Australian Student Loans

Bruce J. Chapman and Ann Harding*
Centre for Economic Policy Research, Research School of Social Sciences, Australian National University
and National Centre for Social and Economic Modelling, Faculty of Management, University of Canberra, respectively

Abstract

The Australian Government introduced the so-called 'AUSTUDY Supplement' in the 1992–93 budget. The scheme gives AUSTUDY recipients the option of trading in up to $2000 per year of their grant for $4000 of an income-contingent loan, to be paid back according to the current HECS arrangements, implying that the Government is acting as an insurer against future default by students. This article addresses the theoretical basis of the scheme, and explores two related questions: will it be in the financial interests of average students to take up the option? and what is likely to be the take-up rate of loans? Through the use of both cross-sectional data and the HARDING microsimulation model it is demonstrated that for many students the loan option will result in financial advantages, and that the take-up rate is likely eventually to be high.

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1. Introduction

The 1992–93 Australian budget saw the introduction of the 'AUSTUDY Supplement', an income-contingent optional loan scheme for tertiary students. This is the first student loan scheme offered in Australia and it was preceded by widespread public debate and controversy promoted by the release of the Government-initiated report *AUSTUDY: Towards a More Flexible Approach* (Chapman 1992). The loans model behind the policy change is explained and analysed in that Report.

As background it is useful to note the basic rationale for governments offering income support for prospective students. Essentially the goal of such intervention is to break the nexus between parental (or, more generally, family) income and individuals' access to an expensive investment, higher education. In part what follows is an analysis of the costs and benefits of alternative government approaches to the issue, but broader questions related to prospective students' access to the system—such as those concerning supposed unmet demand—are not considered.

The major tenet of the new policy is that students in receipt of AUSTUDY grants are able, if they so choose, to trade in up to $2000 per annum of their grant for a doubled amount of a loan, with an apparent zero real interest rate.[1] The loan is to be paid back through the tax system if and only when former students' personal incomes exceed a particular threshold (set in the budget at $27 700 per annum in 1992 terms). The framework is thus closely analogous in spirit to the Higher Education Contribution Scheme (HECS), the income-contingent charge system introduced in Australia in 1989.[2] The repayment conditions for the loan are the same as those applying to HECS.[3]

The basic arguments for the new policy are that:

(i) The existing scheme is insensitive to the financial circumstances of individual students, in

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that little account is taken of such things as parental willingness to share income, important rent differences between regions, and the relative lack of part-time and holiday employment in recessions. These factors imply that at current grant levels a significant number of poor prospective students are not being provided with enough assistance to break down barriers to the system.[4]

(ii) To simply expand the level of AUSTUDY grants to resolve the above problem would deliver additional financial resources to many individuals who will be significantly advantaged in a lifetime sense, and could thus be seen as a 'regressive' change to lifetime income distribution.[5]

(iii) A trade-in loan offers choice and thus increased flexibility, can be designed to be progressive and should have a high take-up because prospective debtors are protected from the costs of default by the income-contingent nature of repayment.

This article explores relevant aspects of the last of these propositions, addressing in particular the question of whether or not income-contingent loans are likely to be attractive to prospective students. If so, incorporating loans of this type into policy provides an opportunity to improve current arrangements. If not, AUSTUDY reform of this type will not be particularly effective since take-up will be low.

The approach adopted is to explore the implications of various grant and loan arrangements, including commercial loans, through an analysis of their effects on the internal rate of return to investment in higher education. Marginal changes in the attractiveness to individuals of university attendance can be used as indirect evidence as to whether policy initiatives are likely to encourage or discourage participation in tertiary education.

As well as calculating the financial costs and benefits of various scenarios from average cross-sections, we present two further innovations involving the use of a recently developed lifetime micro-simulation model. One is the investigation of changes to average rates of return to investment in higher education in a simulation of individuals' lifetime experiences. The other is an examination of the proportions of students for whom the trade-in loan is financially attractive. The latter allows some insight into the likely take-up rate of the loans option in 1993 and beyond.

2. Conceptual Issues

2.1 The Role of Student Income Support

Student income support, defined broadly, is a term for government schemes which provide financial assistance at the time of individuals' study. Government intervention is warranted if the market underprovides education, which could happen for two reasons. One is that private lenders will offer fewer financial resources than is socially desirable given the lack of collateral associated with human capital investments. Prospective borrowers may also demand less commercial financial assistance than is socially optimal if they are risk averse and place a high weight on the possibility of defaulting on the loan.

The aim of government intervention is to reduce students' indirect costs by mitigating against the impact of income forgone on the human capital investment process. Public sector involvement is typically justified through allusion to the inadequate functioning of capital markets and the implications this has for the access of the poor to the higher education system. Consequently policies are generally aimed at a subset of the prospective student body according to a set of targeting rules.

Australian student income support is currently based on a means test on family income and assets. The grant decreases as parental and individual incomes rise, with an age rule helping to define the notion of 'independence' (from parental income support). Understanding these targeting criteria and their implications for the access of financially disadvantaged prospective students is an important issue for policy.

Broadly there are three types of targeted student income support: grants, subsidised commercial loans, and income-contingent loans (ICLs). The crucial differences lie in their repayment conditions: grants require none, commercial loans require repayment in a set time period, and ICLs require repayment conditional on personal income. The only type of scheme used in Australia to this point has involved grants.[6]

2.2 The Implications for Income Distribution of Student Assistance Policy

Targeted income support arrangements are designed to change the behaviour of students from poor backgrounds. The greater a scheme's effectiveness in so doing, the more propitious is the policy at redistributing opportunity to the less advantaged. But the redistribution is not straightforward since while

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individuals may be very poor as students, over their lifetime they may well be advantaged.

In what follows assessment of the efficacy of schemes gives weight to a *lifetime* income distribution perspective. On this basis a scheme which distributes resources to poor students who would have enrolled anyway, without actually changing the behaviour of poorer individuals who might have been encouraged to enrol, is considered to be relatively ineffective. Under the assumption that most graduates belong to the lifetime advantaged[7], policies with effects just described do not assist the poor. In general, the less student support influences choices, the more regressive it is likely to be in a lifetime sense.

It follows that the relative impact of the three approaches on the distribution of income depends on their effectiveness in influencing the choices of prospective students from financially disadvantaged backgrounds. For any given initial outlay in student income support, well-targeted grants have the highest potential to influence behaviour. Because there is no repayment, a grant offers the greatest reward—and a zero impost—for continuing in education. But grants have potentially adverse distributional consequences.

In distributional terms loan schemes have the advantage over grants in that they require some repayment from former students, many of whom will have become members of the lifetime income advantaged group. But several crucial differences exist between the two types of loans schemes related to their potential to influence distribution. They arise because of the repayment conditions of the loans.

The first important difference is that, unlike commercial loans, ICLs take away from prospective students the costs associated with default, such as attaining a poor credit rating. Defaulting on a loan can imply a lack of future facility to borrow at favourable terms for other purposes (for example, housing). The take-up of ICLs is therefore likely to be greater for risk averse prospective students than would be the case for commercial loans.

In other words, ICLs allow governments to act in an insurance capacity for the investor, potentially reducing significantly the borrowing risks for the student. This is the essential reason why, on the face of it, this type of loan is unlikely to have deleterious consequences for educational participation of the targeted group.[8] If the income threshold of repayment is sufficiently high and the repayment rates relatively low, there is almost no prospect of default or bankruptcy, and a minimal likelihood of having to sell assets to repay the debt. Because they lack this feature, commercial loans are less likely to diminish the financial barriers to education for the disadvantaged.

The second important distinction between the loans approaches is that ICLs redistribute income within the targeted group towards the less advantaged.[9] So long as there is an interest rate subsidy such a policy means that those former students earning higher incomes relatively quickly will pay more, while those earning low incomes are receiving more of an interest rate subsidy from the government for every year in which they have outstanding debt. Commercial loans do not have this feature, because even if there is a subsidy there is no direct redistribution on the basis of income when the repayment contingency is time.

For all of the above reasons, ICLs offer an important potential solution to the problems associated with government financing of student income support. They are distributionally superior on a lifetime basis to grants for any given level of take-up and, because there is some repayment, allow more prospective students to be offered assistance for any given level of initial outlay. As well, ICLs are likely to be more progressive than commercial loans because repayment is determined by income. The default protection inherent in the income-contingent nature of repayment further suggests a relatively high take-up potential from risk averse prospective students.

In the current Australian policy context little of the above analysis is particularly interesting if the ICL conditions offered are such as to imply a lack of student participation in the scheme. It is thus essential to explore the potential impact for prospective students of the new approach.

3. Estimating the Impact of Types of Student Income Support on the Demand for Higher Education

An important distinction made by economists is that between consumption and investment. Expenditure on consumption items yields immediate satisfaction or benefits to the consumer but, in contrast, investment items are purchased currently with the benefits accruing only in future periods.

Prior to the early 1960s it was uncommon to regard education as anything more than a consumption item, like food or clothing. But the work of Schultz (1961), Becker (1964), and others dramatically altered the way economists view such expenditures. In his presidential address to the American Economic Association in 1960, for example, Schultz argued strongly for expenditure on education (and, in general, all activities which improve the capacity and productivity of human resources) to be treated as an investment. The essence of the framework is that education provides individuals with an opportunity to

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acquire 'human capital' at a cost (forgone earnings and other direct costs such as fees), with the expectation of higher earnings in the future.

Thought of in this manner, it is sensible to ask how profitable education is relative to other investment opportunities available to the individual. Cost–benefit analysis techniques have been used to demonstrate the private and social profitability of education. From the individual's point of view, profitability (in a wealth-maximising perspective) depends on the cost, the expected returns, and the personal discount rate.

Formally, an individual's earning maximisation decision can be expressed as follows. Let the present value associated with the two income streams be denoted by VA and VB, respectively. Then,

$$VA = \sum_{t=0}^{R} \frac{Yu}{(1+r)^t} \quad (1)$$

$$VB = \sum_{t=0}^{R} \frac{Ynu}{(1+r)^t} \quad (2)$$

where Yu and Ynu are respectively expected net income from higher education use and higher education non-use, t is time, R is expected length of time in the workforce and r is the individual's discount rate.

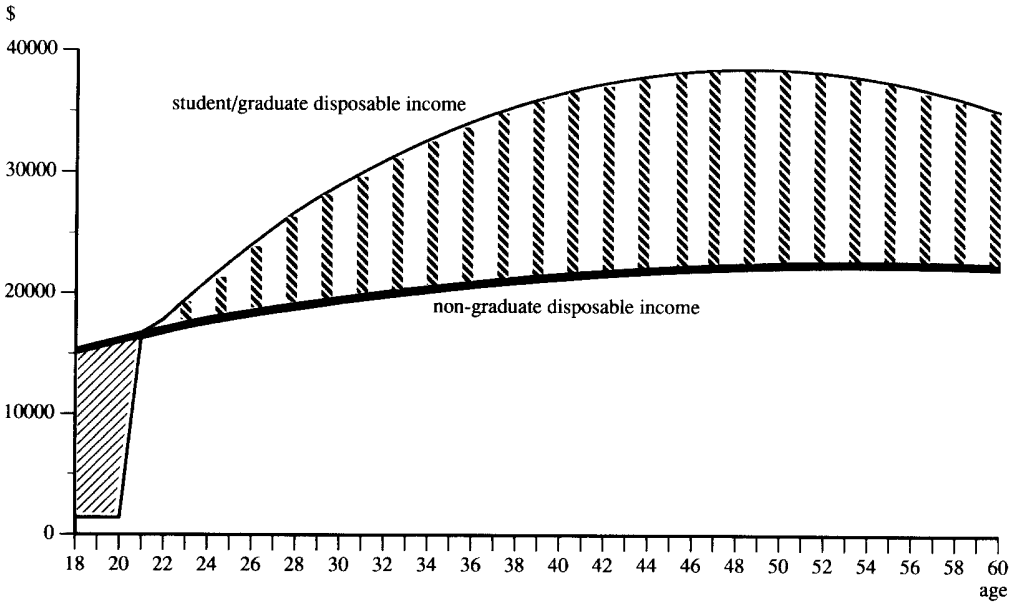
The net present value (NPV) associated with investing in higher education is given by (VA – VB). Whenever NPV exceeds zero, the investment is considered profitable from the individual's point of view, and the rational (assumed to be wealth-maximising) decision would be to enrol.

An alternative way of making the same comparison is to calculate the value of r which equates VA and VB, which is known as the 'Internal Rate of Return' (IRR). The decision rule is that if the IRR exceeds the individual's discount rate the investment is considered profitable, the advantage of this approach being that it presents us with an easily understood summary statistic. More generally, the IRR is a measure of the financial attractiveness of higher education, as changes to its value reflect variations in the private costs and benefits of university graduation.

Chart A shows the financial dimensions of a prospective student's choice, using conventionally shaped age–income profiles. The first shaded area represents the costs—the income forgone from, in this example, three years of full-time study—with the second shaded area representing the benefits—the additional income of graduates over non-graduates. The IRR associated with the higher education investment process is the rate of interest which equates the present values of the illustrated costs and benefits.

Grants, ICLs and commercial loans affect the calculation in the following ways. All three student income support policies decrease the investment costs by providing income in the period of study. However, for grants there is no pay-back, meaning that the student's future disposable income is unaffected. Loans of either variety reduce the gap

Chart A Financial Costs and Benefits of Full-Time University Study



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between graduate and non-graduate disposable income in different ways.

While ICLs and commercial loans both reduce the student's forgone income, the impact of the policies differs significantly in terms of the timing and the extent of future repayment obligations. Commercial loans tend to require earlier repayment than do ICLs. In Chart B, for example, this is made clear through a comparison of the postgraduate income decrease associated with contemporary repayment conditions from commercial loans with those associated with an ICL and current HECS rules.

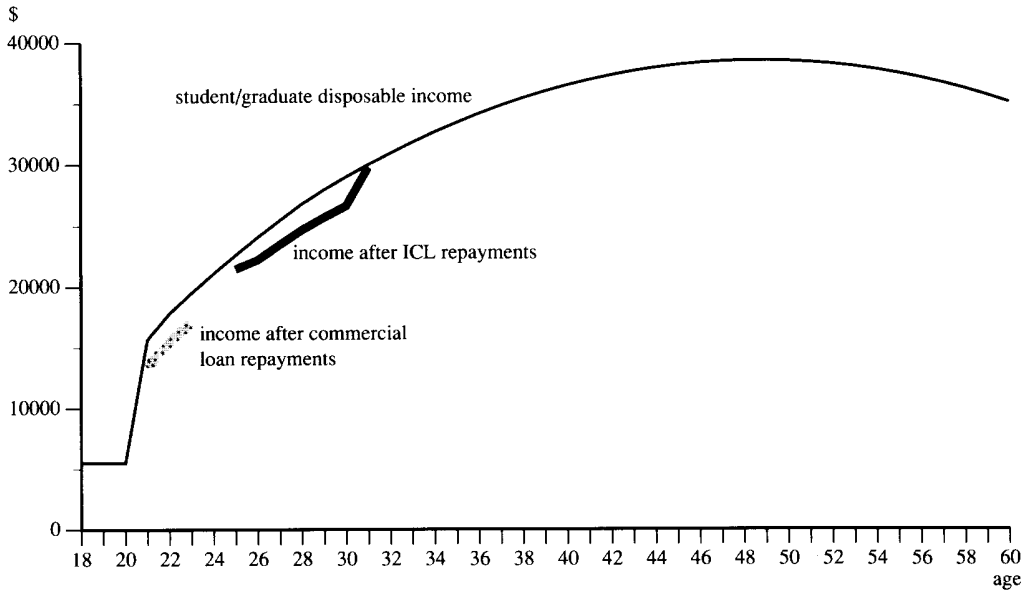
For students aged 18 to 21 the thin line shows student income assumed to be $5500 per annum, which can come from either (the average) $3500 AUSTUDY grant plus $2000 commercial loan, or from the trade-in of $2000 of the AUSTUDY grant for $4000 of an ICL (added to the remaining $1500 of the grant after the trade-in). In this example, the student receives around $16 000 per annum in the first year after graduation, rising to a peak of about $38 000. The patterned line shows the income of the graduate repaying the commercial loan, and the thick line shows the income of the graduate repaying the ICL[10].

From the chart, individuals taking different options have the same income as students, with the commercial loan requiring repayment of a smaller amount but having to be paid off soon after graduation irrespective of income. On the other hand, ICLs of the trade-in variety require a greater (undiscounted) payment for any given increase in student income support because of the need to forgo part of the existing grant. For the suggested conditions of the ICL the repayment is further in the future, contingent on income, and at a relatively low annual level. These characteristics tend to decrease the net present value of the repayment obligation and concomitantly increase the relative attractiveness of ICLs. In the students' implicit calculation these benefits need to be compared to the costs associated with having to trade in part of the grant for the ICL with a $1 for $2 ratio.[11]

The extent to which grants, ICLs and commercial loans impact on the IRR associated with investment in higher education is an empirical question. For any given set of repayment parameters the most important factors affecting this calculation relate to the expected incomes of graduates and non-graduates.

Different data sources can be used to explore changes in the IRR associated with particular higher education student income support policies. Having alternative information allows insight into the likely sensitivity of results to the particular graduate and non-graduate income scenario under investigation. Two completely different data sources are used in the following analysis to calculate the effect of the loans on rates of return. The first part of the analysis, presented in Section 4, focuses on the results from a broadly based data source, the 1985-86 Income Distribution Survey (IDS). The second part of the analysis, outlined in Section 5, uses a lifetime microsimulation model to examine rates of return. To illustrate the potential take-up rate of ICLs the microsimulation approach is used in Section 6 in an

Chart B The Effect of Loans on the Financial Attractiveness of Full-Time University Study



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assessment of the proportion of students who will be advantaged by taking this option.

4. Internal Rates of Return Using IDS Data

The income information now used is drawn from the sample file of the IDS. The survey has extremely good quality data and the number of observations is adequate for a useful analysis. The income profiles are for both males and females and have been inflated to 1992 dollars (using increases in average weekly earnings by sex)[12] and adjusted for single person tax rates.

The 1985–86 survey contains data about age, sex, school-leaving age, and details of post-school qualifications. The amount the individual received in 1985–86 from many different sources is known, including: wages and salary, own business or farm, own partnership, and unemployment benefits. Only earned income for those working full-time was used in the analysis.[13]

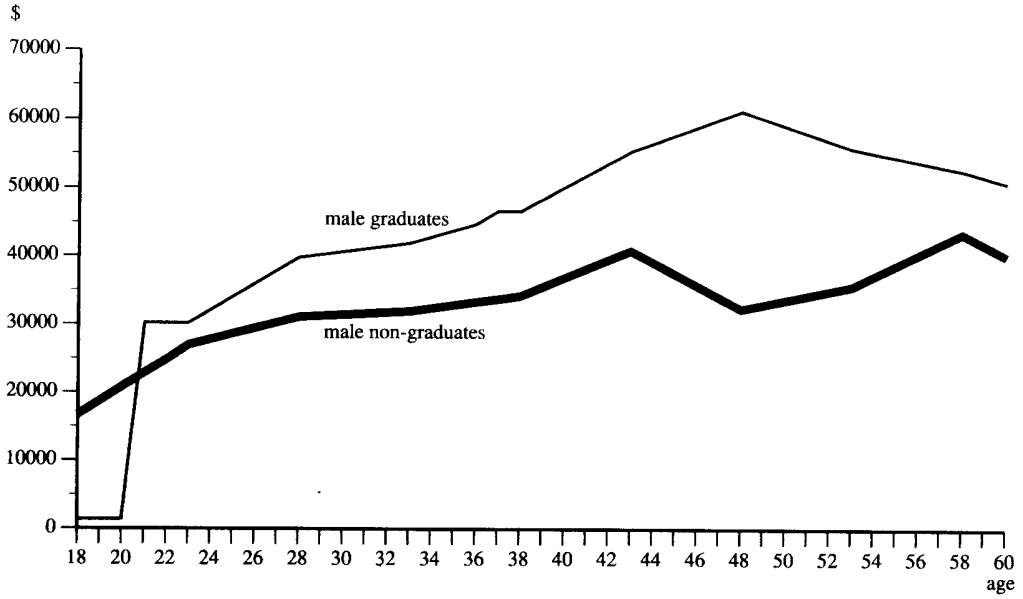
For the hypothetical individuals described below a degree-holder is defined as anyone with a Bachelor or higher degree or postgraduate diploma, and a high-school leaver is defined as anyone who finishes school at age seventeen or above and does not possess any post-school qualifications. The data do not permit us the luxury of more disaggregated analysis.

The net income received whilst studying has the potential to have a major impact on calculations of the IRR to higher education. The Commonwealth Department of Employment, Education, and Training (1987) estimated that in 1984 the average course-related expenses (union and general service fees, cost of books, stationary equipment, materials, etc.) for a university undergraduate amounted to $595. Also, the data reveal that university students not on student assistance schemes averaged $1483 in income from employment during the year.[14] Converting these figures into 1992 annual dollars and rounding off, it is assumed that the direct cost to the individual of studying amounts to $900, earnings are $2270, leaving adjusted student income at $1370.

These data make up part of the average income profiles derived directly from the IDS, which are presented in pre-tax form in Charts C and D. The data illustrate what is very familiar to students of Australian (and other countries') age–income profiles: a clear cost and benefit associated with investment in higher education; and a relative steepness in the more highly educated profiles.

Analysing the effects of particular changes to student income support can be clarified by considering (hypothetical) men and women in 1992, whose potential average lifetime earnings are implicitly reflected in Charts C and D. The individuals have finished year 12 at age 18 and have the options of joining the workforce without any further formal education and receiving for the rest of their lives the average after-tax income of the group of their sex working full-time with this level of education or, alternatively, of attending university full-time for three years after which they receive the average measured income of graduates of their sex.[15]

Chart C Male Graduate and Non-Graduate Average Age–Income Profiles



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The question for university attendance is whether or not to incur the discounted cost of the forgone earnings—illustrated by the first shaded area in Chart A—in order to derive the investment return in the form of higher future earnings given by the second shaded area. The approach allows useful comparisons between the various student income support possibilities. As well, it is possible to gain some insights into the likely effects of HECS on the returns to higher education investments[16] and the relative attractiveness of commercial loans.

An important qualification relates to the possibility of there being a supply response to changes in the IRR associated with different loan scenarios, which would imply that the initial differences are not sustained. But in this context it is pertinent to note that even with the extraordinary expansion in the number of graduates over the past twenty years or so, Chia (1990) found that the calculated IRRs were very robust; for example, his research suggested that the returns to males from higher education actually increased between 1976 and 1986. This implies that any short-term variations in the IRR from policy are not likely to disappear quickly.

Further by way of qualification is that there are several factors at work here which imply biased upwards estimates of the return to higher education. One is from the data used, in that the returns to a three-year degree have been calculated using the broad category of 'graduates', which includes a small proportion of higher degree holders. Two, as is well known, the so-called returns to educational investments include also the returns to 'ability' and 'motivation', variables which are often argued to be positively correlated with both levels of education and earnings (Griliches 1976).[17] But given that the exercise is an attempt to estimate the effects of policy on *changes* to the IRR, the possibility that the *overall* level of the IRR estimated is perhaps biased upwards is of minor concern only.

The male and female IRR to higher education have been calculated for the following five scenarios associated with each of the expected lifetime income profiles:

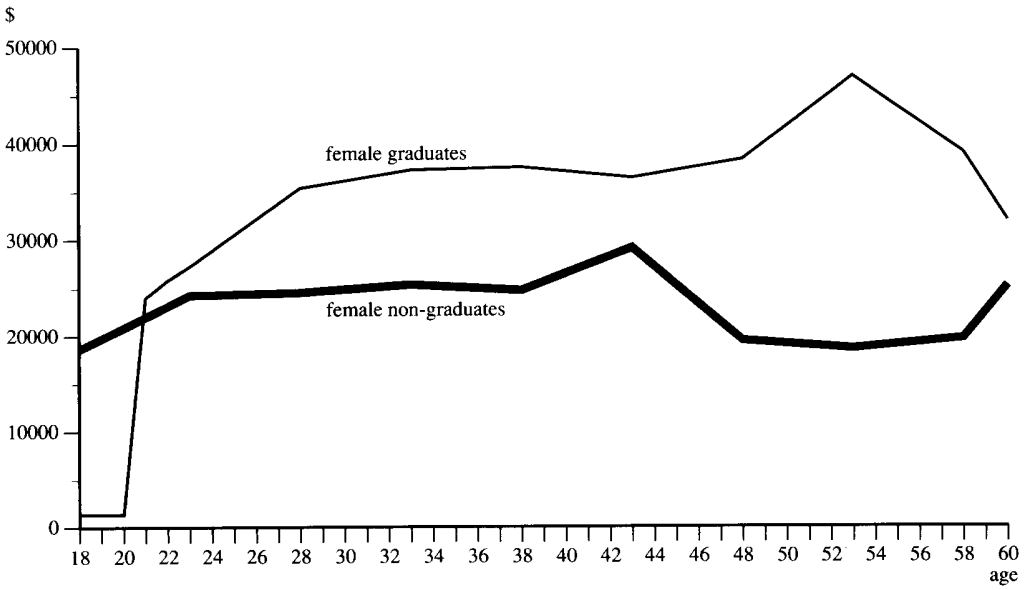
(i) no HECS and receiving no AUSTUDY support (that is, for the costs and benefits implied in Chart A);

(ii) as the system operates in 1992, with a HECS charge of $2250 per year, but with no AUSTUDY support;

(iii) as the system operates in 1992, with a HECS charge of $2250 per year, and in receipt of about the average AUSTUDY grant of $3500 per year;

(iv) as the system operates in 1992, with a HECS charge of $2250 per year, but with the 1993 option of trading in $2000 of the $3500 AUSTUDY grant per year for $4000 of an ICL to be paid back under 1993 HECS conditions; and

Chart D Female Graduate and Non-Graduate Average Age–Income Profiles



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(v) as the system operates in 1992, with a HECS charge of $2250 per year and an average AUSTUDY grant of $3500 per year, with a personal loan of $2000 per year from a commercial bank with repayment conditions as currently apply to such loans.[18]

The results are presented in Table 1. The table should be read as follows. For each scenario the first, second and third columns show respectively the IRR to higher education, the percentage point change to the IRR from the first scenario, and the IRR as a percentage of that associated with the first scenario.

The following five points are of most interest. First, as is usually found, the IRRs to investment in higher education are high and relatively so for females[19]. Males and females receive on average respectively around 13 and 25 per cent return per annum to the investment in higher education. In a qualitative sense the results are similar to those revealed in a host of other Australian studies[20].

The second major point is that the imposition of HECS (necessarily) reduces the financial attractiveness of higher education (comparing scenario 1 with scenario 2), but the extent of the decline is low, of the order of around .75 of a percentage point for the average of males and females. The small difference helps explain why the imposition of HECS has had no obvious effects on the demand for higher education places (Chapman 1992)[21]. This is consistent with there being a considerable average subsidy from HECS given the lack of a real interest rate and the pay-later provisions of the scheme.

Third, the IRR increases associated with the AUSTUDY grant (comparing scenario 2 with scenario 3) are large: of the order of 3 and 7 percentage points for males and females respectively. This implies that removal of the grants and offering no alternative assistance would have a discernible effect on the overall demand for higher education. Since AUSTUDY is targeted on the basis of family income this suggests also that removal of the scheme would have significant consequences for the socioeconomic composition of higher education applicants.

Fourth, and of most interest for the recent policy change, is that trading in $2000 of the grant for a $4000 ICL repayable according to HECS parameters (comparing scenario 3 with scenario 4) results in an *increase* in the average financial attractiveness of higher education. The orders of magnitude for males and females respectively are around .85 and 6 percentage points, or about a 7 and 25 per cent increase in the IRR compared to the current grant scheme. This implies that the average AUSTUDY recipient in circumstances similar to those of the hypothetical individuals will be financially better off in net present value terms by taking up the Government's option of trading in part of their grant for an ICL.

The relative increase for women reported above is the result of females receiving a greater subsidy from an ICL with no real rate of interest, essentially because female graduates earn lower incomes than their male counterparts. As noted, an ICL policy of

Table 1 Returns to Higher Education Using IDS Data

	IRR (per cent per annum)	*Percentage point difference to 1*	*Proportion of 1*
Males			
Scenario 1: No charge or income support	13.17		
Scenario 2: HECS	12.34	–0.83	0.94
Scenario 3: HECS + AUSTUDY grant $3500	15.30	2.13	1.16
Scenario 4: HECS + AUSTUDY grant $1500 + ICL $4000	16.15	2.98	1.23
Scenario 5: HECS + commercial loan $2000 + AUSTUDY grant $3500	15.88	2.71	1.21
Females			
Scenario 1: No charge or income support	24.55		
Scenario 2: HECS	23.90	–0.65	0.97
Scenario 3: HECS + AUSTUDY grant $3500	30.87	6.32	1.26
Scenario 4: HECS + AUSTUDY grant $1500 + ICL $4000	36.68	12.13	1.50
Scenario 5: HECS + commercial loan $2000 + AUSTUDY grant $3500	34.00	9.45	1.38

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this kind cross-subsidises those in the group targeted whose lifetime incomes are relatively low. The extent of this progressivity is determined by the repayment conditions of the loan as well as the measured lifetime incomes[22].

Finally, taking a commercial loan to increase financial resources to the level of the grant plus the trade-in ICL is apparently slightly less attractive on average than the trade-in, but still offers a greater return than not taking any loan. This implies, with an important qualification, that average student financial welfare is higher from taking a commercial loan, but only if an ICL is not an alternative.

There are two caveats pertinent to the final conclusion. The direct comparison of the commercial loan IRRs with those associated with either the grant only or the grant plus the ICL is only strictly valid if all potential students are risk neutral. Given the possibility of defaulting on the commercial loans, for risk averse potential students the comparison of non-risk-adjusted IRRs systematically biases upwards the advantages of taking the commercial loan (Chia 1990).

The other point to make here is that for many students the commercial loan option is not available because—as noted in the conceptual discussion—capital markets are such as not to provide generally for human capital investments, essentially because of the risks associated with underwriting of investments that do not provide easily saleable assets in the event of default. Typically banks require guarantees and/or an established savings record for student loans, meaning that commercial financial assistance is less likely to be available to those from the poorest backgrounds. Again, this implies that the potential advantage to prospective students of the ICL has been understated by the above results.

5. Internal Rates of Return Using Lifetime Microsimulation Modelling

The above approach is commonly used in assessing rates of return. However, there are some questions about its robustness as a tool for analysing the impact upon rates of return of student loans and grants. For example, because there are differences in the labour force participation patterns of female graduates and non-graduates, it is likely that only using the earnings of females working full-time to analyse rates of return could produce inaccurate results. Similarly, using the earnings of graduates working full-time only could overstate how quickly these individuals repay ICLs, thus understating the advantages of the ICL relative to the alternatives. Consequently, an alternative modelling approach is now reported.

The data source is the HARDING lifetime microsimulation model, which tracks 4000 simulated Australians year by year from their birth to their death. This model potentially provides a much richer tool for examining these issues than those models and data sources traditionally used by economists, as it employs the relatively recently developed techniques of dynamic microsimulation to allow the characteristics of all individuals within the model to change every year (so that, for example, individuals may enter or leave the labour force, get married or divorced, and so on). This means that the model allows for the constant changes in the circumstances of individuals which longitudinal data reveal in the real world (Elder 1985; Duncan 1984), albeit being based mainly on cross-sectional information.

The processes simulated in the model for each individual for each year of life, described in more detail in Harding (1992, 1993), include: mortality, marriage, divorce and fertility; disability; pre-school usage and attendance at a range of different primary, secondary and tertiary sectors; and paid labour force participation, including hours in employment or unemployment each year.[23]

While the standard approach to measuring rates of return often only incorporates average income, the HARDING model is unusual in also capturing the effects upon rates of return of the impact of marital status and the number of children (which affect paid labour force participation), long-term unemployment, differential mortality and so on. For example, a small proportion of female graduates marry young and never return to the paid labour force after bearing children, while others never marry, never bear children and have labour force participation patterns which resemble those of many males. This diversity, and its impact upon the IRR, can now be incorporated in the calculations.

It is thus possible to identify those individuals who graduated from tertiary studies and compare their lifetime earnings profiles to those of non-graduates. For the analysis the lifetime records of two groups were used: those males and females who completed year 12 of schooling, who enrolled in full-time higher education between the ages of 19 and 21 and graduated; and those males and females who completed year 12 of secondary schooling, who between the ages of 19 and 21 inclusive did not enrol in full-time higher education or full-time TAFE, and did not become graduates later in life.

An attempt was made to make the two counterfactuals as similar as possible to those reported in Section 4, so that full-time university students were also assumed to receive income of $1370 per year, the same single person income tax scales were used, and

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the same five scenarios were considered.[24] The chief difference between the two data sources was that in the lifetime case there was no assumption that individuals were working full-time for pay; in contrast, for example, the individuals could drop out of the labour force to bear and raise children, go overseas or undertake further study, or could work part-time and retire before age 65.

The world simulated was that of 1986, so that tertiary education participation, unemployment and paid labour force participation rates, for example, were those applying at that time. However, while all of the income values in the model were originally in 1986 dollars, for this analysis self-employment income was inflated by movements in the relevant National Accounts aggregate to 1992 dollars. Similarly, wage and salary earnings were inflated by the movement in average weekly earnings for each sex between 1986 and 1992.

The results are presented in Table 2. While the actual level of the rates of return are slightly lower in the lifetime data than those calculated using the IDS data, some discrepancy should be expected given the radically different modelling techniques and the slight differences in the counterfactual. Of more interest is whether the conclusions about the differences in rates of return between the different student support options are changed.

In both the IDS and lifetime microsimulation modelling cases, as expected, HECS reduces the rate of return apparent in a non-HECS world, by a similar amount for both males and females. In addition, for males, the addition of a $3500 AUSTUDY grant under scenario 3 produces much the same proportionate increase in the rate of return under both modelling scenarios. However, for females, the AUSTUDY grant produces a much higher increase in the rate of return in the lifetime data (41 per cent higher than scenario 1) than in the IDS data (26 per cent higher). More importantly, for both males and females the lifetime data show even greater increases in the rate of return as a result of the ICL under Scenario 4 than does the cross-sectional IDS data.

The above suggests that for males and, to an even greater extent, for females, life paths after initial graduation result in lower ICL repayments than an analysis of the earnings of full-time workers would suggest. This may be due, for example, to graduates: taking extended holidays after graduation; returning to further full-time study; experiencing unemployment; or engaging in child-rearing activities during the period when the loan would otherwise be repaid. None of these possibilities is captured properly in the estimations using the full-time cross-sectional data of the IDS.

The most important finding is that the simulated lifetime data do not reverse, but instead reinforce, the conclusion reached by use of the IDS data: rates of return are *higher* under the AUSTUDY grant/ICL combination than under the AUSTUDY grant scenario. Further, the results suggest that using the standard methodology *understates* the attractiveness of ICLs relative to grants. This is presumably

Table 2 Returns to Higher Education Using Lifetime Data

	IRR (per cent per annum)	*Percentage point difference to 1*	*Proportion of 1*
Males			
Scenario 1: No charge or income support	11.19		
Scenario 2: HECS	10.59	–0.60	0.95
Scenario 3: HECS + AUSTUDY grant $3500	13.25	2.06	1.18
Scenario 4: HECS + AUSTUDY grant $1500 + ICL $4000	14.18	2.99	1.27
Scenario 5: HECS + commercial loan $2000 + AUSTUDY grant $3500	13.69	2.50	1.22
Females			
Scenario 1: No charge or income support	18.22		
Scenario 2: HECS	17.68	–0.56	–0.97
Scenario 3: HECS + AUSTUDY grant $3500	25.73	7.53	1.41
Scenario 4: HECS + AUSTUDY grant $1500 + ICL $4000	34.63	17.67	1.97
Scenario 5: HECS + commercial loan $2000 + AUSTUDY grant $3500	31.44	13.22	1.73

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because using the average earnings by sex of full-time workers for calculating how quickly ex-students repay loans does not capture the diversity in the income of graduates; not all graduates either work full-time for pay or receive average earnings, which are critical factors in determining the extent and timing of ICL repayments.

6. Estimating the Likely Take-Up of Loans

The results of Sections 4 and 5 suggest that the statistically average (and thus hypothetical) male and female students will experience increases in rates of return to higher education investments as a result of taking up the new ICL option. But this in itself offers little information about the likely *proportions* of 1993 AUSTUDY recipients trading in the maximum level of grant for a doubled ICL. The reason this is a complicated calculation is now explained.

The relative attractiveness of the new scheme will differ between all individuals, the major reason being that students or prospective students will have idiosyncratic expectations of the time stream of future income, on which repayment of the loan depends. There are many reasons for this, and to offer a few examples:

(i) students close to graduation are more likely to reach the first income repayment threshold quickly and will thus be receiving a relatively low total interest rate subsidy;

(ii) students in areas of study in which occupational earnings are high (low) will receive low (high) interest rate subsidies;

(iii) within occupations, students will have differing expectations of expected incomes because of their perceptions of inherent ability or because of implicit trade-offs in income for non-wage job benefits;[25] and

(iv) students who expect to be out of the paid labour force for a period (for example, for child-rearing), who thus would expect to receive a greater subsidy.

Because of the above contingencies, no simple statement can be made about the likely take-up of the ICL option, even though the more aggregative analysis implies that the *average* prospective student defined in the analysis above will be made better off by taking the trade-in option. What follows is an analysis using the microsimulation model aimed at determining the proportion of students followed in the simulation who would be better off trading in $2000 of their grant for an additional $4000 loan for each year of a three-year degree. The approach uses calculations of the net present value of this strategy as illustrated in equations (1) and (2) above in a way now explained.

Trading in a grant of $2000 for a $4000 ICL means that individuals as students have an extra $2000 per year for three years, but that individuals as graduates are required to repay (over time but at a zero interest rate) the whole $4000 for each of the years, or $12 000 in total. Several factors will matter in this calculation. The first is expected future income, which conditions the time stream of repayments. The second is the individuals' time preference which is unknown and thus needs to be imposed; to cover a reasonable range of possible experience, we have used discount rates of both 5 and 10 per cent, acceptable rates in exercises such as these.

For individuals to find the loan trade-in desirable, the time stream of benefits (the availability of the loan income when studying) needs to exceed the time stream of costs (the repayments once the first income threshold of repayment is reached). Thus the exercise entailed the calculation of these numbers for each person in the microsimulation, the important summary statistic being the ratio of those for whom the calculation yields a positive result to the total number potentially taking out the loan. The results are presented in Table 3.

The major points from the table are as follows:

(i) The proportions estimated of those who will be advantaged by taking up the ICL option are quite high, varying from about 29 per cent for males at the lower discount rate, to almost 90 per cent for females at the higher discount rate.

Table 3 Proportions of Students Financially Advantaged by Taking the Trade-in Loans Option
(per cent)

Discount rate (per cent per annum)	*Males*	*Females*	*Total*
5	28.9	60.7	44.5
10	67.6	88.8	78.0

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These calculations suggest that the predictions of the likely take-up of ICL contained in Chapman (1992), of about 30 per cent in the introductory year, are moderate.

(ii) The results are quite sensitive to the rate of time preference used. For example, use of the relatively low rate of 5 per cent reveals that a total of about 45 per cent would be financially advantaged by trading in their grant for an ICL. But at the higher rate of 10 per cent, the total proportion advantaged increases to almost 80 per cent[26]. Because it is hard to know what the 'true' discount rate actually is, these large differences imply the need for circumspection in a forecast of what the likely take-up proportion will be.

(iii) A higher proportion of women than men will be advantaged by taking up the trade-in option—about double and 20 percentage points respectively at discount rates of 5 and 10 per cent. The differences, however, may be more apparent than real. This is because the continuing increases in the paid labour force participation rates of women mean that the 1985–86 data on which the calculations are based are highly likely to understate the expected future incomes of female graduates because of the ongoing trend. As female incomes increase from this factor, so too does the advantage decrease of taking an interest rate subsidised ICL. At the same time, likely higher unemployment rates suggest that the advantages to males of an ICL might be greater than suggested here. Over time it is expected that the female take-up rates of the ICL will approach those for males.

A caveat or two on these conclusions is necessary. The first is that the hypothetical scenarios used in these calculations are for individuals initially enrolling in higher education who have at least three years in front of them before any loan repayments are required. This will tend to exaggerate the benefits of the trade-in, because the longer it takes for an individual student to begin to pay back the loan, the greater is the government subsidy through the lack of a real interest rate once the debt is incurred. Students in their final years of study will in general have less to gain from the ICL option.

Second, and in contradistinction to the above, we have not modelled a particular aspect of the new Government policy. This is that repayments of the loan have a five-year 'holiday', with none being required until 1998. Incorporating this feature of the scheme must increase (or leave unchanged) the net benefits of the trade-in, simply because it offers a deferral of the repayment for a small proportion of the student body who otherwise would have been expected to begin repaying; this implies a concomitant higher interest rate subsidy for this group.

Finally, there are reasons to believe that there is underestimation in the presumed take-up rates estimated because of the lack of weight given to the default insurance implicit in ICLs. That is, because there are no (or low) costs associated with not repaying the debt, since this happens as a consequence only of having low taxable income, it should be expected that the take-up rates would reflect this protection. A point on this issue more related to the rate of return calculations is that this implies that the comparison of the ICL with the commercial loans systematically understates the advantages of the former.

7. Conclusion

The exercise has allowed some insight into the consequences of offering Australian tertiary students the option of trading in part of their grant for a doubled level of an ICL. For the prospective students considered there is an increase in the rate of return associated with investment in higher education, of a small and considerable amount respectively for males and females. In general, taking a commercial loan (if available) is a less attractive proposition than trading in part of the grant for an ICL, even though no trade-in of the grant is required to gain access to commercial finance. The relative unattractiveness of the commercial loans is a consequence of the need for the debt to be paid back relatively quickly and with no interest rate subsidy.

Of potentially greater importance however, is that commercial loans offer no default protection, meaning that if prospective students are averse to risk the relative advantage of the ICL is understated in the calculations. That is, the new policy offers a borrowing choice to prospective students which is default protected, with the Government acting as the insurer. This fact, and the results presented, suggest that many individuals are likely to take up the new loans.

Two further policy points are worth making. One is that ICLs financed in part by students trading in grants implies that the Government is able to decrease outlays for student financial assistance over time, while at the same time making no prospective student worse off. The Pareto improvement is a consequence of students in effect being allowed to take advantage of the chance to tax their own future earnings to subsidise themselves while studying and

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relatively poor. The extent to which this allows budgetary savings and/or AUSTUDY expansion depends partly on whether or not there is a small or large adverse selection in the process[27].

Finally, from both the conceptual discussion and the results, it appears likely that the institution of the ICL scheme has the potential to decrease income inequality in a lifetime sense compared to current arrangements. Some—perhaps significant—proportion of the taxpayer subsidy from student income support will be repaid under the new arrangements, but only when and if former students are in relatively propitious income circumstances.

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Endnotes

1. It is apparent only because the requirement to trade in $1 grant for each $2 of loan must be associated with more than a zero rate of interest due to the grant forgone. An estimate of the real rate of interest associated with this arrangement is 7 to 8 per cent per annum.

2. For analysis of HECS see Chapman and Chia (1989) and Hope and Miller (1988).

3. That is, annual repayment of the debt starts at 2 per cent of the first threshold of $27 700, and rises to the respective rates of 3 and 4 per cent of taxable income at annual taxable incomes of around $31 000 and $41 000. The debt is indexed to the CPI, meaning there is no real rate of interest.

4. For evidence that the existing arrangements are such as to exclude from participation a significant number of poor prospective students see Chapter 7 of Chapman (1992).

5. Evidence for this proposition is available in the form of the very high internal rates of return to investment in higher education reported in Chapman and Chia (1989), Chia (1990), Miller (1982) and elsewhere. Similarly, Harding (1993) found that the (undiscounted) disposable lifetime incomes of male graduates were almost 60 per cent higher than those of males with no tertiary qualifications, while those of female graduates were almost 90 per cent higher than those of females with only secondary qualifications.

6. The level, form and conditions of delivery of the grants has changed significantly over time. It is clear, for example, that the overall level of per student support has decreased markedly since the mid-1970s because of the demise of the State Teachers' College Scholarships. For description and analysis, see Chapter 4 of Chapman (1992).

7. This proposition is supported strongly in other analyses, with the essential internal rate of return results being replicated in the current study.

8. The evidence on the effects of the HECS scheme on the access to higher education of disadvantaged groups is strongly consistent with this view. For details see Chapter 12 in Chapman (1992).

9. At least as assessed on a personal income basis.

10. For clarity, the illustration ignores the effect of the HECS obligation. It affects both hypothetical cases identically.

11. Rough calculations suggest that, by itself, the trade-in requirement implicitly equates to an effective real rate of interest of 7 to 8 per cent for a typical male graduate.

12. Under the assumption that the average male and female graduate incomes increased by the same percentage as did the respective average weekly earnings for males and females.

13. This is defined as the sum of the pre-tax incomes from wages and salaries, and from own business, trade or profession. No adjustments have been incorporated for investment income or superannuation. This is likely to mean an understatement in calculated rates of return to higher education. There are around 600 to 700 observations in each of the four categories.

14. Those on TEAS, on the other hand, received an average of $2565 in assistance during the year (1984 dollars) and earned an average of $865 during the year.

15. The income profiles are for those recognised in the sample as working full-time at the time of the survey. The most important implication of this is a relative high income for female non-graduates, compared to the average, because female non-graduates are relatively more likely to have worked part-time in the past implying greater work experience and thus higher incomes for female graduates. The sensitivity of results is explained in Section 5 through the use of lifetime microsimulation modelling.

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16. These particular calculations can be compared to those made with cross-sectional data for the initial parameters of HECS, analysed in Chapman and Chia (1989).

17. Relatedly, the estimates do not correct for the self-selection process in which those involved in higher education are more likely to be individuals with a comparative advantage in this activity (Vella & Gregory 1992).

18. The conditions, obtained from several major banks in September 1992, are as follows. For a personal loan of $2000 per year for each of three years as a student, interest is accrued from the time of taking the loan at the nominal rate of 10.5 per cent per annum. The loans are to be paid back within three years after graduating. To make the comparison with ICLs valid the interest rate used in the calculation was changed to the implicit real rate by reducing the nominal rate by 2.5 per cent per annum, which is about the current and expected future inflation rate.

19. The latter point, due to the difference between female graduate and non-graduate income, is mainly because female graduate labour force participation and hours worked are high relative to those of female non-graduates (Beggs & Chapman 1988).

20. See, for example, Blandy and Goldsworthy (1975), Miller (1982) and Chapman and Chia (1989).

21. The story is a bit more complicated than this, however, because at the same time as the Government introduced HECS it abolished the Higher Education Administration Charge, a relatively small up-front fee. This action which by itself would have increased the IRR.

22. It needs to be recognised that, for women specifically, the results will be overstating the benefits of the ICL. This is because female participation and hours worked in the paid labour force in the future will be understated by the use of the 1985–86 cross-section. Women's involvement in the paid labour force is expected to increase over time.

23. In this approach the hypothetical students analysed are implicitly considered to expect future incomes calculated on the basis of a comprehensive range of sources. This provides a more accurate estimate of the consequences of the repayment of the ICL.

24. The counterfactual differs slightly in some respects from that adopted in the IDS data. In the lifetime data the non-graduate group included those who received some post-school qualifications, but not a degree. Similarly, individuals were put through three years of university from ages 19 to 21 (rather than 18 to 20 as in the IDS case), as in reality a minority commence university at age 18.

25. An obvious example here would be for two law students, one expecting to work in Legal Aid and the other as a private solicitor.

26. It is easy to understand why a higher discount rate gives many more individuals advantaged from the trade-in. High discount rates result in a lower value being given to the payments involved and a higher value being given to the initial receipts of the higher level of income support.

27. Students expecting to earn low future incomes have more to gain by taking the ICL. It is interesting to note that estimates using the HARDING microsimulation model suggest that over 90 and 70 per cent respectively of males and females over their lifetimes will pay back their HECS in full (Harding & Chapman 1993). Even so, the interest rate subsidy implicit in both HECS and ICL imply the potential for some students expecting to earn low incomes to take loans and pay back relatively low amounts in net present value terms.

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