THE IMPACT OF INCOME CONTINGENT PROVISIONS ON STUDENTS' LOAN TAKING BEHAVIOUR

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Abstract

This paper investigates the determinants of taking out government-funded student loans for university study in Australia. Using an ordered probit model, the analysis considers the factors which affect students' decisions on funding their entire tertiary study using student loans, funding some of their university study using student loans, and funding their university study entirely through other means. It finds that the probability of taking out students loans for the full cost of university is largely influenced by students' socioeconomic status. Other major influences on this decision include students' demographic and university enrolment characteristics.

Keywords: Student Loans, University Study, Ordered Probit

JEL Classifications: A20, A23

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I. INTRODUCTION

An important consideration in the decision making of many university students is the availability of loan finance. Student loans come in a variety of forms, with the most important parameters being the eligibility conditions, the amounts that may be borrowed, the rate of interest charged, the period of grace between graduation and when loan repayments commence, the repayment period and the conditions under which repayments may be deferred or cancelled. The main loan programs can be described using these parameters.

The Federal Perkins Loan Scheme in the US is a low-interest loan for students with financial need. The loans are advanced by the institution attended, though the government provides the greater part of the finance. The total amount that may be borrowed is capped (currently at US$20,000 for an undergraduate student), and repayments typically commence nine months after graduation. After this initial "grace period", repayments are made on a monthly basis, and may be spread out over up to 10 years. Deferment is possible in situations of financial hardship. The National Student Loans in Canada are structured along lines similar to the Federal Perkins Loans in the US.

Another type of student loan in the US is Stafford Loans. These loans come in two forms: subsidised, which are awarded on the basis of financial need, and unsubsidised, where financial need is not a criterion. Repayments are typically made over a 10-year period. Various repayment options are available, including fixed monthly repayments, monthly repayments that rise over time, and income-sensitive repayments.

Income-sensitive repayments appear to be growing in popularity in student loans schemes. Such an arrangement is a key component of the Higher Education Contribution Scheme (HECS) in Australia, and also of the Student Loans and Fee Loans in the UK, and Student Loans in New Zealand.[1] Under the HECS in Australia, for example,

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[1] These loan programs have many similarities with the pioneering Yale Tuition Postponement Option of 1972-73 (Johnstone, 1972).

undergraduate students who are either citizens or permanent residents are charged fees per year of study that vary with course type and institution attended. Students may either pay these fees to the institution at the time of enrolment (and are rewarded by a 20 percent discount on their fee) or they may defer the obligation and pay it later through the income tax system, with the annual repayment depending on the individual's income. Deferring the HECS liability rather than paying up-front can be viewed as the equivalent of taking out a student loan under other loan schemes.

The aim of this study is to examine the factors that determine students' decisions to defer their higher education liabilities in Australia, and to compare these with the findings from overseas studies on the influences on students' decisions concerning loans. Given that the main difference between the Australian loan program and most of those in the comparison literature is the income contingent nature of the Australian scheme, the differences that arise may be able to be linked to the role this parameter has.[2]

Knowing who defers their HECS liability is important for a number of reasons. First, there is concern in Australia that some low socioeconomic status students for whom HECS was meant to be an equitable scheme through which they could finance their tertiary education are paying up-front when deferring would otherwise be the economically rational thing to do (see Birch and Miller, 2006a). Knowledge of whether this is a widespread practice would be useful. Second, there is a small body of, admittedly somewhat speculative, literature that draws attention to the possible adverse effects that HECS has on post-graduation decisions and outcomes, including housing tenure decisions, fertility and measured earnings inequality. In this instance, knowledge of the incidence of deferred HECS liabilities will enable assessment of the distributional impact of these phenomena, or at least identify the target populations where further study into these possible effects can be focussed. Third, there are studies that report links between the means of funding of university study and students' academic performance (see, for

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[2] It is acknowledged that this approach cannot account for other institutional differences. However, even within-country analysis, where student reaction to changes in the parameters of a particular loan scheme is studied, has the potential to confound the impact of changes to the parameters of the loan scheme with the influence of the circumstances that gave rise to the change in the loan program. Despite these limitations, the cross-country approach appears to be informative, and provides intuitively appealing evidence.

example, Monks, 2001). While a consensus finding has not emerged from this line of research, the fact that HECS debts have been linked to first-year academic outcomes, possibly via the interaction of deferred HECS liabilities and socioeconomic status[3], indicates a need to quantify the underlying facts, as planned in this paper.

The structure of the paper is as follows. Section II provides a brief overview of HECS in Australia. Section III reviews the literature on the factors that influence students' loan decisions. The empirical methodology and data are reviewed briefly in Section IV, and the results from a multivariate analysis of the factors that influence students' decisions to take out loans (*i.e.*, they defer their HECS liability) discussed. A summary is given in Section V.

II. THE HIGHER EDUCATION CONTRIBUTION SCHEME IN AUSTRALIA

The Higher Education Contribution Scheme in Australia was introduced in 1989. Under this scheme, domestic students were required to pay AUD$1,800[4] per year, which was approximately 20 percent of the cost of a university course. Students were provided with two options for paying their contribution. First, they could pay their HECS liability up-front at the time of enrolment, and a discount was provided to make this option attractive. Second, students' contributions could be deferred until their earnings reached a threshold level (of $22,000 in 1989, which was the average annual earnings at the time). Once at this income threshold, students were required to pay back a proportion of their HECS through the income tax system (with the Australian Taxation Office administering this repayment process). The repayment schedule was progressive, with the repayment rate varying between one percent, where the individual's taxable income was between $22,000 and $25,000, and three percent, where taxable income was over $34,999. No interest was charged on students' HECS debts, but they were indexed to inflation.

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[3] The effect, however, does not carry over to the years of study beyond first year. See Birch and Miller (2007) for details on this relationship, and Birch and Miller (2006a) for details on the other possible influenced of HECS mentioned above.

[4] All currency (unless stated) refers to Australian dollars (AUD$).

There have been a number of changes to HECS since its introduction, and these are documented in Birch and Miller (2006b). Most of these changes have resulted in students incurring a larger debt per year, and being required to repay their outstanding debt more rapidly, although the most recent reforms (for students commencing in 2005) have introduced more generous income thresholds for repayment. The main student financing scheme was also renamed in 2005, and is now called HECS-HELP.

At present, students contribute up to $8,170 per annum to the cost of their university studies, with the actual figure varying with the course studied (higher fees are generally charged for courses that cost more to deliver, and for courses where graduates have higher earnings potential) and institution attended (institutions can levy a surcharge of up to 25 percent on the base fees set by the Commonwealth Government). If this amount is paid to the institution at the time of enrolment, a 20 percent discount is offered, and no HECS liability accrues. This discount is also offered for partial up-front payments of $500 or more. Hence, a student with a HECS liability of $4,000 for a semester of study would need only pay $3,200 to the institution to discharge this liability. The $800 discount component is covered by the Commonwealth Government, which remits this amount to the institution concerned.

However, any amount that is not paid to the institution needs to be subsequently paid through the income tax system, at a rate that varies with a tax base called the HECS repayment income.[5] The repayment rates for those currently in place are presented in Table 1 (the repayments rates for 2002, the year the data analysed below were collected, are presented in Appendix A).

Individuals may also make voluntary repayments to the Australian Taxation Office in order to increase the rate at which they pay off their HECS debt. If they make a voluntary

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[5] In 1996 the reference income for repayment rates changed from students' taxable income to a slightly broader income base termed "HECS repayment income". The HECS repayment income is an individual's taxable income for a year, plus reportable fringe benefits amounts received and any amount of taxable income that they claim has been reduced by a net rental loss.

repayment of $500 or more they receive a bonus of 10 percent of the repayment made. In other words, if $500 is paid, they have their HECS debt reduced by $550.

Table 1   HECS-HELP Repayment Rates, 2006-2007

HECS-HELP Repayment Income	Percentage Rate Applied
Less than $38,149	Nil
$38,149 - $42,494	4.0
$42,495 - $46,838	4.5
$46,839 - $49,300	5.0
$49,301 - $52,994	5.5
$52,995 - $57,394	6.0
$57,395 - $60,414	6.5
$60,419 - $66,485	7.0
$66,486 - $70,846	7.5
More than $70,846	8.0

Most undergraduate students "choose" to defer all or some of their HECS liabilities, and pay for their education on an income contingent basis through the income taxation system. For example, in 2002 approximately 75 percent of undergraduate students deferred all of their HECS liabilities (see Department of Education, Science and Training, 2002), and 5 percent deferred a proportion of their HECS and paid a proportion of their HECS up-front. Fewer than 20 percent of students paid all of their HECS or had all of their HECS paid for them at the time they started their tertiary study. Explaining these variations in the proportion of HECS that is deferred provides the basis for the empirical analysis of Section IV.

III. EMPIRICAL LITERATURE ON STUDENT DEBT

The non-Australian studies of the determinants of student debt have examined both financial (wealth and current needs) and non-financial influences. Of major importance are the analyses which show that students' debt tends to be negatively related to their wealth (see Clark, 1998; Curs and Singell, 2002; Clinedinst *et al.*, 2003). This finding emerges in studies that focus on the students' own financial circumstances, as well as in studies that widen the consideration to cover family wealth.

Past borrowing and debt levels also appear to impact on current financing decisions, with most studies addressing the role of these factors suggesting that they increase the likelihood of taking out a student loan (see Gayle, 1994; Johnes, 1994). For example,

Gayle (1994) showed that British students with loan overdrafts of £110 were over ten times more likely to take out a student loan for university education than students with loan overdrafts of £10. It has also been reported that there is a negative correlation between the size of the student loan and the amount repaid. In the study for Canada by Schwartz and Finnie (2002), every CAN$1,000 increase in the amount borrowed by students was associated with a reduction by 5 percent in the proportion of the loan repaid within two years of graduation.

Students' ethnicity and marital status have also been identified as major factors influencing their tertiary financing decisions. In the US, non-white students tend to have a higher probability of applying for tertiary aid and are also more likely to take out larger student loans than their white counterparts (Curs and Singell, 2002; Clinedinst *et al.*, 2003). In the UK, however, ethnic minorities have been reported to have a much lower probability of taking out student loans than white students. For example, Callender and Kemp (2000) reported that the odds of an Asian student taking out a loan are 35 percent of the odds that a white student will borrow for their tertiary education.

Students' gender and age have also been considered in the literature, although the findings are mixed. Dee and Jackson (1999) found that female students are more likely to apply for government financial aid than male students, whereas Johnes (1994) found that male students are more likely to obtain government finance than female students. Clinedinst *et al.* (2003) reported that there were no significant differences between men's and women's decisions on student loans. Similarly, with regard to age, Schwartz and Finnie (2002) and Clark (1998) found that older students were less likely to take out loans than their younger counterparts, while Callender and Kemp (2000) reported the opposite finding.

Finally, it has been reported that married students have a substantially higher probability of financing their tertiary study from student loans than non-married students (see Clinedinst *et al.*, 2003; Gayle, 1996). Students with children and lone parents also appear

to be more likely to borrow money for university study than other students (see Johnes, 1994; Callender and Kemp, 2000).[6]

In summary, according to the large body of literature covering countries other than Australia, a wide range of factors appear to influence students' decisions to seek loan finance. These factors have a reasonably clear link to the student's socioeconomic status (measured by their family's income and their own income) and their current needs (as proxied by, for example, marital status and age).

There have been fewer studies of students' decisions on loan finance (or to defer their HECS liability) in Australia, and the studies available are descriptive in nature. As the determinants of HECS payment status have been considered separately in these studies rather than together in a multivariate framework, the findings may be distorted. For example, the study by Birch and Miller (2006b) uses data for 2002 and presents a series of plots of the proportion of HECS deferred for students of particular characteristics against a measure of socioeconomic status. Students who were from poorer neighbourhoods, aged 18 to 30 years, studied full-time, were born outside Australia, or had lower scores on the tests used for admission to university were reported as deferring a higher proportion of their HECS liability than other students. The basis of the Birch and Miller (2006b) study was the census data on student enrolments and HECS liabilities that all universities are required to submit to the Australian Government.[7]

Two other Australian studies that have addressed similar issues, but which were based on surveys of university students, are Smith *et al.* (1998) and Long and Hayden (2001). Smith *et al*. (1998) compared the characteristics of students who deferred their HECS (*i.e.*, who took out a loan) to those of students who paid their HECS up-front using data from 1996. They found that students deferring their HECS were more likely to be

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[6] Other variables included in models of students' loan-taking behaviour include year at university (see Johnes, 1994; Clinedinst *et al.*, 2003; Callender and Kemp, 2000) and field of study (see Schwartz and Finnie, 2002; Clark, 1998).

[7] Birch and Miller (2007) examine the gaps in current understanding of the effects of HECS. Among the gaps identified are the need to understand the distribution of HECS debts, and how HECS affects risk averse students from low socioeconomic status backgrounds.

enrolled full-time, of a young age, unemployed (as opposed to working), work part-time, have lower earnings, and live in areas of a lower socioeconomic status.

Long and Hayden (2001) also compared the characteristics of students deferring HECS and paying HECS up-front, though their data were from a later year, 2000. Deferring HECS was positively correlated with year at university, being middle aged, being born overseas, not speaking English at home, being a full-time student, being an Indigenous student, being from a low socioeconomic background, being a student from a government secondary school, having dependent children, having a disability, moving to attend university, living in a shared rented house, studying science, not working, having a loan and having low levels of income.

Finally, recent research by Cardak and Ryan (2006) suggests that, conditional upon achieving grades in high school that permit entry university, students' socioeconomic background is not an important factor in university participation decisions. This is argued by Cardak and Ryan (2006) to indicate that HECS has effectively removed any short-term credit constraint problems that those from low socioeconomic status backgrounds might otherwise have faced. Nevertheless, substantial differences in university participation according to socioeconomic status remain (Le and Miller, 2005; Cardak and Ryan, 2006), which Cardak and Ryan (2006) attribute to other factors which prevent students from low socioeconomic backgrounds converting their innate ability into acceptable high school grades.

Thus, the studies of student loan taking behaviour in Australia, like the studies for other countries, stress the importance of financial need but indicate that an income-contingent student loans scheme can alleviate the short-term credit constraints that some students confront. However, the studies for Australia appear to place greater emphasis than overseas studies on the role of students' potential income and also on their actual earnings. For example, when discussing the finding that older students were less likely to take out loans (*i.e.*, were less likely to defer their HECS), Birch and Miller (2006b, p.108) argue: "This finding could be a result of these students working, and hence having

incomes that push them over the threshold at which they are required to make HECS payments. These students may thus opt to pay their HECS up front to receive the associated discount". Thus, this review of the literature suggests that the parameters of loans programs may have an impact on student behaviour. The analyses of HECS payment status which follow are conducted within a multivariate framework, and hence should provide a more precise quantification of the effects of the characteristics examined separately in previous studies.

IV. EMPIRICAL ANALYSIS

A. Methodology

In the period for which data are available for analysis, the amount that students would borrow in Australia, in the absence of a decision to pay up-front, was predetermined once course type and course load were selected. Accordingly, to abstract from the influences of these parameters, the examination here is cast in terms of the tendency to defer the compulsory HECS. This unobserved tendency (*DEFER*) can be expressed in linear form as:

$$DEFER_i = \alpha' Z_i + \varepsilon_i \tag{1}$$

where Z_i is a vector of observable characteristics which influence current and future income and expenditure. It also includes a constant term.

Three observed outcomes, defined with reference to *DEFER* in equation (1), are considered: (i) do not defer any HECS (*i.e.*, do not take out a student loan); (ii) defer a proportion of HECS (*i.e.*, use a student loan and own or parents' funds for education); and (iii) defer the full amount of the HECS liability (*i.e.*, cover all university fees using loans).[8]

Given these three observed outcomes, the model can be estimated using a multinominal probability model (which ignores the underlying ordering in the categories but which is a

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[8] Separate analysis could be conducted on the probability of deferring HECS and the amount of HECS deferred using a sample selection framework. However, as most (96 percent) students who defer their HECS defer their full liability, as noted above the amount of HECS deferred will be determined mainly by the type of course studied and by the annual course load.

more flexible approach in terms of allowing the impact of regressors to vary across the log odds) or an ordered probability model (which accommodates the underlying ordering in the categories, but which assumes that the proportional odds of going from one category to the next are the same as going from the next category to the following category). Both models were estimated and the findings, in terms of predicted distributions across response categories, were very similar.[9] For space reasons only the results of the ordered probit approach are presented below.

The framework for the ordered probability model is well established, and only brief, operational, comment is provided (for further information on the model see McKelvey and Zavoina, 1975). With this model, the observed data on whether students defer all ($DF_i = 2$), some ($DF_i = 1$) or none ($DF_i = 0$) of their HECS can be linked to the unobserved variable ($DEFER_i$) described above as follows:

$$DF_i = 0 \text{ if } DEFER_i \leq \mu_0 \tag{2}$$

$$DF_i = 1 \text{ if } \mu_0 \leq DEFER_i \leq \mu_1$$

$$DF_i = 2 \text{ if } \mu_1 \leq DEFER_i$$

where the μs are unknown threshold parameters separating the adjacent categories. These are estimated together with the αs in equation (1). The first threshold parameter is normalised to equal zero. In terms of loan taking behaviour, being in the category $DF = 2$ indicates a high propensity to use loans to finance tertiary studies, and conversely, being in the category $DF = 0$ indicates a low propensity to use loans for this purpose.

If it is assumed that the ε in equation (1) is normally distributed across observations, the following probabilities may be calculated:

$$Prob\,(DF_i = j) = \Phi(\mu_\varphi - \alpha'Z_t) - \Phi(\mu_{\varphi-1} - \alpha'Z_t) \tag{3}$$

where Φ denotes the standardised cumulative normal distribution function.

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[9] Comparing these two models needs to rely on assessments along these lines: see Miller and Volker (1985).

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B. Data

The analysis draws upon data from the Australian Government's Department of Education, Science and Training's *Higher Education Statistics* for 2002. This database contains information on all students studying at Australian universities in 2002. It includes data on the characteristics of the institution at which the student was studying (*e.g.*, campus location) and enrolment characteristics (*e.g.*, course type and mode of attendance), together with details on the demographic and personal characteristics of students, including their age, birthplace and gender. As data for 2002 are analysed, and the HECS scheme has changed over time, Appendix A provides a brief overview of the main parameters of the scheme for that year.

In order to estimate the determinants of the probability of students deferring some or all of their HECS, the data sample was restricted to students who were studying towards a bachelor degree, had Australian citizenship (including those with dual citizenship)[10] and who had incurred a HECS liability during the year. The sample does not include international students, as their fee system is different, nor post-graduate students or the few students receiving scholarships that exempted them from a HECS liability. Overall, the data sample comprises a total of 452,657 students.

There are three features of the data that need to be noted. First, where more than one student had a given combination of characteristics, the data were supplied in aggregate form (that is, aggregate HECS paid, aggregate HECS liability, aggregate student load and number of students). Of the 452,657 students in the purged data set, 448,329 (or 99.04 percent) have unique combinations of characteristics. The remaining students (4,328 students) have combinations of characteristics in common. Of these students, 3,387 (or 78.26 percent) deferred all of their HECS. For the remaining 941 students, it is not known if one or all students in a particular group deferred some of their HECS. Fortunately, with so few students involved (only 0.2 of one percent of the total sample), the alternative assumptions that can be made about this group (*e.g.,* omitting them from the analysis,

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[10] The sample does not include students who are New Zealand citizens or those who have permanent residency status. In 2002 these students, while eligible for a HECS university place, were generally required to pay their entire liability up-front (see Aungles *et al*., 2002).

assuming they defer none of their HECS, assuming they all defer the full amount of their HECS, assuming that each defers some of their HECS) make little difference to the statistics prepared. In the analysis that follows it is assumed that each of these students defers a proportion of their HECS.

Second, the measure of socioeconomic status included in the analysis is based on the students' home neighbourhood (measured at the postcode level[11]) rather than on details about the socioeconomic status of the individual student or of their family: universities do not collect the latter information. This is a major limitation of the data that arises because some poor people live in rich neighbourhoods and, likewise, some rich people live in poor neighbourhoods. This means that the true, individual-level, relationship between HECS repayment status and socioeconomic status will tend to be attenuated in the statistical analyses presented below.

Third, the analyses are restricted to those who were attending university in 2002. If HECS debt deters some from attending university, then the estimates of the student debt model may be biased. This is of particular concern in the case of the socioeconomic status of students. Australian studies of the impact of HECS on the socioeconomic mix of students at university have shown this has had a minimal impact (for evidence and interpretations of this, see Aungles *et al*., 2002, p.3 and Birrell *et al*., 2000, p.50). Nevertheless, this limitation of the analysis needs to be kept in mind.

Given the data set, the *Z* vector in equation (1) may be specified to include students' attendance mode, type of attendance, age, Indigenous status, disability status, commencing student status, gender, birthplace, language spoken at home and socioeconomic status. These variables are defined in Appendix B. With the exception of socioeconomic status the variables are dichotomous. The omitted categories for the dichotomous variables define the reference group as non-Indigenous, Australian-born, male, non-commencing, internal mode students who were studying full-time. These

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[11] Postcodes in Australia are maintained solely for mail processing purposes, and their number and structure, and hence the size of the group in any particular postcode, is determined by operational efficiency factors from this perspective.

students were aged under 18 years, spoke English at home and did not have a disability. Preliminary information on the HECS repayment status according to each of these characteristics is presented in Table 2.

Table 2   *Distribution of Decisions on Deferring HECS by Selected Characteristics* [a]

Characteristic	Percent of Students Paying HECS Up-Front	Percent of Students Deferring Some HECS Liabilities	Percent of Students Deferring All HECS Liabilities	Row Sample Size
All students	19.86	5.33	74.81	452,657
Attendance Mode				
Internal student	18.78	5.37	75.85	383,521
External student	31.80	4.50	63.70	44,915
Multi-mode student	15.09	6.21	78.70	24,221
Attendance Type				
Full-time student	17.46	5.61	76.93	337,731
Part-time student	27.00	4.49	68.51	114,926
Age				
Aged under 18 years	22.42	8.25	69.33	32,381
Aged 18 years	20.89	7.17	71.94	62,797
Aged 19 years	19.37	6.06	74.57	65,346
Aged 20 years	17.75	5.06	77.19	62,056
Aged 21 years	15.84	4.48	79.68	47,125
Aged 22 to 30 years	15.84	3.86	80.30	115,485
Aged over 30 years	29.85	4.80	65.35	67,467
Indigenous Status				
Non-Indigenous student	19.98	5.34	74.68	447,732
Indigenous student	9.20	3.71	87.09	4,925
Disability Status				
Does not have a disability	20.02	5.28	74.70	434,551
Has a disability	19.66	5.38	74.96	18,106
Commencing Student Status				
Non-commencing student	19.79	4.71	75.50	307,511
Commencing student	20.01	6.65	73.34	145,146
Gender				
Male student	20.07	5.09	74.84	190,151
Female student	19.71	5.50	74.79	262,506
Birthplace				
Australia	20.24	5.41	74.35	376,747
Overseas	17.95	4.92	77.13	75,910
Language				
Speaks English at home	20.45	5.40	74.15	391,468
Does not speak English at home	16.02	4.83	79.15	61,189
Socioeconomic Status (SES)[b]				
SES lowest quartile	14.98	5.11	79.91	113,127
SES second lowest quartile	17.08	5.16	77.76	113,551
SES second highest quartile	19.60	5.28	75.12	112,533
SES highest quartile	27.77	5.75	66.48	113,446

Notes: [a] The distribution of students' HECS liability status varies significantly across the each of the characteristics at the 10 percent level. [b] Socioeconomic status is measured by the Australian Bureau of Statistics' (ABS) 'Index of Economic Resources', which considers the economic resources of families living in particular regions. Regions that have a high score on the index have a higher proportion of high income families, a lower proportion of families on low income, a larger number of households living in homes with four or more bedrooms, and higher rent and mortgage payments (ABS, 2001). The SES quartiles are approximate quartiles due to the fact that a number of students have the same score on the 'Index of Economic Resources', making it impossible to group students into exact quartiles.

As shown in Table 2, approximately 75 percent of students deferred all of their HECS liability, 5 percent deferred some of their liability, and just less than 20 percent paid all of their HECS up-front. The percentage representation of students in each of these categories varies according to their characteristics. The proportions of students deferring some or all of their HECS debt were positively correlated with their course load, with part-time students being less likely to defer their HECS. Students who were born overseas, spoke a language other than English at home or were of Aboriginal or Torres Strait Islander (Indigenous) ancestry were also more likely to defer some or all of their HECS. The proportion of students deferring part or their entire HECS debt was negatively associated with the socioeconomic status of their home neighbourhoods.

C. The Determinants of Deferring HECS

The results from the ordered probit model of the determinants of students' loan-taking behaviour in Australia are presented in Table 3. The table presents the coefficients and 't' statistics for the analyses undertaken for all students. The dependent variable is the decision on deferring HECS (*DF*) which was defined in the previous section.

In the ordered probit results in Table 3, a positive coefficient implies a higher probability of being in the 'Defer all HECS' category. A negative coefficient implies a higher probability of being in the 'Pays HECS up-front' category. The implications of the sign of a coefficient for membership of the intermediate category of 'Defer some HECS' cannot be determined a priori. Either marginal effects or predicted distributions across the three response categories can be used to illustrate the implications of the estimates for membership of each of the three HECS payment categories. As the magnitudes of the memberships of the various repayment states are of interest in their own right, and marginal effects can be inferred from the predicted distributions, predicted distributions, computed using equation (3), are considered below.

The results in Table 3 show that students aged 18 to 30 years (*Age18*, *Age19*, *Age20*, *Age21* and *Age22_30*) and those of Aboriginal or Torres Strait Islander origin (*ATSI*) have a higher probability of deferring all of their HECS. Students who studied externally

(*External*), part-time (*Part-time*) or lived in neighbourhoods with a higher socioeconomic status (*Index*) have a lower probability of being in the 'Defer all HECS' group. The effects of these characteristics on each of the three HECS repayment categories are illustrated in Table 4, which lists predictions of the option the student chooses regarding payment of their university fees. The general feature of these predicted distributions is that the variations across categories of variables are less pronounced than in the unstandardised cross-tabulation of Table 2. This appears to be a result of the statistical control for socioeconomic status.

Table 3 ** *Results From Ordered Probit Analysis of Decisions on Deferring HECS Liabilities***

Variable	Coefficient	Absolute 't' Value
Constant	-2.441	9.09
Attendance Mode: *External*	-0.312	40.48
Multi	-0.001	0.08
Attendance Type: *Part-time*	-0.258	46.73
Age: *Age18*	0.100	10.98
Age19	0.200	20.46
Age20	0.300	29.76
Age21	0.417	38.98
Age22_30	0.508	53.36
Age31	0.078	7.61
Indigenous Status: *ATSI*	0.472	20.41
Disability Status: *Disability*	0.042	9.60
Commencing Student Status: *New*	0.019	3.80
Gender: *Female*	0.023	5.64
Birthplace: *OS*	0.079	12.33
Language: *NoEng*	0.084	11.87
SES: *Index*	0.824	16.22
Index^2	-0.050	21.03
Threshold Parameter: μ	0.187	160.50
		Chi Square (17) = 22636.04 Sample Size = 452,657

As shown in Table 4, students' decisions regarding deferring HECS vary substantially by their mode of study and type of attendance. Students who study externally are predicted to be 10 percentage points less likely to defer all their HECS than students who study internally, with the predicted proportion deferring all HECS being 66 percent for external students and 76 percent for internal students. Likewise, part-time students are 8 percentage points less likely to defer all of their HECS than their full-time counterparts.[12]

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[12] This finding is comparable with the results presented in Smith *et al.* (1998) and Long and Hayden (2001).

As noted above, these findings are likely to result from the market work that many external and part-time students undertake, which would push them over the income threshold for HECS repayments.[13] In this situation there would be an incentive to pay HECS up-front to receive the associated discount rather than to defer HECS. In other words, the findings appear to be associated with the structure of the HECS scheme.

Table 4   *Predicted Distribution of Decisions on Deferring HECS by Selected Characteristics* [a]

Characteristic[b]	Predicted Proportion Paying HECS Up-Front	Predicted Proportion Deferring Some HECS	Predicted Proportion Deferring All HECS Liabilities	Row Total
Attendance Mode				
Internal student~	18.95	5.23	75.82	100.00
External student	28.08	6.34	65.58	100.00
Multi-mode student	19.90	5.33	74.77	100.00
Attendance Type				
Full-time student~	18.04	5.10	76.86	100.00
Part-time student	25.27	6.06	68.67	100.00
Age				
Aged under 18 years~	27.58	6.31	66.11	100.00
Aged 18 years	24.44	5.98	69.58	100.00
Aged 19 years	21.54	5.62	72.84	100.00
Aged 20 years	18.83	5.23	75.94	100.00
Aged 21 years	15.93	4.75	79.32	100.00
Aged 22 to 30 years	13.91	4.37	81.72	100.00
Aged over 30 years	25.13	6.06	68.81	100.00
Indigenous Status				
Non-Indigenous student~	20.01	5.35	74.64	100.00
Indigenous student	9.83	3.44	86.73	100.00
Disability Status				
Does not have a disability~	20.39	5.40	74.21	100.00
Has a disability	19.29	5.24	75.47	100.00
Commencing Student Status				
Non-commencing student~	20.06	5.36	74.58	100.00
Commencing student	19.56	5.28	75.16	100.00
Gender				
Male student~	20.26	5.38	74.36	100.00
Female student	19.64	5.29	75.07	100.00
Birthplace				
Australia~	20.24	5.38	74.38	100.00
Overseas	18.18	5.08	76.74	100.00
Language				
Speaks English at home~	20.17	5.38	74.45	100.00
Does not speak English at home	18.00	5.05	76.95	100.00

Notes: [a] The predicted distribution of decisions on deferring HECS for the variable '*Index*' varies with the level of the '*Index*' variable owing to the quadratic functional form used in the ordered probit model. The predicted distribution is discussed in the text. [b] The symbol ~ represents the omitted category for the empirical analysis.

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[13] Long and Hayden (2001) report that 65 and 47 percent of male and female part-time students, respectively, were employed full-time, whereas only 4 and 3 percent of male and female full-time students worked on a full-time basis. Similarly, over 40 percent of male and 17 percent of female part-time students had an annual income of $40,000 or more, while fewer than 2 percent of male and female full-time students had the same level of income.

There is a non-linear relationship between students' age and their predicted probability of deferring HECS liabilities. Students aged 18 to 30 years have increasingly higher incidences of deferring HECS than students aged under 18 years, with the difference in the predicted proportions of these students deferring HECS ranging from 3.5 percentage points (students aged 18 years) to 15 percentage points (students aged 22 to 30 years). Students aged over 30 years were also found to have a higher likelihood of deferring all of their HECS liability than the omitted category (students aged less than 18 years), although the predicted probability that they will defer their HECS was smaller than that of all other age groups. These findings are comparable with the results in the Canadian study by Schwartz and Finnie (2002), which indicate that older students are less likely to take out student loans than younger students.

This pattern between age and the probability of deferring all the annual HECS liabilities is likely to be a result of three factors. While the weights that should be attached to these factors are unknown, it seems that only one of them can be discounted at this stage. First, relatively young students are more likely to live with their parents than older students and therefore may have their parents pay for their education rather than have to defer their HECS. Long and Hayden (2001) found that the proportion of students who paid their HECS up-front was 12 percentage points higher among those who lived with their parents than it was for those who lived in shared rental accommodation.

Second, relatively older students may have a higher likelihood of working and thus may pay all of their HECS up-front due to the discounts available. The study by Long and Hayden (2001) suggests that students aged 25 to 34 years worked, on average, 27.5 hours a week and students aged 35 to 44 years worked 29.2 hours a week. In comparison, students aged under 25 years worked only an average of 15.9 hours a week.

Third, and more speculatively, the increase with age in the probability of deferring HECS among students aged 18 to 30 years may reflect increasing awareness of the financial benefits of deferring HECS when expected earnings are relatively low and hence repayments will be spread further into the future. If this is the case then the probability of

deferring-age relationship should be steeper among sub-groups of students with relatively low expected earnings. This hypothesis is explored in Figure 1, which illustrates the predicted proportion of students deferring their total HECS liability for students of different fields of study.[14] While students studying medicine (a course associated with high wage growth after graduation) are considerably less likely to defer HECS than students studying education and nursing (courses associated with low wage growth after graduation), the predicted proportion of students deferring HECS rises considerably for students aged 18 years to 30 years within each field of study. This uniformity runs counter to the hypothetic proposed above.

Figure 1 ***Predicted Proportion of Students Deferring Their Entire HECS Liability, by Field of Study and Age***
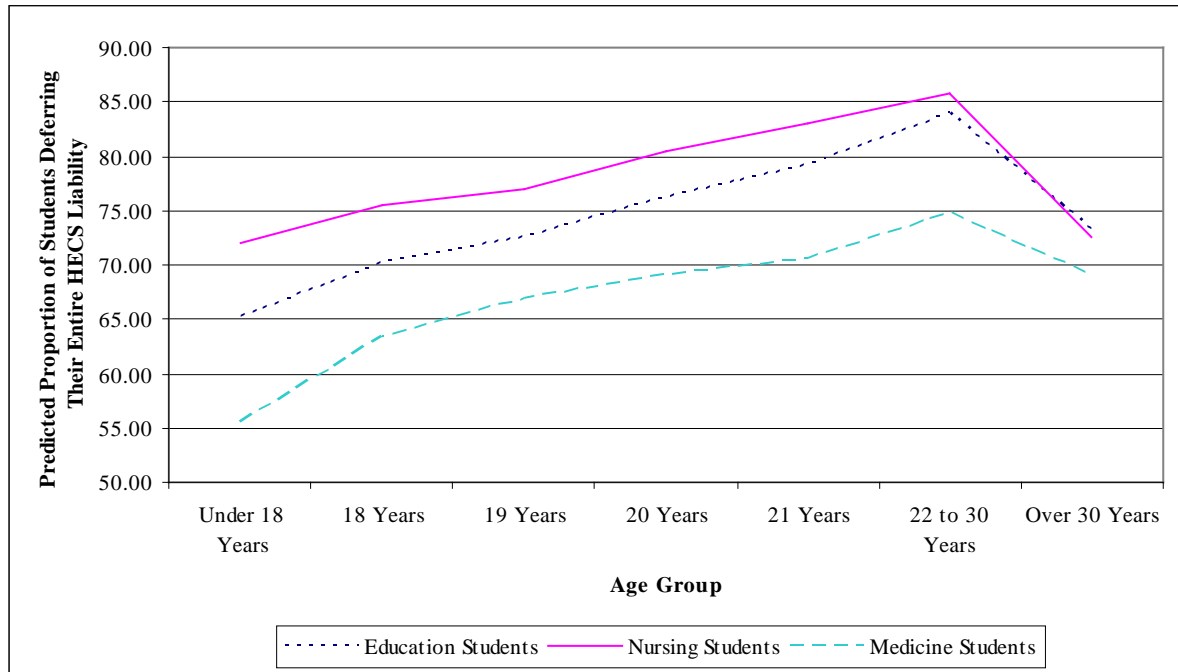

Table 4 also shows that the predicted proportion of students deferring HECS was considerably higher for students of Aboriginal or Torres Strait Islander origin (*ATSI*) than for their non-Indigenous counterparts. Hence, approximately 87 percent of Indigenous students are predicted to defer their entire HECS liability. In comparison, the predicted

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[14] The predicted distributions were calculated using the ordered probit model outlined in the previous section estimated on data samples of students from each field of study.

proportion of non-Indigenous students deferring their HECS is 75 percent. This finding is more pronounced than that reported in Long and Hayden (2001), who establish only a 6 percentage points difference in the probability of paying HECS up-front among Indigenous and non-Indigenous students. The higher probability of Indigenous students deferring their HECS may be associated with different levels of wealth that are not captured by the variable for socioeconomic status. Long and Hayden (2001) found that Indigenous students were considerably less likely to be employed than their non-Indigenous counterparts, while Gregory and Daly (1997) report that Aboriginal and Torres Strait Islanders have lower wages than individuals not of Aboriginal or Torres Strait Islander origin.

There are only minor differences (less then 3 percentage points) in the predicted proportions of students deferring their entire HECS liabilities by commencing student status, gender, birthplace and disability status. The finding regarding the link between gender and deferring HECS liabilities differs from that reported in the study by Johnes (1994), who found that, in the UK, male students were more likely to take out student loans than female students. Johnes (1994) attributed this finding to the fact that female students have lower lifetime earnings than their male counterparts, and therefore do not take out loans because they do not have the capacity to meet the loan repayments. The small difference in the predicted probability of males and females deferring their total HECS liability (of less than 1 percentage point) in this study may be associated with the more egalitarian pay structure in Australia. It may also be associated with men and women having similar resources to pay their HECS up-front at the time they commence their study.[15] Finally, it could derive from the income contingent nature of the Australian HECS, which may remove capacity to meet loan repayments as a consideration.

The similarities in the probability of deferring HECS for students of different birthplaces contrasts with many of the findings in the empirical literature, which indicate that there are substantial differences in loan take-up rates among students of different ethnic

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[15] Long and Hayden (2001) report that there was less than a two-percentage point difference in the proportion of male and female students whose income was over $40,000 and that there was less than a two hour difference in the mean hours worked per week by men and women at university.

backgrounds. It is also a surprising finding given that immigrant students are considerably less likely to be working and hence less likely to have their own resources to finance their tertiary education.[16] Moreover, the well noted difficulties in accumulating wealth in the destination country apparent in immigrant families[17] would have been expected to work against this type of finding. The results from this analysis, which imply that Australian-born and overseas-born students have a similar propensity to pay HECS up-front, may be explained by a number of factors. It could be that the tertiary education financing decisions of immigrants are guided by a 'family investment model' (Benjamin and Baker, 1997), where parents work in initially high pay but low wage growth jobs or even in multiple jobs so that their children can invest in human capital to obtain a job with relatively high wage growth (see Baker and Benjamin, 1997, p.705). This model is commonly used to explain the labour supply decisions of immigrants. It also could be that the immigrant students are from families who have been in Australia for long periods, and therefore have had time to accumulate the resources to pay HECS up-front. Antecol *et al.* (2003), among others, report that the incomes of immigrants and non-immigrants converge after immigrants have lived in the destination country for long periods. The relationship between birthplace and deferring HECS could also be attributed to immigrant families holding education in high regard[18] and therefore simply choosing to pay for their children's tertiary education. Finally, the similarities in the probability of deferring HECS for students of different birthplaces may simply be associated with the income contingent nature of HECS and the similarity of the post-graduation labour market experience across birthplace groups.

The variable representing students' socioeconomic status, *Index*, was entered in quadratic form in the model to capture potential non-linearities in the impact of changes

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[16] Long and Hayden (2001) show that the proportion of overseas-born students in paid employment was only four-fifths that of Australian-born students. The proportion of students who did not speak English at home who worked was only two-thirds that of students whose language spoken at home was English.

[17] For example, Headey *et al.* (2005) suggest that immigrants to Australia from English speaking countries have levels of wealth that are 23 percent lower than their Australian-born counterparts. Immigrants from non-English speaking countries have wealth levels that are nearly 27 percent lower than the levels of wealth for individuals born in Australia.

[18] See Birrell (1987) for further discussion.

in this status on the probability of deferring HECS. The findings indicate that the predicted probability of deferring the entire HECS liabilities decreases at an increasing rate with socioeconomic status over almost all levels of socioeconomic status represented in the sample.

Figure 2   Predicted Proportion of Students Deferring Their Entire HECS Liability by Students'
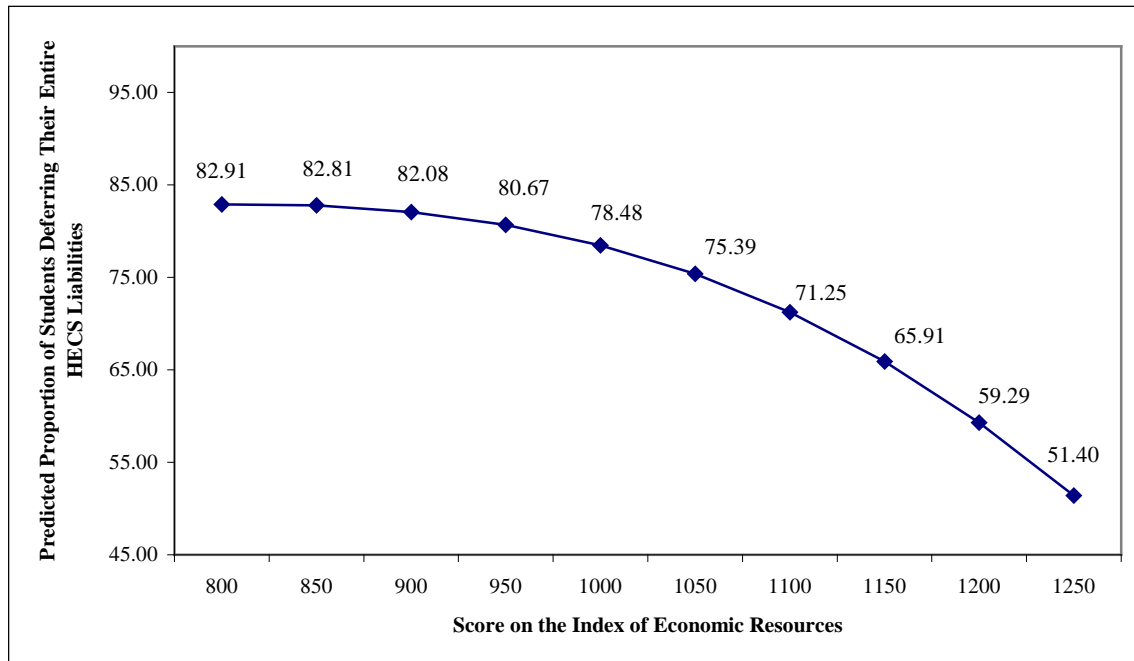*Socioeconomic Status*

Figure 2 shows that the predicted probability of deferring the entire HECS liabilities for students whose home neighbourhoods were given around the lowest score on the index (of around 800 in the sample) was 83 percent. There is little change in this probability until areas have a score around 950 on the index. For students whose home neighbourhoods had scores above 950, the probability of deferring HECS decreases dramatically, falling to 51 percent for students living in neighbourhoods which had a score around the highest score on the index (of around 1250 in the sample).[19]

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[19] The mean status score for the population is, by construction, 1000, while that for the sample of university students is 1039. Approximately 64.4 percent of the sample have a status score above the population mean.

Variable	Panel (*i*) Male Students		Panel (*ii*) Female Students	
	Coefficient	Absolute 't' Value	Coefficient	Absolute 't' Value
Constant	-2.010	4.83	-2.851	8.19
Attendance Mode: *External*[+]	-0.403	32.08	-0.257	26.50
Multi	-0.001	0.04	0.003	0.23
Attendance Type: *Part-time*[+]	-0.283	33.66	-0.240	33.07
Age: *Age18*	0.098	6.87	0.101	8.56
Age19	0.218	14.28	0.186	14.78
Age20	0.316	20.08	0.287	22.05
Age21[+]	0.438	26.50	0.400	28.70
Age22_30[+]	0.543	36.80	0.480	38.66
Age31[+]	0.040	2.44	0.095	7.30
Indigenous Status: *ATSI*	0.487	12.58	0.461	16.09
Disability Status: *Disability*[+]	0.052	7.78	0.035	6.20
Commencing Student Status: *New*[+]	0.039	4.95	0.004	0.69
Birthplace: *OS*	0.087	9.01	0.070	8.36
Language: *NoEng*[+]	0.202	9.52	0.070	7.45
SES: *Index*[+]	0.735	9.34	0.912	13.82
Index^2[+]	-0.046	12.41	-0.055	17.55
Threshold Parameter: μ[+]	0.179	101.67	0.192	125.13
	Chi Square (16) = 12403.69 Sample Size = 190,151		Chi Square (16) = 22636.04 Sample Size = 262,506	

Notes: [(a)] The symbol [+] indicates that the estimated impacts for male and female students with these characteristics were significantly different at the 10 percent level.

The ordered probit model was estimated using separate samples of males and females. These results are presented in Table 5, with each panel containing the estimated coefficients and 't' statistics for the respective groups of students. As shown in the table, the variables influence the decisions regarding the deferment of HECS liabilities in the same direction for both males and females.[20] Where significant differences between male and female students in the estimated impacts arise, most of variables appear to have a slightly larger impact on the probability of deferring HECS liabilities for male students than for female students. For example, the estimated coefficient for studying externally was -0.40 for male students and -0.23 for female students.[21] Moreover, the differences

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[20] To examine whether results from the model to estimate the determinants of deferring HECS decisions were significantly different for males and females, the model was first estimated with the inclusion of interaction terms between gender and all other independent variables in the models. Tests were conducted to examine whether the intercept, slopes and threshold parameter for males and female students were significantly different. Overall, there are significant differences in the results obtained using the separate samples of male and female students (Chi Square (18) = 458.16).

[21] Notable exceptions where the female impact is greater than the male impact are the 'Age31' and socioeconomic status variables.

between males and females in the estimated impacts are typically consistent with the explanations advanced above in relation to the particular findings reported. For example, the relatively lower propensity to defer HECS among part-time students was attributed to the market work they undertake. It was noted that male part-time students were more likely than female part-time students to be employed full-time, and to have relatively high income. This is consistent with the coefficient for the part-time variable being greater (in absolute terms) for males than for females.

V. SUMMARY

This paper has examined the factors which influence students' decisions on taking out loans to finance their tertiary study. It has a focus on the debts incurred under the Higher Education Contribution Scheme (HECS) in Australia. Three outcomes were examined: the probability of deferring some HECS and paying some HECS up-front, the probability of deferring the total HECS liability, and the probability of paying the entire liability up-front. An ordered probability framework was used.

Student's decisions to defer some or all of their fees for tertiary education (*i.e.,* they take out loans to cover fees) is predominately influenced by their socioeconomic status, with students from richer neighbourhoods being less likely to defer HECS than their counterparts from poorer neighbourhoods. Deferring HECS was also negatively associated with studying externally, studying part-time, and being of a relatively young age. Students in the middle age cohorts, who were of Aboriginal or Torres Strait Islander origin, or who had a disability, were found to have a higher probability of deferring HECS. The findings from the models estimated separately for male students and for female students were similar to those from the estimation of the model for all students.

The results from the analysis that relate to wealth (*e.g.*, the socioeconomic status index) are consistent with studies in the United States, the United Kingdom and Canada. Students from poorer families are more likely to resort to loans to finance their tertiary studies. The parameters of loan schemes do not seem to be able to over-ride the influence that family background has on loan taking behaviour. That is, poor students use loans

regardless of the parameters of the loans scheme in order to overcome short-term credit constraints. In other words, these student loan schemes channel funds to those without other means of funding their higher education.

There are two types of differences that emerge from the current study for Australia compared to the typical findings in studies for other countries. First, differences with respect to gender and birthplace appear to be more minor in Australia than elsewhere. Second, age effects and the effects associated with studying on a part-time basis are more pronounced than elsewhere. It has been conjectured that both sets of findings could be related to the design of the income contingent loan scheme in Australia, where discounts are offered to encourage up-front payments, and all students who are Australian citizens have access to the loan and can pay their debts under the same set of income contingent conditions. In this regard it would appear that the design of a student financing scheme can affect the likelihood that various groups of students will take out loans.

Finally, the results from the paper can assist in addressing some of the outstanding issues regarding the deferment of HECS liabilities. The paper has found that more than four out of five students with a very low socioeconomic background defer their HECS liability compared to approximately one in two students with a very high socioeconomic background. That is, students of a low socioeconomic status are making good use of the opportunity of having access to an income contingent loans scheme. Nevertheless, there is a need to investigate why and how some students from a low socioeconomic background are paying up-front when it might be economically rational to defer their liability. Moreover, if the deferment of HECS is associated with poorer academic outcomes while at university, and difficulties in accumulating wealth following graduation, such as saving for a sufficient home loan deposit, then the findings in this paper indicate that this will be a much bigger issue for students of a low socioeconomic status. Few of the characteristics considered in the model other than socioeconomic status, Indigenous status, studying part-time and age have influences that are large enough to warrant further consideration. Accordingly, attempts to further understanding of the empirical effects of HECS should focus on these characteristics. A prerequisite for

such study, however, is for universities to collect appropriate data on the socioeconomic background of each student.

MAIN FEATURES OF HECS IN 2002

The main differences between the current HECS system and that in operation in 2002 are associated with the HECS repayment rates and levels of contributions. In 2002, students studying HECS Band 1 subjects (Arts, Humanities, Legal and Justice Studies, Social Studies and Behavioural Studies, Visual and Performing Arts, Education and Nursing) were required to contribute $3,589 towards the cost of their university degree. HECS Band 2 students (students studying Mathematics, Computing, Other Health Sciences, Agriculture, Renewable Resources, Built Environment, Architecture, Sciences, Engineering, Processing and Administration, Business and Economics) were required to pay $5,125 and HECS Band 3 students (students studying Law, Medicine, Medical Science, Dentistry, Dental Service and Veterinary Science) were required to pay $5,999. Students who were exempt from the HECS bands (*i.e.*, students who had commenced their university study prior to the introduction of the HECS bands in 1997) were required to pay $2,702 per year.

Students who paid their entire contribution up-front or made a $500 or more payment received a 25 percent discount on their HECS liability. Students who deferred their HECS liability were required to start repaying their liability once their income reached approximately $23,000 to $24,000. The repayment rates for HECS at this threshold level are presented below.

Table 6   HECS Repayment Rates, 2001-2002 and 2002-2003

| | Year | |
Percentage Rate Applied	2001-2002 HECS Repayment Income	2002-2003 HECS Repayment Income
Nil	Less than $23,242	Less than $24,365
3.0	$23,242 - $24,510	$24,366 - $25,694
3.5	$24,511 - $26,412	$25,695 - $27,668
4.0	$26,413 - $30,638	$27,689 - $32,118
4.5	$30,639 - $36,977	$32,119 - $38,763
5.0	$36,978 - $38,921	$38,764 - $40,801
5.5	$38,922 - $41,837	$40,802 - $43,858
6.0	More than $41,837	More than $43,858

APPENDIX B

Table 7   ***Description of the Variables in the Models of the Determinants of Decisions to Defer HECS for All Students***

Variable	Description	Mean	Std Dev.
Decision on Deferring HECS			
DF	This is the decision on deferring HECS where *DF* = 2 if the student defers all of their HECS; *DF* = 1 if the students defers some of their HECS and *DF* = 0 if the student pays their entire HECS up-front.	1.59	0.81
Commencing Student Status			
New	Dummy variable for students who commenced their current course in 2002.	0.32	0.47
Nonnew	Omitted category.	0.68	0.47
Attendance Mode			
External	Dummy variable for students who studied all their units outside the tertiary institution or the tertiary institutions' facilities.	0.10	0.30
Multi	Dummy variable for students who studied some of their units outside the tertiary institution or the tertiary institutions' facilities and some of their units at the tertiary institution or the tertiary institutions' facilities.	0.05	0.23
Internal	Omitted category.	0.85	0.36
Attendance Type			
Part-time	Dummy variable for students whose aggregate Equivalent Full-time Student Units (EFTSU) for all the courses was less than 0.75.	0.25	0.44
Full-time	Omitted category.	0.75	0.44
Gender			
Female	Dummy variable for female students.	0.58	0.50
Male	Omitted category.	0.42	0.50
Age			
Age18	Dummy variable for students who were aged 18 years at the end of 2001.	0.14	0.35
Age19	Dummy variable for students who were aged 19 years at the end of 2001.	0.15	0.36
Age20	Dummy variable for students who were aged 20 years at the end of 2001.	0.14	0.35
Age21	Dummy variable for students who were aged 21 years at the end of 2001.	0.10	0.31
Age22_30	Dummy variable for students who were aged 22 to 30 years at the end of 2001.	0.25	0.44
Age31	Dummy variable for students who were aged over 30 years at the end of 2001.	0.15	0.36
Age<18	Omitted category.	0.07	0.26
Birthplace			
OS	Dummy variable for overseas-born students.	0.17	0.37
Aust	Omitted category.	0.83	0.37
Language			
NoEng	Dummy variable for students who do not speak English at home.	0.13	0.34
Eng	Omitted category.	0.87	0.34
Indigenous Status			
ATSI	Dummy variable for Aboriginal or Torres Strait Islander students.	0.01	0.10
NonATSI	Omitted category.	0.99	0.10
Disability Status			
Disability	Students who identify themselves as having a long term disability.	0.04	0.19
NonDis	Omitted category.	0.96	0.19
Socioeconomic Status			
Index	Continuous variable for the socioeconomic status of students' home address measured by ABS's *Index of Economic Resources*. In the model the index is scaled by one hundred.	10.39	0.83

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