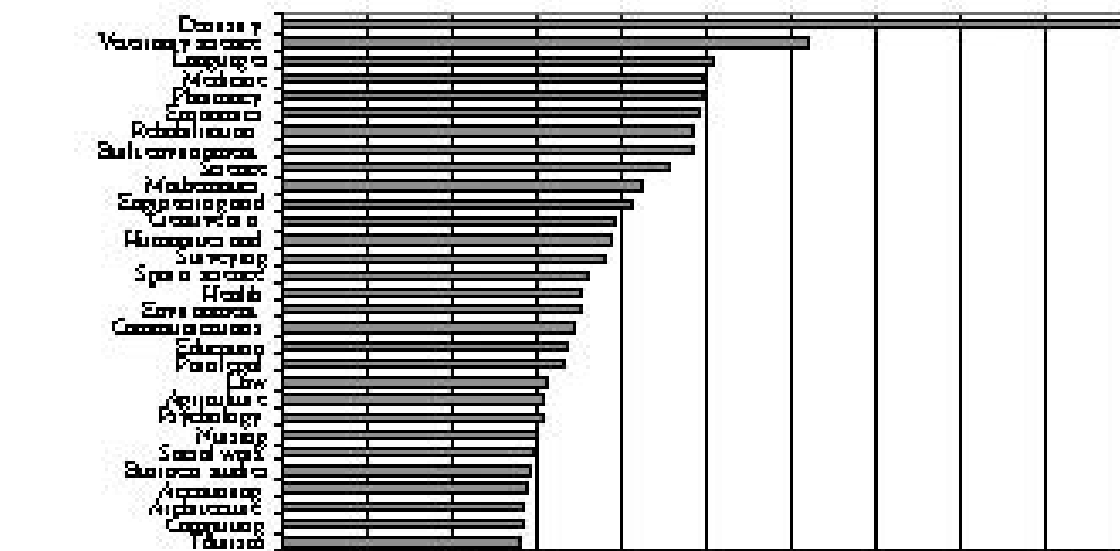
and humanities hide a wide range of specialisations. For example, a student wanting to specialise in marine biology, aeronautical engineering or anthropology would be likely to choose a university according to whether such subjects were first available and second the university's reputation for teaching that subject.

In general, the subjects associated with relatively low probabilities of moving are fairly well catered for with offerings at most universities in capital cities. For example, in mathematics almost 90 per cent of commencing places in 1999 were on campuses based in the city¹². This would explain the relatively low probability of moving to study mathematics for metropolitan students.

There are, however, a few surprises. Architecture, for example is offered at relatively few (16) campuses and we would have expected this subject to be associated with a higher probability of moving. Similarly, given that getting into law is extremely competitive a relatively high probability of moving may have been expected. However, for both these subjects most of the campuses offering courses are in capital cities and the large majority of campuses have very high UAI cut-offs which means the law or architecture course on offer nearby can be just as attractive as one which requires relocation.

As indicated in Figure 2, some of the subjects associated with high mobility for city students are also high for non-metropolitan based students. Courses which are not widely available such as dentistry, veterinary science, pharmacy, medicine, rehabilitation and surveying, are associated with high probabilities of moving. Again subjects with generic labels such as science, engineering and perhaps humanities, have relatively high probabilities of moving that could be due to specialisation in a narrower topic. This rationale could also be extended to include creative arts which also has a large number of possible specialisations.

Figure 2 The adjusted predicted probability of moving for non-metropolitan students by subject choice



¹³ This calculation makes allowance for students undertaking economics at country campuses of Sydney and La Trobe Universities.

¹⁴ The deciles are designed to group the 10 per cent of students with the highest UAI scores. These groups, however, do not contain equal numbers because of the skewed nature of the UAI scores.

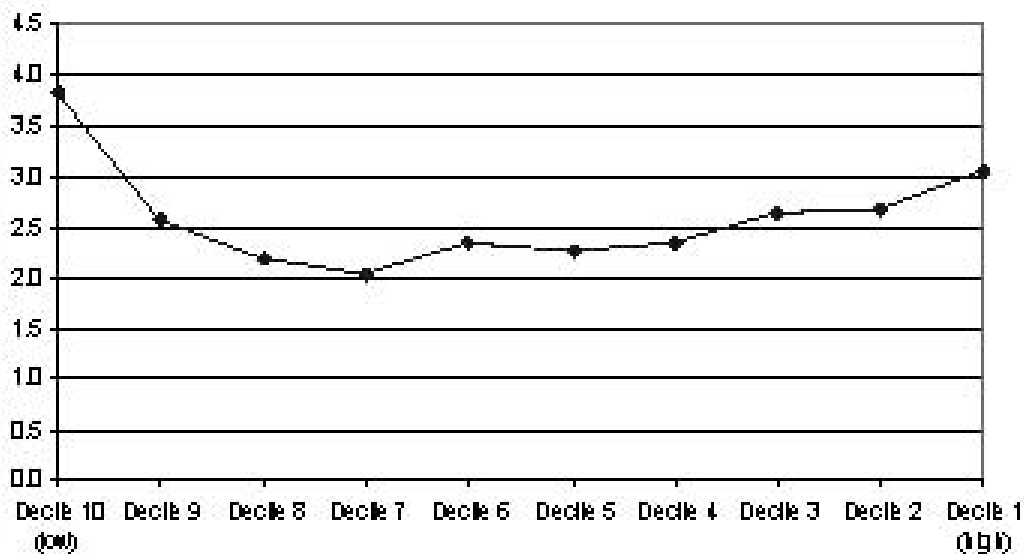
probabilities for metropolitan based students. For non-metropolitan based students, however, these subjects are associated with relatively high probabilities of moving. We have already noted that almost 90 percent of maths places filled in 1999 were in capital city campuses. This could explain the high probability of non-metropolitan students having to move to undertake mathematics. The same is true for economics and languages. At least 90 per cent of economics and language places are at city based campuses¹³.

Overall, it would appear that relocating to study is not so much about access but access to a particular course.

Academic ability

The results for metropolitan based students suggest that the ten per cent of students with the highest UAI scores (decile 1) and those with the bottom scores (decile 10) are more likely to move than those students in the middle deciles¹⁴. Those in the lowest decile are in fact more likely to move than those in the top decile. Figure 3 demonstrates the likelihood of a metropolitan student moving, given a particular UAI decile, holding other variables constant.

Figure 3: Probability of a metropolitan student moving by UAI decile.



The fact that students with high UAI scores move is not surprising as these students have more capacity to pick and choose between universities. It is interesting that those in the lowest decile exhibit a higher probability of moving than those in the top decile. This suggests that they may be moving because their UAI is not competitive at nearby universities.

¹⁵ Only institutions and courses attracting more than 5 per cent of moving students are listed in Tables 5, 6, 7 and 8.

Table 5 provides the university and subject destination of those students originating from metropolitan areas who move and are in the top two deciles. Students in the top deciles move to undertake engineering, humanities, business and medicine and move mainly to city locations.

Table 5 Subject choice and destination of metropolitan students in the top two UAI deciles¹⁵

Subject choice	Per cent of movers (number)	Institution	Per cent of movers (number)
Engineering and technology	17(65)	University of Queensland	21(81)
Humanity and social science	11(43)	University of Sydney	14(55)
Business and management	11(42)	University of Melbourne	12(50)
Medicine	11(41)	University of New South Wales	10(40)

Table 6 provides the university and subject destination of students in the bottom two UAI deciles. These students move to study humanities and social science, nursing, agriculture, sciences, business and management, education and training, and tend to be moving away from the big cities.

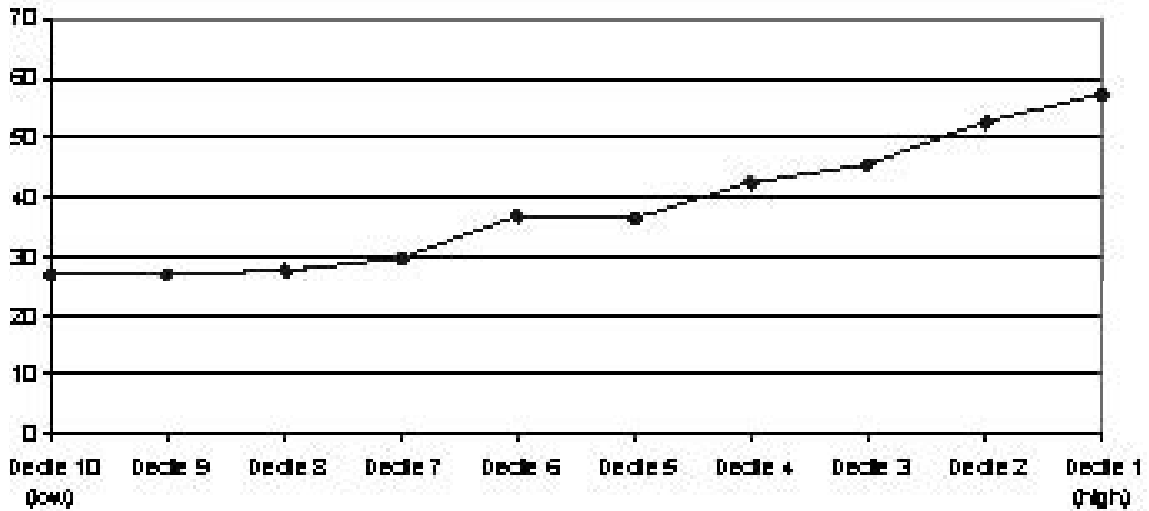
Table 6 Subject choice and destination of metropolitan students in the bottom two UAI deciles

Subject choice	Per cent of movers (number)	Institution	Per cent of movers (number)
Humanities and social science	18(66)	Charles Sturt University	15(54)
Nursing	11(42)	La Trobe University	13(47)
Education and training	10(37)	James Cook University	7(27)
Agriculture	10(37)	University of Tasmania	7(25)
Sciences	10(36)		
Business and management	9(32)		

Figure 4 presents regression results for non-metropolitan students who moved. These results are quite different to those for metropolitan students. The likelihood of moving steadily decreases as UAI decreases and, unlike their metropolitan counterparts, the 10 per cent of students in the bottom deciles have a probability of moving lower than the average.

¹⁶ Curtin University of Technology is particularly strong in business engineering and health, including rehabilitation.

Figure 4 Probability of non-metropolitan students moving by UAI decile



The likelihood of moving for a non-metropolitan student in the top decile is almost 57 per cent compared to a 27 per cent likelihood of moving for a student in the bottom decile. Thus students with a high UAI are twice as likely to move to attend university than those in the bottom deciles.

Tables 7 and 8 provide the university and subject destination of non-metropolitan based students in the top and bottom two deciles. While there are similarities in the subjects that students with high and low UAI scores move to study, again it is clear that those in the top two deciles are moving to city universities while those in the bottom deciles are moving to country universities.

Table 7 Subject choice and destination of non-metropolitan students in the top two UAI deciles

Subject choice	Per cent of movers (number)	Institution	Per cent of movers (number)
Engineering and technology	18(198)	University of Queensland	31(337)
Sciences	16(176)	University of Melbourne	10(108)
Business and management	10(106)	Curtin University of Technology ¹⁶	7(73)
Rehabilitation	8(83)		
Humanities and social science	8(83)		

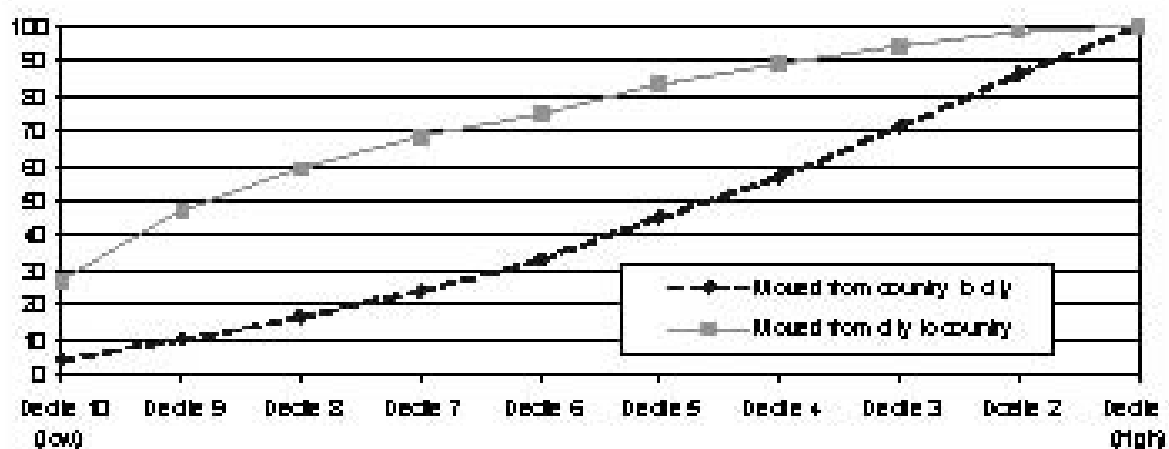
¹⁷ Almost a third of these were enrolled on the basis of satisfactory completion of final year of secondary school. It is possible that these students had deferred and their tertiary entrance score was incompatible with the newly introduced, nationally consistent UAI. It may also be the case that some of these students are the recipients of scholarships. It is also possible that these students did have UAI scores but that the universities failed to record the score.

Table 8 Subject choice and destination of non-metropolitan students in the bottom two UAI deciles

Subject choice	Per cent of movers (number)	Institution	Per cent of movers (number)
Education and training	20(185)	La Trobe University	18(169)
Humanities and social science	14(129)	James Cook University	13(119)
Nursing	10(97)	Charles Sturt University	7(66)
Business and management	9(81)	Central Queensland University	6(58)
Sciences	7(67)	University of Southern Queensland	6(58)
Agriculture	6(59)		

Figure 5 demonstrates the extent of difference in academic ability of those who move from non-metropolitan to metropolitan areas and vice versa. Non-metropolitan students who move to attend city universities tend to have high academic ability, while metropolitan based students who move to the country tend to be concentrated in the lower UAI deciles. As Figure 5 shows, 67 per cent of non-metropolitan to metropolitan movers are students in the top 5 UAI deciles, while only 25 per cent of metropolitan to non-metropolitan movers are in the same category.

Figure 5 Cumulative distribution by UAI decile of students who move from the city to the country and the country to the city



The student population included around 4,700 students who did not have a UAI score¹⁷. The regression results indicate that metropolitan based students who enrolled on a basis other than UAI had a higher probability of moving than students in any of the UAI deciles. Indeed the probability of moving for metropolitan based students (7.8 per cent) is almost three times the average probability of moving (2.8 per cent). For non-metropolitan based students entering university on a basis other than a UAI score, the adjusted probability of moving was around 36 per cent which is equal to the average probability of moving.

The high proportion of city movers in the non-UAI group can in part be explained by the fact that almost 30 per cent of the city based movers enrolled at the Australian Defence Force Academy (ADFA) which only has one location and does not recruit only on the basis of UAI. Another 17 per cent moved to undertake creative arts, another subject for which entry is not based solely on UAI.

Socio-economic variables

While the influence of the socio-economic variables is not as strong as that of the subject choice and UAI influence, the logistic regression results indicate that the economic resources, the education and occupation structure of the region and the region's unemployment rate are all statistically significant influences on whether students move to study.

The results indicate that as economic resources of the region increase, the probability of moving decreases for both metropolitan and non-metropolitan students. For students in metropolitan areas at the 10th percentile of economic resources, the probability of moving is 5.4 percent while those at the upper end in the 90th percentile have a below average probability of moving. The probability of moving for students from non-metropolitan areas falls from 39 per cent to just over 32 per cent over the same range.

These results conflict with the expectation that those with higher economic resources are more likely to move to undertake study. This result may be due a lack of willingness to move from a comfortable home or the fact that income support, which is conditional on income and assets, is generally not available to the better off. Such a result may also be due to the relative weakness of the economic resources variable in capturing individual circumstances since it relates to the region not individual families.

The regression results for education and occupation structure of the student's home region are mixed. In the metropolitan areas the higher the educational and occupational index the more likely it is that students will move to attend university. This result is consistent with the view that, since high education and occupation status is associated with higher participation rates in metropolitan regions (Stevenson et al. 2000), those with such a background are more likely to take the decision on what and where to study more seriously. This finding does not hold for non-metropolitan based students where the probability of moving declines as education and occupational status increases. Again this may be due to the noise introduced by using data at the postcode level, particularly given the problems of assuming homogeneity across postcodes.

The unemployment rate at the SLA level was included to capture the likelihood of gaining part-time work while studying, with the rationale being that as the potential for part-time work increases the greater is the likelihood of not moving. While the effect is small, this holds for metropolitan areas where the likelihood of moving (2.5 per cent to 3.1 per cent over the 10th to 90th percentiles) increases slightly as unemployment increases. The opposite effect holds for non-metropolitan areas

where the probability of moving to study declines as unemployment increases. Overall it would seem that the unemployment rate may be capturing something other than the availability of part-time work.

Gender and language background

Personal characteristics such as gender and language background were included in this study on the basis that they have tended to matter in terms of participation in higher education and in academic outcomes. The regression results indicate that, everything else being equal, female country based students are slightly more likely to move than their male counterparts. Non-metropolitan based females have an adjusted probability of moving of 37.5 per cent while males have a probability of 33 per cent. Metropolitan based female students, however, are no more likely to move than male students.

In metropolitan areas students with a non-English speaking background were more likely not to move. Those with an English speaking background had an adjusted probability of moving of 3 per cent while those with a non-English speaking background had a probability of moving of 2.2 per cent. In non-metropolitan areas they were just as likely to move as those with an English speaking background. It is unclear whether the probabilities of moving associated with gender and language background are due to educational decisions or are related to social, cultural or personal reasons.

5 Conclusions

Undergraduate student mobility in Australia is mainly about country students moving to undertake study. Around 40 per cent of country based students (around 5,200 students) move compared to only 4 per cent of metropolitan or city based students (around 1,900 students). Our interest lay in whether students who moved did so because there was no access to a local university or whether students were moving for other reasons. To disentangle the reasons for moving we examined a number of factors. These were:

- access, with prestige of nearby universities taken into account in non-metropolitan areas;
- subject chosen by the students;
- academic ability as measured by UAI scores;
- socio-economic status of home region as measured by the indices of economic resources and education and occupation status. The unemployment rate for the Statistical Local Area was included as a proxy for the availability of part-time employment to financially support students through university; and
- personal characteristics of students, such as gender and language background.

Overall the factors that most influence the decision to move are subject choice and UAI score rather than access to a campus. In metropolitan areas it is clear that much of the likelihood of moving is due to subject choice and the choice of specific universities rather than general access to campuses.

In non-metropolitan areas movement is high as would be expected, but much of the movement is not because of lack of access to a campus. Rather it is again about subjects and particular universities with students moving predominantly to metropolitan city universities. The students in the top UAI decile have around double (57 per cent) the propensity to move compared to students in the bottom decile (27 per cent).

A few points are worthy of note. First, even though we can appeal to creature comfort and lack of access to income support, the result that the higher the economic resources the less likely students are to move to study is still somewhat surprising. Second, the results for the education and occupation status and the unemployment rate variables are, to say the least, ambiguous.

The overall implication of the findings is that greater provision of places in non-metropolitan areas will not prevent students, many from the top of the academic ability distribution, leaving country areas. However, there is some room for optimism in that some regional universities are attractive in niche areas. The overall message for regional universities is therefore that they cannot assume a monopoly over local students.

References

- Ainley, Graetz., Long, and Batten., 1995, *Socio-economic Status and School Education*, published by the Australian Council for Educational Research
- Ashenden, D and Milligan., S., 1998 *The Good Universities Guide, Australian Universities Courses and Campuses in 1999*, Ashenden Milligan Pty Ltd, Subiaco, Western Australia, .
- Cumpston, A., Blakers, R., Maclachlan, M. and Karmel, T., *Atlas of Higher Education, A Community Focus, Occasional Paper Series, No 01-B*, Canberra, Higher Education Division, Department of Education, Training and Youth Affairs.
- Department of Employment, Workplace Relations and Small Business, 1996 "Small Area Labour Markets Australia", December Quarter 1996, Commonwealth of Australia.
- Higher Education Access and Equity for Low SES School Leavers*, Evaluation and Investigations Programme (EIP) 98/18, October 1998.
- James, R., Baldwin, G., and McInnis, C., 1999 *Which University? The factors influencing the choices of prospective undergraduates*, Evaluation and Investigations Programme (EIP) , Higher Education Division, Department of Education, Training and Youth Affairs, 99/3, August .
- McLennan, W., 1998, *1996 Census of Population and Housing, Socio-Economic Indexes For Areas*, October .
- McLennan, W., 1998, *Australian Bureau of Statistics Information Paper, 1996 Census of Population and Housing, Socio-Economic Indexes for Areas*, 2039.0.
- SAS Institute Inc., 1995 *Logistic Regression Examples Using the SAS System*, Version 6, First Edition, Cary, NC, SAS Institute,
- Stevenson, S., Evans, C., Maclachlan, M., Karmel, T. and Blakers, R., 2000, *Access : effects of campus proximity and socio-economic status on university participation rates in regions*, No 00-D, Canberra, Higher Education Division, Department of Education, Training and Youth Affairs.
- Stevenson, S., Maclachlan, M. & Karmel, T., 1999, *Regional Participation in Higher Education and Distribution of Higher Education Resources across Regions: Occasional Paper Series, No 99-B*, Canberra, Higher Education Division, Department of Education, Training and Youth Affairs.
- Urban, M., Jones, E., Smith., G., Evans, C., Maclachlan, M., and, Karmel, T., *Completions: undergraduate academic outcomes for 1992 commencing students: Occasional Paper Series, No 99-G, Canberra*, Higher Education Division, Department of Education Training and Youth Affairs.

Appendix 1

Campuses included in this study

University	Campus
ACT	
Australian Catholic University	Signadou
Charles Sturt University	Canberra
The Australian National University	Canberra
The University of New South Wales	ADFA
University of Canberra	Canberra
NSW	
Australian Catholic University	Castle Hill
	Mackillop
	Mount Saint Mary
Central Queensland University	Sydney International
Charles Sturt University	Dubbo
	Goulburn
	Manly
	Mitchell
	Murray
	Riverina
	Rozelle
	Thurgoona
Macquarie University	Macquarie
Southern Cross University	Coffs Harbour
	Lismore
	Port Macquarie
The University of New England	UNE
The University of Newcastle	Central Coast
	Newcastle
The University of Sydney	Burren Street
	Camden
	Camperdown/Darlington
	Conservatorium
	Cumberland
	Kirkbride
	Mallett Street
	Orange
	St James

University of Western Sydney	Surry Hills Westmead Hawkesbury (Blacktown) Hawkesbury (Richmond) Macarthur (Bankstown) Macarthur (Campbelltown) Paramatta Penrith
University of Wollongong	Graham Park Wollongong
University of Technology, Sydney	City Kuring-gai St Leonards
Northern Territory	
Batchelor College	Batchelor
Northern Territory University	Casuarina
Queensland	
Australian Catholic University	McAuley
Bond University	Robina
Central Queensland University	Bundaberg Conservatorium Emerald Gladstone Mackay Rockhampton
Griffith University	Gold Coast Morningside Mt Gravatt Logan Nathan Southbank
James Cook University	Douglas Smithfield
Queensland University of Technology	Carseldine Gardens Point Kelvin Grove Sippy Downs
University of the Sunshine Coast	Ipswich
The University of Queensland	Gatton College St Lucia
University of Southern Queensland	Toowoomba Wide Bay
South Australia	
The Flinders University of South Australia	Flinders
The University of Adelaide	North Terrace

University of South Australia	Roseworthy Thebarton Commerce & Research Precinct Waite City East Magill Salisbury The Levels Underdale Whyalla
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Tasmania	
Australian Maritime College	Newnham
University of Tasmania	Hobart Launceston North West

Victoria	
Australian Catholic University	Aquinas Christ Mercy
Deakin University	Burwood Geelong Rusden Woolstores Warrnambool

La Trobe University	Bendigo Bundoora Mildura Shepparton Wangaratta Wodonga Mt Buller
Marcus Oldham College	Geelong
Monash University	Berwick Caulfield Clayton Gippsland Parkville Peninsula

Royal Melbourne Institute of Technology	Bairnsdale Bundoora City Coburg
Swinburne University of Technology	Hawthorn Prahran

The University of Melbourne	Swinburne at Lilydale Burnley Dookie Gilbert Chandler Glenormiston Hawthorn Kew Longerenong Parkville Victorian College of the Arts
University of Ballarat	Ballarat
Victoria University of Technology	City Footscray Melba Conservatorium Melton St Albans Sunbury Werribee
Western Australia	
Curtin University of Technology	Bentley Curtin Kalgoorlie Joondalup Muresk Institute of Agriculture Shenton Park
Edith Cowan University	Bunbury Churchlands Joondalup Mt Lawley
Murdoch University	Murdoch Rockingham
The University of Western Australia	UWA Albany

Campus changes between 1996 and 1999

Due to the difficulties in obtaining campus EFTSU for 1999 this study has used 1996 campus EFTSU data. Some inaccuracies have arisen due to closures and amalgamations of certain campuses over the 1996 to 1999 period. Where possible, these inaccuracies have been allowed for and adjustments made to the data.

As a result the following campuses were excluded because they closed between 1996 and 1999:

Castle Hill (Australian Catholic University), Toorak (Deakin), Abbotsford (La Trobe), St George (UNSW) and Coburg (RMIT) closed during 1996-1999. Carlton (La Trobe) merged with Bundoora and therefore EFTSU was combined.

The following campuses were created between 1996 and 1999 and the EFTSU were derived from the Good University Guide (1999):

Albany (UWA), Headland (Curtin), Logan (Griffith), Coolangatta (Southern Cross), Ipswich (Queensland), Woolstores (Deakin) and Mt Buller (La Trobe) and Fishermen's Bend (RMIT) were created over the period 1996-1999.

The following institutions were excluded from variable calculation because EFTSU was not able to be obtained :

Australian Film and Radio School, National Institute of Dramatic Art, Avondale College, Batchelor College, Australian Maritime College and Marcus Oldham Farm Management School, as well as campuses at the University of Notre Dame (Fremantle, Broome) and Bond University (Robina).

Appendix 2 Regression Results for Metropolitan and Non-metropolitan Students

Parameter	Metropolitan population			Non-metropolitan population		
	Estimate	Standard Error	Pr > Chi Sq	Estimate	Standard Error	Pr > Chi Sq
Intercept	0.698	0.463	<.0001	7.439	0.650	<.0001
Access						
Access	0.004	0.000	<.0001			<.0001
Prestige access 1				-0.043	0.005	<.0001
Prestige access 2				-0.007	0.001	<.0001
Prestige access 3				-0.002	0.000	<.0001
Prestige access 4				-0.005	0.001	<.0001
Prestige access 5				-0.010	0.001	<.0001
Subject choice						
Accounting	-2.293	0.196	<.0001	-0.833	0.145	<.0001
Agriculture	0.000	0.000		0.000	0.000	
Architecture	-2.395	0.299	<.0001	-0.735	0.215	0.0006
Built environment	-2.830	0.468	<.0001	-0.846	0.271	0.0018
Business studies	-2.153	0.150	<.0001	-0.827	0.114	<.0001
Communications	-1.298	0.179	<.0001	-0.590	0.155	0.0001
Computing	-2.297	0.183	0.0244	-0.855	0.134	<.0001
Creative arts	-1.755	0.155	<.0001	-0.375	0.128	0.0033
Dentistry	-0.665	0.351	<.0001	9.634*	173.9	0.9558
Economics	-1.790	0.220	<.0001	0.029*	0.220	0.8961
Education	-1.897	0.153	<.0001	-0.611	0.112	<.0001
Engineering and technology	-1.634	0.147	<.0001	-0.283	0.117	0.015
Environment	-2.074	0.212	<.0001	-0.537	0.156	0.0006
Health	-1.607	0.189	<.0001	-0.534	0.147	0.0003
Humanities and social science	-1.816	0.137	<.0001	-0.395	0.109	0.0003
Languages	-2.513	0.434	<.0001	0.108*	0.331	0.743
Law	-2.458	0.257	<.0001	-0.722	0.191	0.0002
Mathematics	-2.095	0.404	<.0001	-0.238*	0.326	0.4652
Medicine	-0.954	0.189	0.0004	0.061*	0.210	0.7716
Nursing	-1.944	0.171	<.0001	-0.766	0.179	<.0001
Para legal	-0.821	0.255	<.0001	-0.626	0.256	0.0148
Pharmacy	-1.694	0.299	<.0001	0.061*	0.279	0.8275
Psychology	-1.855	0.220	<.0001	-0.746	0.179	<.0001
Rehabilitation	-1.462	0.200	<.0001	0.000*	0.161	1
Science	-1.489	0.139	<.0001	-0.116*	0.112	0.3
Social work	-2.197	0.332	0.0001	-0.789	0.238	0.0009
Sports science	-1.676	0.245	<.0001	-0.511	0.162	0.0016

Surveying	-1.629	0.438	<.0001	-0.423*	0.295	0.1511
Tourism	-1.851	0.214	<0.001	-0.888	0.165	<.0001
Veterinary science	-0.508*	0.384	0.2904	0.556*	0.623	0.372
Academic ability						
No UAI	0.000			0.000		
UAI decile 1 (top)	-0.946	0.101	<.0001	0.876	0.102	<.0001
UAI decile 2	-1.077	0.104	<.0001	0.678	0.094	<.0001
UAI decile 3	-1.091	0.106	<.0001	0.392	0.091	<.0001
UAI decile 4	-1.218	0.110	<.0001	0.274	0.093	0.0031
UAI decile 5	-1.248	0.104	<.0001	0.026*	0.088	0.7662
UAI decile 6	-1.213	0.114	<.0001	0.042*	0.093	0.653
UAI decile 7	-1.358	0.112	<.0001	-0.280	0.091	0.0022
UAI decile 8	-1.280	0.108	<.0001	-0.379	0.090	<.0001
UAI decile 9	-1.114	0.104	<.0001	-0.418	0.089	<.0001
UAI decile 10 (bottom)	-0.714	0.097	<.0001	-0.410	0.084	<.0001
Socio-economic status						
Economic resources	-0.007	0.0005	<.0001	0.004	0.001	<.0001
Education and occupation	0.007	0.0004	0.0001	-0.004	0.000	<.0001
Unemployment rate	0.026	0.008	0.001	0.012	0.006	0.047
Gender and language background						
Female	0.059*	0.053	0.2185	0.197	0.044	<.0001
Male						
English speaking background						
Non-English speaking background	-0.315	0.074	<.0001	0.063*	0.084	0.4506

* Denotes that the p-value is insignificant for these explanatory variables given the chi-square distribution.

In testing the global null hypothesis, the net effect of the explanatory variables is statistically significant for both metropolitan and non-metropolitan regressions. In evaluating the overall fit of the results of both models, the Hosmer and Lemeshow Goodness of fit test (a test of the statistical significance of the combined effects of the independent variables), indicates that the respective models provide a good fit for the data for both the metropolitan and non-metropolitan regressions.

	Metropolitan population				Non-metropolitan population			
	Mean	Standard Deviation	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum
Intercept	1.00				1.00			
Access								
Access	361.35	192.57	1.82	550.00				
Prestige access 1					2.91	7.84	0.00	170.99
Prestige access 2					3.27	17.86	0.00	129.18
Prestige access 3					15.78	65.71	0.00	376.41
Prestige access 4					4.69	18.81	0.01	219.06
Prestige access 5					5.48	20.66	0.01	156.24
Subject choice								

Accounting	0.04	0.20	0.03	0.17
Agriculture	0.00	0.00	0.02	0.00
Architecture	0.01	0.12	0.01	0.10
Built environment	0.01	0.09	0.01	0.08
Business studies	0.12	0.32	0.11	0.31
Communications	0.02	0.15	0.02	0.15
Computing	0.06	0.24	0.05	0.21
Creative arts	0.05	0.21	0.05	0.21
Dentistry	0.00	0.05	0.00	0.01
Economics	0.02	0.15	0.01	0.09
Education	0.07	0.25	0.11	0.32
Engineering and technology	0.10	0.30	0.08	0.28
Environment	0.02	0.15	0.08	0.28
Health	0.03	0.16	0.0	0.28
Humanities and social science	0.15	0.36	0.13	0.34
Languages	0.01	0.08	0.00	0.06
Law	0.02	0.15	0.01	0.11
Mathematics	0.01	0.08	0.00	0.06
Medicine	0.02	0.12	0.01	0.01
Nursing	0.04	0.19	0.06	0.24
Para legal	0.01	0.07	0.01	0.08
Pharmacy	0.01	0.08	0.01	0.07
Psychology	0.02	0.13	0.02	0.13
Rehabilitation	0.02	0.14	0.02	0.14
Science	0.10	0.30	0.10	0.30
Social work	0.01	0.09	0.07	0.08
Sports science	0.01	0.11	0.02	0.14
Surveying	0.00	0.06	0.00	0.07
Tourism	0.02	0.14	0.02	0.15
Veterinary science	0.00	0.04	0.01	0.04
Academic ability				
No UAI	0.07		0.14	
UAI decile 1	0.11	0.31	0.06	0.24
UAI decile 2	0.10	0.30	0.07	0.27
UAI decile 3	0.09	0.29	0.08	0.28
UAI decile 4	0.09	0.28	0.07	0.27
UAI decile 5	0.11	0.31	0.09	0.30
UAI decile 6	0.08	0.27	0.07	0.27
UAI decile 7	0.09	0.29	0.09	0.28
UAI decile 8	0.10	0.30	0.10	0.30
UAI decile 9	0.09	0.29	0.11	0.30
UAI decile 10	0.08	0.27	0.11	0.35

Socio-Economic Status								
Economic resources		78.01	734.73	1269.37		35.32	799.62	1175.9
Education and occupation		89.68	730.75	1270.65		43.49	758.00	1183
Unemployment rate	6.17	3.14	0.40	27.87	7.51	3.39	0.40	38.07
Gender and language background								
Female	0.59	0.50			0.60			
Male	0.42				0.40			
English speaking background	0.79				0.94			
Non English speaking background	0.21	0.41			0.06	0.49		