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1 The HECS Scheme

1.1 Introduction

1.1.1 The Higher Education Contribution Scheme (HECS) was introduced in 1989 as a means of funding the expansion of the tertiary education sector. Under the scheme, students are required to contribute towards the cost of their higher education when they have the capacity to do so.

1.1.2 The major features of the scheme as it currently operates are:

- a charge for each semester of equivalent full-time study;
- all Australian citizens have the option of paying all or part of their contribution up front or deferring payment. A 25 percent discount applies to full up front payment and partial up front payments of more than \$500;
- New Zealand citizens and permanent residents may under certain circumstances be required to pay up front without receiving the 25 percent discount;
- if any part of the charge is deferred, a HECS debt is established which is maintained in real terms through annual indexation on 1 June in line with the Consumer Price Index (CPI);
- voluntary repayments of outstanding HECS debt may be made at any time. A 15% bonus reduction of debt applies to voluntary payments over \$500;
- repayment becomes compulsory once income exceeds a threshold, the amount required being determined under a series of thresholds and repayment rates, which are set for each financial year;
- employees with a HECS debt may have PAYG tax deductions made to cover anticipated HECS assessments for the financial year; and
- debt which remains outstanding at the time of death is written off.

1.1.3 In January 2002, a new scheme covering postgraduate students was introduced which provides for fees for certain postgraduate courses to be deferred under similar arrangements as apply for HECS. This scheme is called the Postgraduate Education Loan Scheme (PELS). Any tuition fees deferred under PELS are treated in the same way as deferred HECS charges. That is, they are added to an individual's HECS debt (if any) and thereafter treated as normal HECS debt.

1.1.4 The Australian Taxation Office (ATO) is responsible for maintaining the records of outstanding debt, determining the amount of compulsory repayment required (if any) and processing all debt and payment transactions.

1.1.5 The scheme design is intended to provide incentives to pay early, through the discount on up front payments of HECS and voluntary repayments of both HECS and PELS, while at the same time protecting those who have a limited capacity to meet the charges from any requirement to pay until their income has increased.

1.1.6 The income contingent nature of repayment, combined with the provision for writing off outstanding debt on death, means that some debt will never be repaid. However, the income dependency of repayments makes it very difficult to estimate what proportion of the debt will remain outstanding at the time of death and thus will never be repaid.

1.1.7 Since 1997/98, AGA has been using a model which estimates doubtful debt by simulating the future income progression of individual debtors. Fairly major changes were made to the model over 2000/01 to address issues which were apparent in the results for 1999/2000. The 2000/01 model was used largely unchanged in 2001/02, apart from a minor modification to improve its performance in projecting voluntary repayments. Section 2 provides details on the model used for this report. Section 3 reports on the estimates of doubtful debt for 2001/02. The remainder of Section 1 provides some background on HECS debtors and scheme experience to date.

1.2 *The Nature of Doubtful Debt*

1.2.1 As noted above, the income contingent repayment system for HECS means that some debt will remain unpaid. We refer to this unpaid debt as doubtful debt. It is important to recognise that this doubtful debt is quite different in nature from bad debt incurred by credit providers. In issuing loans, banks and other credit providers start with the premise that all loans should be repaid. The policy framework for the HECS system is that deferred charges should only be repaid where income is greater than a certain minimum level. Thus, it is a direct and inevitable policy consequence that there will be a certain amount of doubtful debt associated with deferred HECS charges at the time of deferral.

1.2.2 There are a number of ways in which doubtful debt can be measured. Three of these measures are included in this report. The first is the face value of debt which is not expected to be repaid. The second is doubtful debt expressed as a percentage of the outstanding debt and this has typically been used as the headline measure in our reports on doubtful debt. An alternative measure is doubtful debt as a percentage of the debt which was originally incurred at the time the HECS charge was deferred. In our analysis, we use outstanding debt at the time the last HECS debt was incurred as a proxy for debt incurred and this is referred to in the report as 'debt on completion'. Doubtful debt as a percentage of debt on completion has also been included in our previous reports on doubtful debt. It is important that the difference between these two measures be understood.

1.2.3 The level of doubtful debt, expressed as a percentage of debt on completion, is of itself neither good nor bad but simply reflects the HECS policy parameters established by the Government of the day, and the behavioural response of HECS liable students to those parameters. Increasing HECS charges, for example, would be expected increase doubtful debt as a percentage of debt on completion because there is a higher probability that a debtor will die before completing repayment. This should not necessarily be seen as a case of exploitation or failure of the system. Conversely, reducing the minimum threshold for repayment would be expected to reduce doubtful debt, as debtors will commence payment earlier. The debtors under this scenario are no more credit worthy or virtuous. Rather, the policy parameters of this scenario imply a lower level of Government support for tertiary students.

1.2.4 Doubtful debt as a percentage of debt on completion is therefore one of a number of indicators that might reasonably be used in policy development.

1.2.5 The work underpinning this report is concerned with deriving an estimate of doubtful debt as a percentage of outstanding debt for use in the DEST financial statements. This figure reflects not just the policy parameters which have been in operation over the lifetime of the scheme but also, because of the accounting treatment of doubtful debt, the age of the scheme.

1.2.6 Debt is not written off until the debtor dies. This means that, as the scheme ages, the rate of doubtful debt as a percentage of outstanding debt appears to deteriorate without any change in the underlying propensity of debtors to repay.

1.2.7 A simple example will illustrate the how this feature arises. Suppose \$1,000 of debt is incurred of which \$100 is not expected to be repaid. The remaining \$900 is repaid in \$100 tranches over the next nine years. At the time the debt is incurred the doubtful debt percentage is 10%. After five years, \$500 has been repaid and the doubtful debt now represents 20% of the outstanding debt. At the end of eight years, only \$200 remains outstanding and the doubtful debt percentage is 50%. We refer to this phenomenon as 'debt creep' and its impact on reported doubtful debt for 2003 is discussed further in Section 3.2 of this report.

1.2.8 The most important implication of debt creep is that it invalidates the use of doubtful debt as a percentage of outstanding debt as an indicator of the underlying repayment prospects of HECS debtors. The focus on doubtful debt as a percentage of outstanding debt in this report reflects its purpose in providing an estimate for the financial statements.

1.2.9 Considerable care should, therefore, be taken in using these figures for any other purposes than that for which they were intended. In particular, it needs to be borne in mind that doubtful debt as a percentage of outstanding debt will continue to further diverge from doubtful debt as a percentage of debt incurred for many years yet.

1.3 The Current Scheme

1.3.1 In 2002, the HECS charge for continuing students undertaking a full-time study load who commenced their course of study before 1 January 1997 is \$2,702 for a full year, and is charged on a semester basis. Since 1 January 1997, new students have been subject to differential charges depending upon the units studied. The full-time charges range from \$3,598 to \$5,999 for a full year. Part-time students pay a pro-rata amount based upon their study load. The discount applying to full up front payments, and partial up front payments over \$500, is set at 25%. Where partial payments of \$500 or more are made, the 25% discount is calculated on the basis of the actual payments rather than the total amount of HECS charged for the semester.

1.3.2 The compulsory repayment threshold was set at \$23,242 in 2001/02 and has been indexed to \$24,365 in 2002/03. The repayment schedules applying above these thresholds are shown below. Note that, unlike marginal income tax rates, the HECS repayment rates apply to all income.

Table 1: Repayment Schedule

Repayment Rate	Repayment Income Range ⁽¹⁾	
	2001/02 Income Year	2002/03 Income Year
3% of taxable income	\$23,242 to \$24,510	\$24,365 to \$25,694
3.5% of taxable income	\$24,511 to \$26,412	\$25,695 to \$27,688
4% of taxable income	\$26,413 to \$30,638	\$27,689 to \$32,118
4.5% of taxable income	\$30,639 to \$36,977	\$32,119 to \$38,763
5% of taxable income	\$36,978 to \$38,921	\$38,764 to \$40,801
5.5% of taxable income	\$38,922 to \$41,837	\$40,802 to \$43,858
6% of taxable income	\$41,838 and over	\$43,859 and over

(1) Note that income for HECS repayment purposes is defined as taxable income plus net rental losses on rental properties, to the extent that they have reduced taxable income, plus reportable fringe benefits.

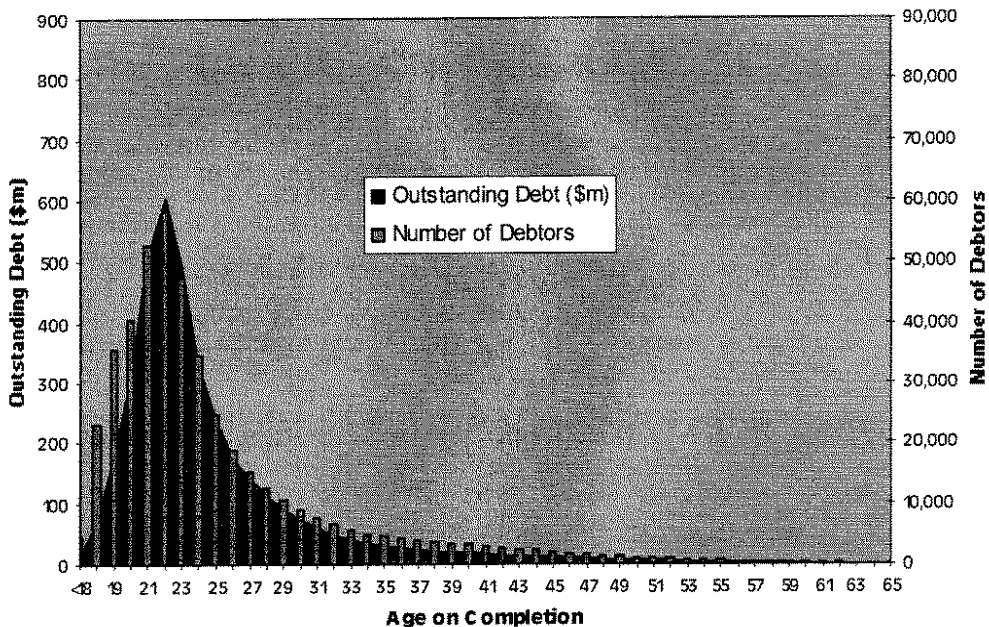
1.3.3 Since 1 July 1994, employers have been required to deduct additional tax instalments on a PAYG basis to cover compulsory HECS repayments. These amounts are treated in the same way as other PAYG tax deductions and are not credited against an individual's outstanding HECS debt. The actual repayment due is calculated at the time an income tax return is lodged and the additional PAYG credits are then applied to the assessed amount.

1.3.4 A bonus of 15% applies to voluntary lump sum repayments of \$500 or more.

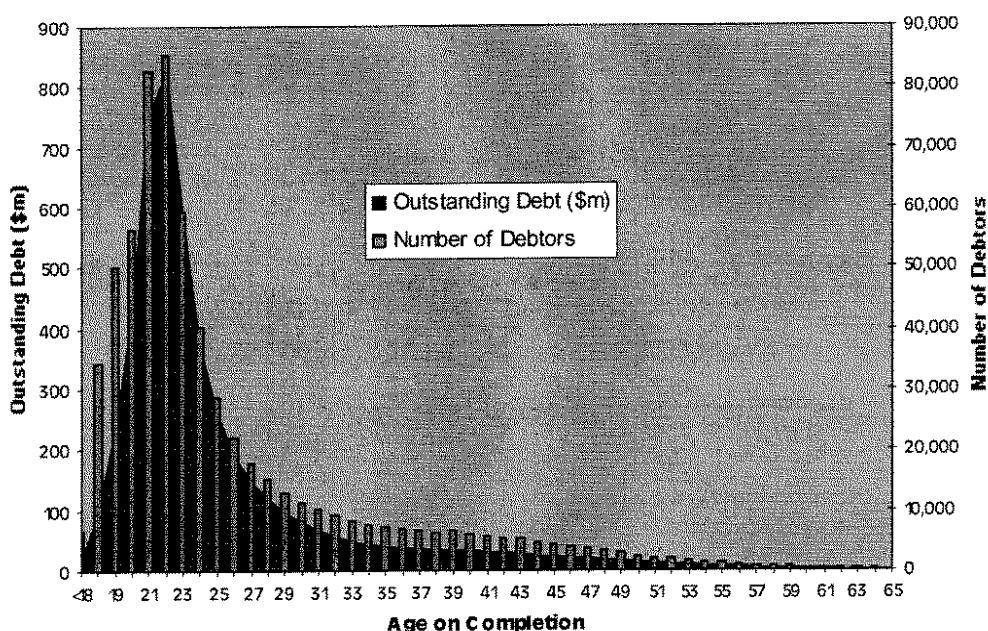
1.4 Profile of Current Debtors

1.4.1 As at 30 June 2002, we had records for 1,113,084 people holding \$8.67 billion of outstanding debt. These records include 16,047 students who deferred their PELS charge for study in semester 1 of 2002. The total amount of PELS deferred was \$49 million. This amounts to about one half of one percent of the total outstanding debt and less than 7% of the HECS debt incurred in semester 1, 2002. Figure 1 shows the distribution of debt and debtors by age at completion as at 30 June 2002. This has been derived from data supplied by the ATO and includes all transactions up to that date.

Figure 1: Debtors and Debt as at 30 June 2002 by Age on Completion
(a) Males



(b) Females



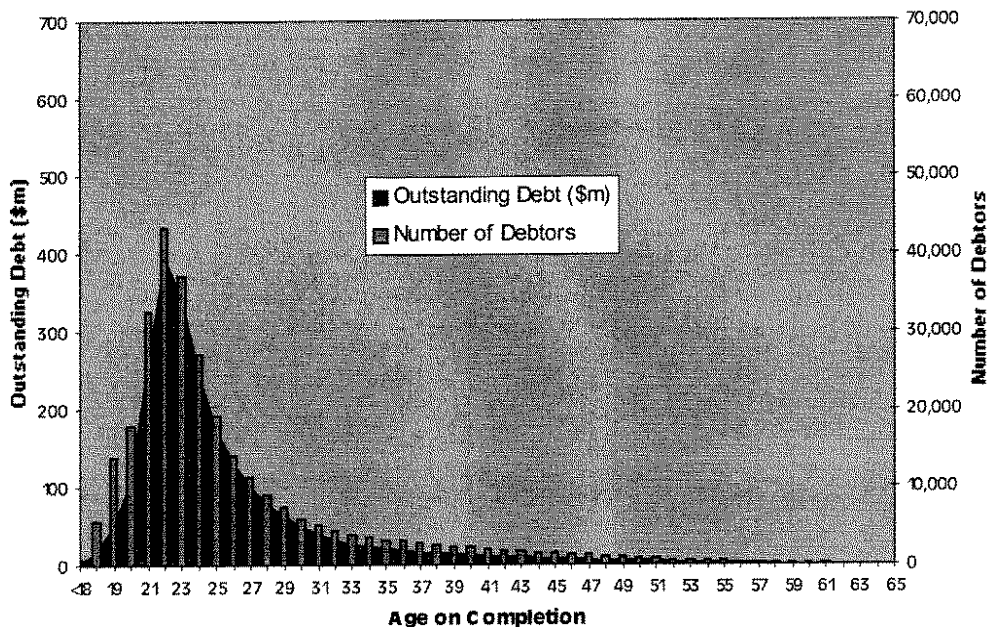
1.4.2 It can be seen that the majority of both the debt and the debtors are concentrated in the category aged under 30 on completion, with the outstanding debt peaking at an age on completion of 22 for both males and females. This is primarily the result of the concentration of tertiary students in their late teens and early twenties, particularly among those who are still studying. However, it also reflects the higher average outstanding debt on completion for the younger age group.

1.4.3 Note that completion for the purposes of classifying debtors is taken to be the last financial year in which debt has been incurred. This may or may not correspond to course completion. It is also the case regardless of whether there have been any gaps in debt accrual which may indicate completion of one course and commencement of another. Conversely, it is possible that students may still be studying but not incurring a HECS debt (by paying their HECS charge up front). In this case, we would treat them as completed prior to their actual course completion. For those students who have a debt accrual in the 2001/02 financial year, current age as at 30 June 2002 is used as age on completion and, for most of these students, will underestimate the age at which study will in fact be completed.

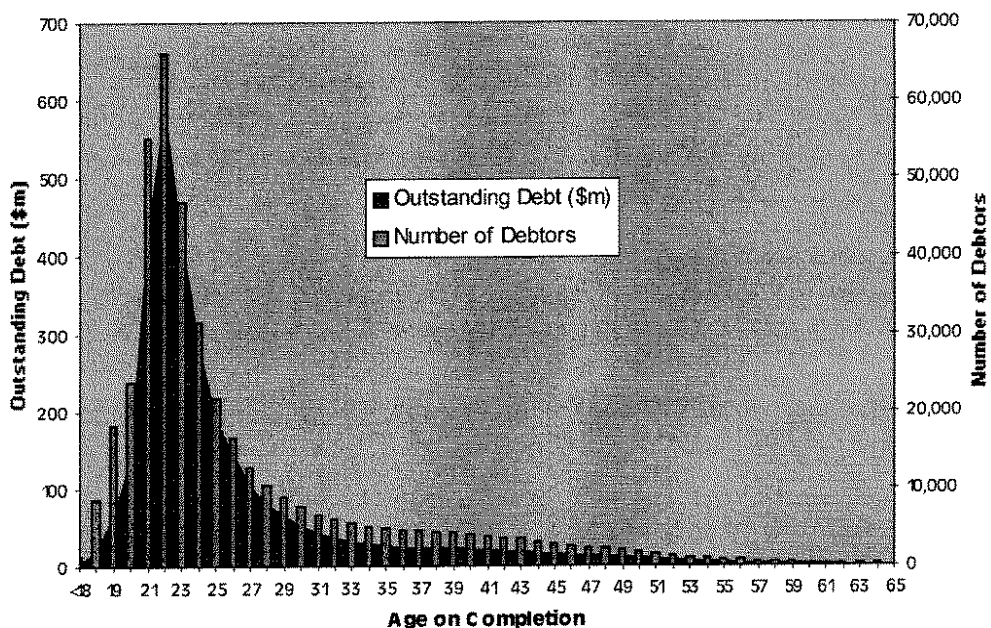
1.4.4 In order to remove the bias towards underestimation of age on completion resulting from this definition, Figure 2 shows the debt and debtors by age on completion excluding those who incurred a debt in semester 1 of 2002. This significantly changes the distributions at the younger ages. The data in Figure 1 shows that those aged 20 or less on completion hold over \$1.3 billion of debt.

When those still studying in 2002 are excluded from the analysis, this figure falls to less than \$400 million.

Figure 2: Debtors and Debt as at 30 June 2002 by Age on Completion
 (a) Males (excluding those with debt in Semester 1 2002)



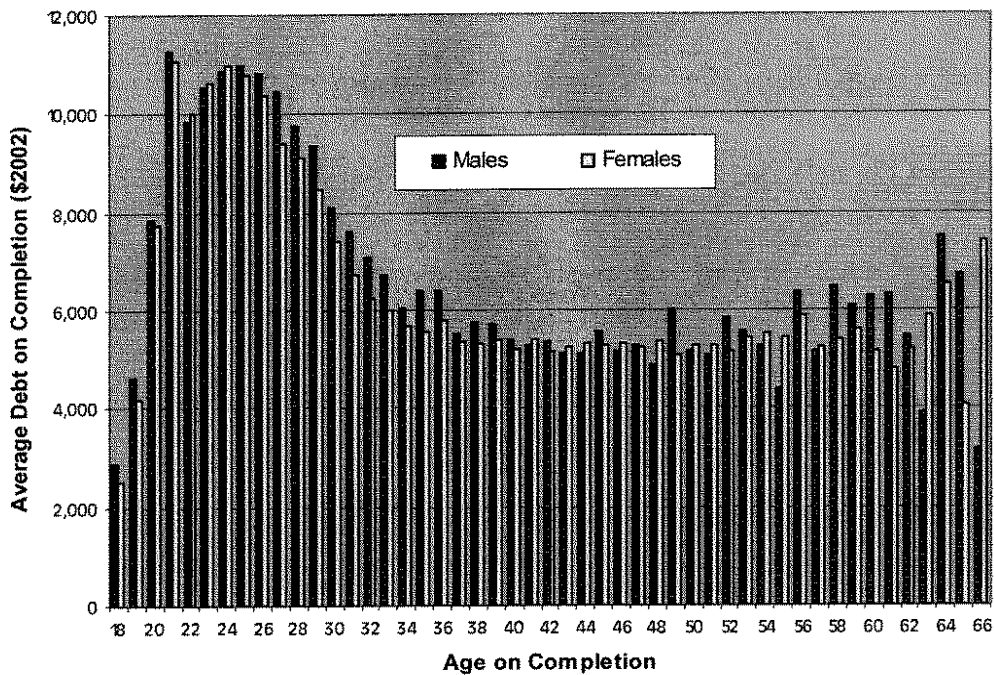
(b) Females (excluding those with debt in Semester 1 2002)



1.4.5 Figure 3 shows the average debt on completion for those completing¹ in 2000 and illustrates the higher debt accruals for younger students. This arises because:

- members of this group are likely to study for a longer period on average than older students and so accrue a higher debt over their course of study; and
- they are less able to pay up front and so have a higher debt when they complete their studies.

Figure 3: Average Debt on Completion by Age on Completion for 2000 Completers



1.4.6 The impact of differential HECS is clearly seen in the relatively high debts on completion of those aged 21 or less. Most of this group could be expected to have commenced study in 1997 or later and so been subject to differential HECS. Their debt on completion is significantly higher than the comparable group in previous years. For example, the average debt on completion for 21 year olds completing in 1999 was less than \$8,000 (in \$2002). In 2000, the average debt of 21 year old completers was over \$11,000 (again in \$2002).

¹ Note that a small number of these apparent completers may not be actual completers, either because they have deferred their studies for a period or because they have paid HECS charges up front in the intervening period.

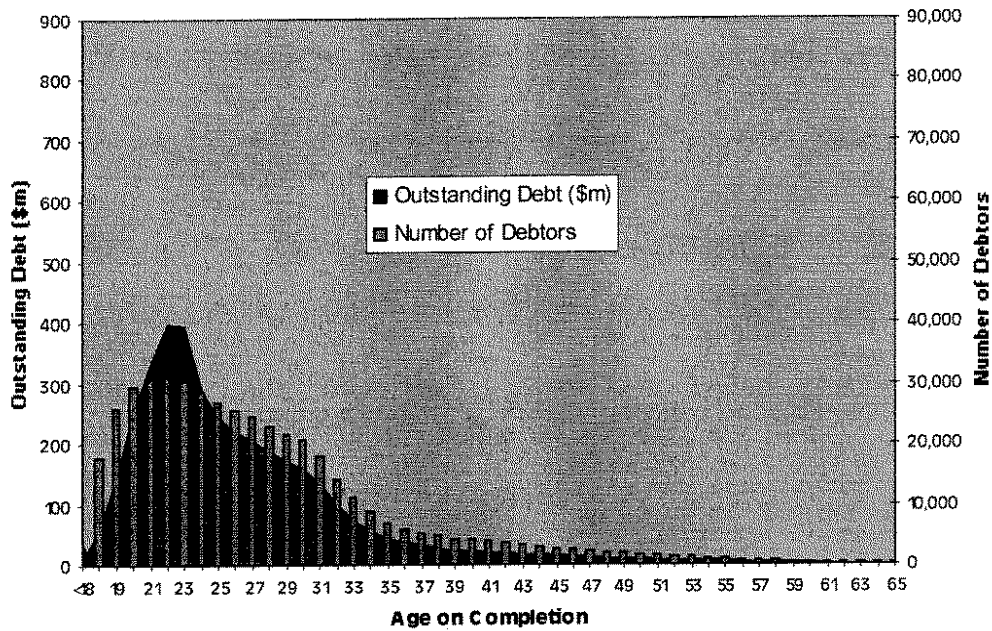
1.4.7 Figure 3 also reveals that for ages between 24 and 41, males have higher average debt on completion than females. This may be the result of more males than females undertaking longer degree courses. If this is the case, the differential is likely to be amplified as the new HECS charges take effect, since the longer degree courses such as law and medicine typically fall into the highest charge bracket. For older ages, debt on completion for females is generally above that for males and may reflect the higher up front payment rates for males in this age group and/or a longer study period for females.

1.4.8 Figure 4 shows the distribution of debt and debtors by current age as at 30 June 2002. The impact of the introduction of differential charging which could be seen for the first time in 2000 has become further exaggerated and can be clearly seen in the peak in outstanding debt around age 22 for both males and females. The sharp drop at age 24 signals the transition from those who were subject to differential HECS to the population who were largely subject to non-differential charges. The extended hump to the right of this peak and the thickening of the tail of the distribution relative to that evident in Figure 1 is the result of the ageing of the earlier year completers. Over time, the tail can be expected to continue to thicken as the unpaid (and increasingly doubtful) debt from those who are currently in the hump of the distribution shifts to the right.

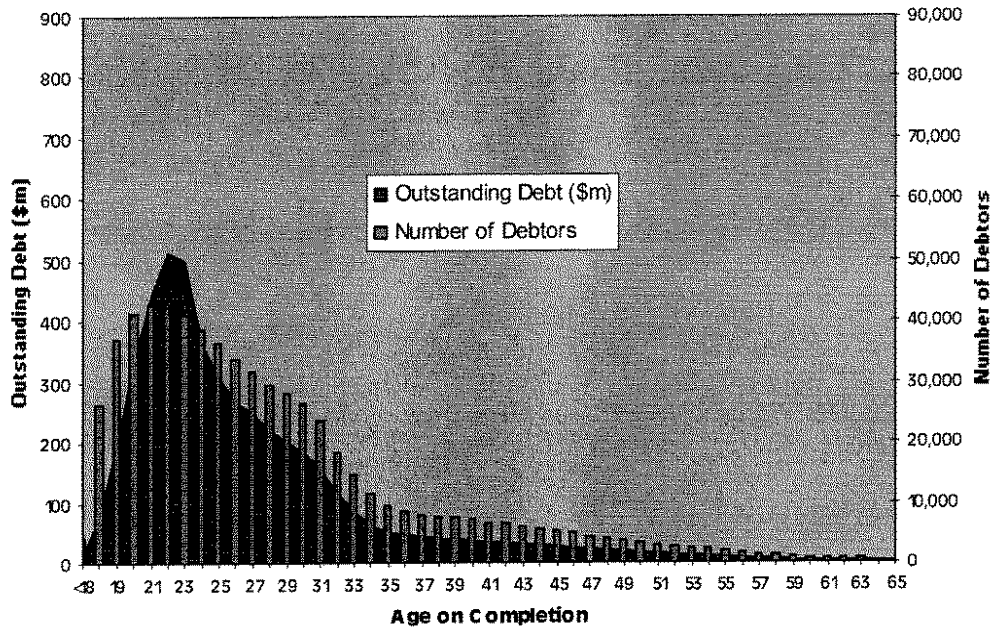
1.4.9 Figure 1 and Figure 4 both show that females constitute a larger number of the debtors and hold more of the debt than males. This is due to:

- more females than males enrolling in HECS liable study. In 2001, 58% of HECS liable students undertaking study in each semester were female;
- the slightly higher proportion of males paying up front. In 2001, 24.2% of males paid all of their HECS liability up front, compared with 23.5% of females; and
- the generally slower rate of repayment of females relative to males.

Figure 4: Debtors and Debt as at 30 June 2002 by Current Age
(a) Males



(b) Females



1.4.10 Set out below is a summary of the amount of outstanding debt as at 30 June 2002 with comparative figures as at 30 June 2001. For comparison purposes, the 2001 figures have been indexed using the indexation factor applied to outstanding HECS debt in June 2002. The indexation factor for 2002 was 3.6%

and this has resulted in an increase in the 2001 outstanding debt from \$7.75 billion to \$8.03 billion.

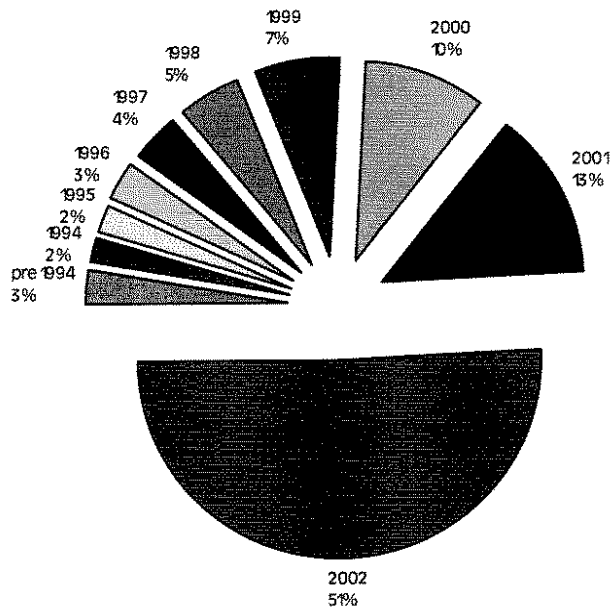
Table 2: Outstanding Debt

	Outstanding Debt ⁽¹⁾		
	30 June 2001 (\$bn)	30 June 2002 (\$bn)	Increase (\$bn)
Males	3.52	3.79	0.27
Females	4.51	4.88	0.37
TOTAL	8.03	8.67	0.64

(1) Both the 2001 and 2002 figures are before deduction of estimated PAYG payments received during the relevant year.

1.4.11 Figure 5 shows the proportion of the outstanding debt held by debtors from year of completion. As has been the case since we commenced doing these reports, around fifty percent of the outstanding debt belongs to those who were still studying in the latest year.

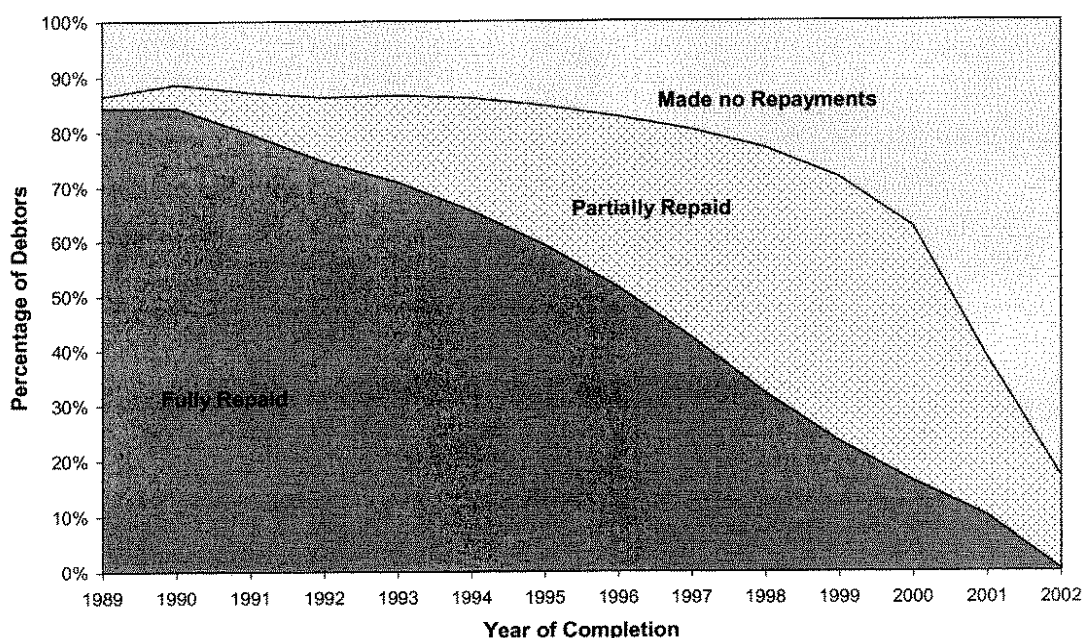
Figure 5: Outstanding Debt by Year of Completion



1.4.12 We would expect the proportion of debt held by current debtors to decline eventually as the debt remaining in the system from earlier years of completion which is not expected to be repaid assumes increasing importance. However, the impact of the introduction of higher charges under differential HECS has led to

higher average debt for those who are still studying relative to earlier year completers.

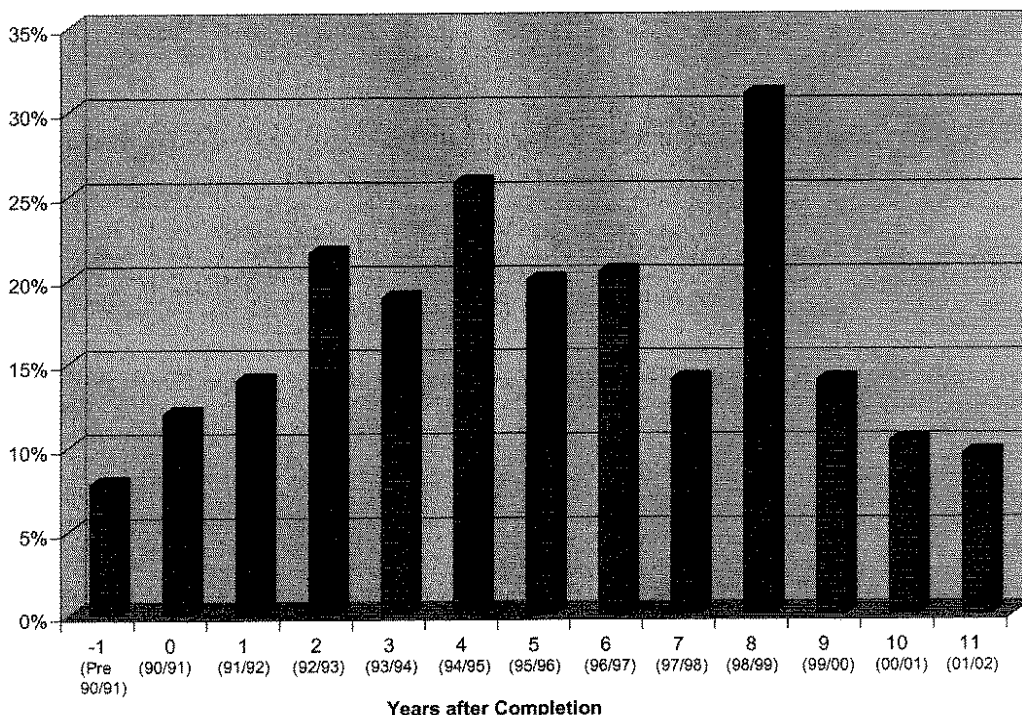
Figure 6: Debtors by Repayment History



1.4.13 In our report on doubtful debt as at 30 June 1998, we found that 25% of those who completed in 1989 had made no repayment. This figure has been gradually falling over subsequent years and there are now only 13% of 1989 completers who have made no repayment. For 1990 completers, who probably represent a more typical group, the percentage who have made no repayments is less than 11%, while 84% of erstwhile debtors have fully repaid their liability.

1.4.14 Our hypothesis on HECS repayments has been that there should be a point, beyond which, the probability of those who have repaid nothing to that point making a repayment in future is virtually zero. The data suggests that we have not yet reached this point. Figure 7 shows the transition of debtors into the repayment phase for those who completed in the 1990/91 financial year. This shows that around 10% of those who had not previously made any repayments (1.3% of the total 1990/01 completion cohort) made their first payment eleven years after completion. While there is a clear downward trend over the last four years, the rate of decline is slowing and it is possible that it will be another 5 to 10 years before a figure of less than 1% is reached.

Figure 7: Percentage of Non-Repaying Population making their First Repayment – 1990/91 Completers



Note: The first category (-1) refers to those who made a payments in the years prior to completion. The jump in year 8 is the result of the substantial reduction in repayment thresholds which took effect in the 1997/98 income year and resulted in a large group of the debtor population making their first repayments in 1998/99.

1.5 History of Changes

1.5.1 At the time of the scheme's introduction in 1989, it was announced that both the charge and the repayment thresholds would be automatically indexed, the former in line with growth in the higher education operating grant index and the latter by the growth in AWE. There have, however, been a number of other changes in the scheme which have affected the patterns of debt accrual and repayment, most notably the substantial reduction in repayment thresholds in 1997/98 and the introduction of increased differential HECS charges for new degree students from January 1997.

Table 3: Changes to the HECS Scheme

Year	Change
1990/91	Repayment rates increased by 1 percentage point for each income range
1992	A discretionary increase in the amount of the charge of \$144 over and above the normal indexation increase
1993	The discount rate applying to up front payments increased from 15% to 25%
1993/94	Repayment thresholds reduced in real terms and the repayment rates increased by a further 1 percentage point for each income range.
1994/95	Employers required to make PAYE deductions to cover anticipated HECS assessment debts
1995/96	Bonus of 15% on voluntary lump sum payments of \$500 or more. Bonus of 10% on entire outstanding debt for those electing to repay at a rate of 2% when income in a prescribed range below the minimum income threshold for compulsory repayments (\$20,000 - \$26,853 in 1995/96). As a result of 1996 Budget changes, this measure did not apply beyond 1996/97.
1996	All commencing New Zealand citizens required to pay their HECS contribution up front without a discount. Students who commence a course and became Australian Permanent Residents on or after 1 January 1996 required to pay their HECS contributions up front without a discount when they exceed the residency requirements for Australian

Year	Change
	<p>citizenship as prescribed in the <i>Higher Education Funding Act 1988</i> by 12 months. This provision took effect from 1 January 1999.</p> <p>All other students required to pay their HECS contribution up front no longer receive 25% discount.</p>
1996/97	<p>Expanded seven step repayment schedule took effect.</p> <p>Assessable income for HECS purposes redefined to include taxable income plus net losses on rental property income.</p> <p>Differential charges apply to new students commencing study on or after 1 January 1997. Depending upon the discipline of study, the annual charge ranged from \$3,300 to \$5,500 (1997)</p>
1997/98	<p>Repayment thresholds reduced substantially (in both nominal and real terms) and the voluntary repayment threshold abolished (see 1995/96). New thresholds apply to all HECS debtors including those with an existing debt or currently studying.</p> <p>25% discount on up front payments extended to partial up front payments of at least \$500.</p>
1999/2000	<p>Assessable income for HECS purposes redefined to include reportable fringe benefits</p>
2001/2002	<p>PELS scheme introduced from semester 1 of 2002.</p>

1.5.2 There were no changes to HECS arrangements in the 2002/03 Budget.

1.6 Trends in Debt Accumulation and Payment

1.6.1 The general thrust of the Government's changes over the past 10 years has been to encourage a greater proportion of up front and voluntary payments (by providing a bonus on such payments) and to increase the speed of compulsory repayment (both by reducing the thresholds to bring people into the repayment system earlier and by increasing the rates of repayment). The latter has the effect of reducing the doubtful debt as repayments are made sooner. This is particularly relevant for younger female graduates who, in the absence of any other changes, could be expected to have a higher probability of repaying their HECS debt before leaving the workforce to start a family. The interaction of the two has provided a strong incentive for those who know they will have to repay quickly after graduation to elect to pay up front and benefit from the 25% discount if they have the means to do so. The corollary of higher up front payments by this group is that HECS debt not paid up front is more likely to be doubtful.

1.6.2 Offsetting this reduction in doubtful debt due to earlier and quicker repayment, is the substantial increase in charges applying to students who commenced their study in 1997 or later. This has increased the likelihood that debt will not be fully repaid. It has also made it more difficult to make a full up front payment. The introduction of the bonus on partial up front payments has, however, provided an incentive for students to pay part of their liability up front. The net effect of the Government's measures appears to have been a substantial improvement in debt repayment among those aged 30 to 55 on completion. The changes for the younger and older age groups have been less substantial.

1.6.3 Table 4 shows the average debt accumulated by those completing study in each year since the scheme started. The same information is shown graphically in Figure 8.

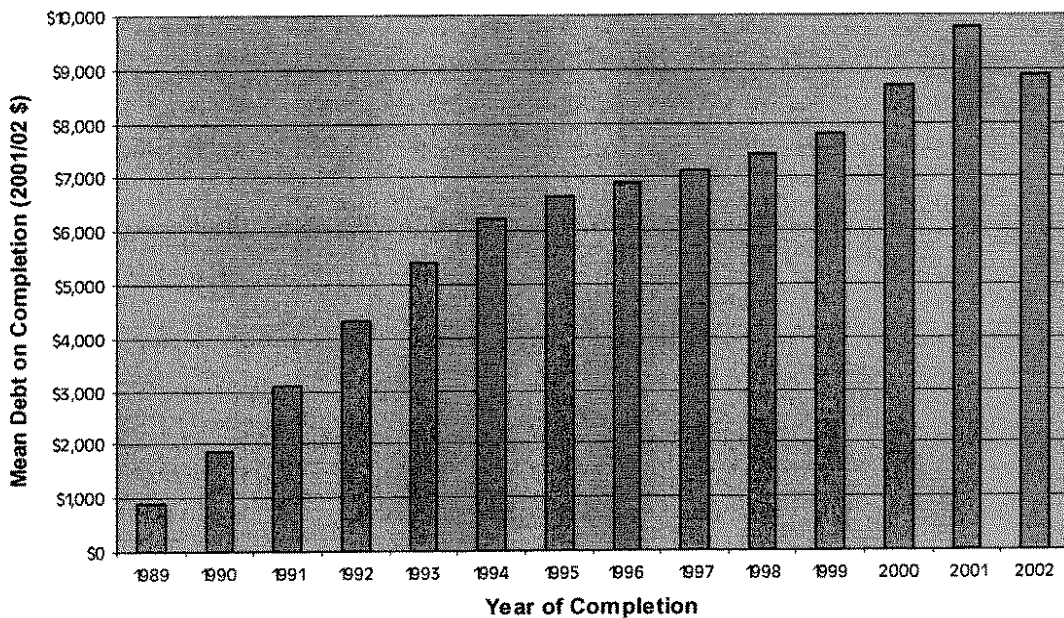
Table 4: Average Debt on Completion

Year	Average Debt on Completion ⁽¹⁾
1988/89	\$886
1989/90	\$1,862
1990/91	\$3,112
1991/92	\$4,330
1992/93	\$5,417
1993/94	\$6,235
1994/95	\$6,643

Year	Average Debt on Completion ⁽¹⁾
1995/96	\$6,901
1996/97	\$7,136
1997/98	\$7,430
1998/99	\$7,788
1999/00	\$8,707
2000/01	\$9,779
2001/02	\$8,889

(1) All figures indexed to 2001/02 dollars using the HECS indexation factors. 2001/02 figure includes those who are still studying. Note that the figures for earlier years change from those previously reported as a result of both indexation and transactions relating to previous years which have only been reported in the most recent year.

Figure 8: Average Debt on Completion



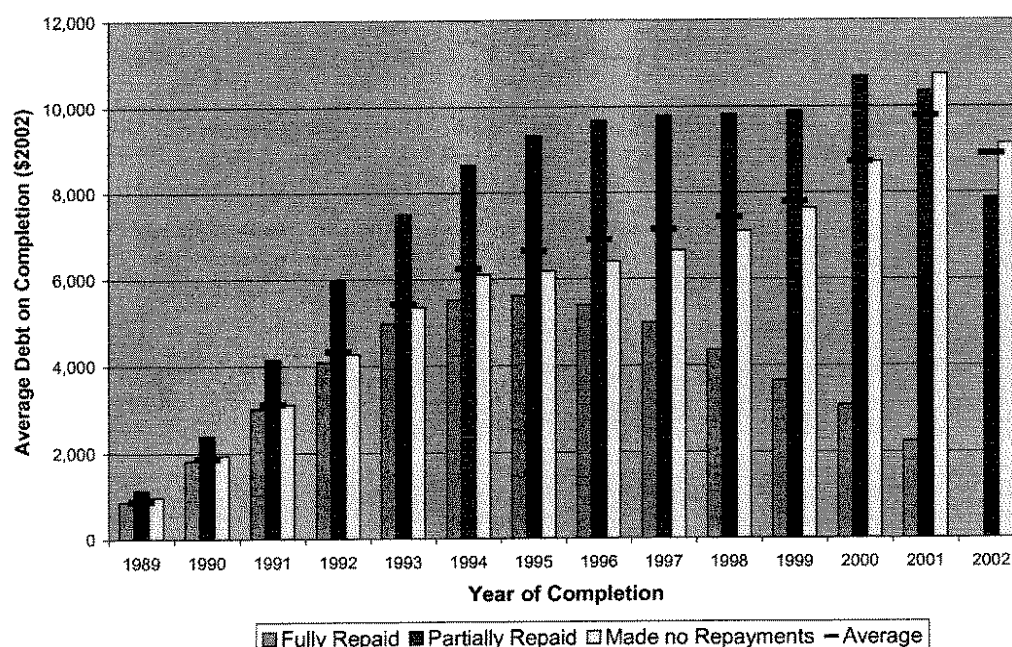
1.6.4 The chart shows a rapid increase in debt on completion over the first four years of the scheme as students were subject to the charge for a greater proportion of their time at university. The flattening off in the rate of increase after 1992/93 reflects the preponderance of students undertaking three and four

year courses, while the jump in 2000 and 2001 is due to the impact of differential HECS. The 2000 year saw the first group of three year degree students complete their degrees under the differential HECS system.

1.6.5 The lower average debt on completion for the latest year compared to the preceding year reflects the fact that the final year includes those who are still studying and thus may have only one or two years of debt.

1.6.6 Figure 9 disaggregates the average debt on completion by repayment status. Not surprisingly, it shows that those who have fully repaid tend to have smaller debts than those who have not, with the difference increasing very markedly for later years of completion where students would only have had a short time to repay their debt.

Figure 9: Average Debt on Completion by Repayment Status



1.6.7 Perhaps less predictably, Figure 9 also shows that those who have made no repayments have lower than average debts on completion for all but the first two and last two years of completion. This suggests that, at this stage, there is no evidence of widespread exploitation of the system by people incurring very large debts which they have no expectation of repaying. It may also suggest that those who drop out, and hence have lower levels of debt, may have poorer repayment prospects. In aggregate, this latter feature may have a more material impact on doubtful debt.

1.6.8 As noted above, it is quite likely that higher levels of up front payment lead to a worsening of doubtful debt experience. This is based on the assumption that those who pay up front would have had, on average, a better debt repayment profile had they chosen to defer than those not paying up front. Thus, an increase

in up front payments is expected to increase the doubtful debt (expressed as percentage of debt incurred) arising from those who defer. From 1993 to 1995 there was a clear trend towards up front payment.

1.6.9 However, Table 5 suggests that this shift towards up front payment has been reversed over recent years. The proportions choosing (or being required) to pay all of their debt up front have fallen since 1996 for all but the oldest age group, to the point that they are now well below the 1994 levels. This could be expected to reduce the reported doubtful debt percentage for these later year cohorts.

Table 5: Percentage of Students Fully Paying Up front

Year	Males			Females		
	< 30	30 - 55	> 55	< 30	30 - 55	> 55
1993	20.0	45.6	42.7	20.7	39.7	35.6
1994	22.0	48.5	43.8	22.5	41.7	37.9
1995	23.3	51.0	43.8	23.0	43.0	38.7
1996	23.5	50.1	43.7	22.9	43.6	38.3
1997	23.3	48.3	43.8	23.0	42.4	39.7
1998	22.5	45.8	44.6	22.1	40.6	41.9
1999	21.2	43.7	43.9	20.7	38.2	41.5
2000	20.8	41.8	45.8	20.3	36.9	41.6
2001	20.7	39.9	44.4	20.2	35.6	41.4

1.6.10 It is interesting to note that the decline in up front payments starts at roughly the same time as the introduction of differential HECS with the associated higher charges. This suggests that at least part of the reduction is associated with affordability. This does not, of itself, imply that the value of the eventual repayments will be less than up front payments. The extent of any overall loss or gain to the Commonwealth will depend upon the timing of future repayment and any doubtful debt arising from the deferred charge.

1.6.11 If the debt is fully repaid within a relatively short time frame (and the voluntary repayment discount is not accessed) the present value of repayments may well exceed the up front payment which would have otherwise been made.

However, if the reduced up front payments are indicative of a generally reduced capacity to pay due to the higher charges, either up front or subsequently in repayments of deferred debt, then doubtful debt as a percentage of debt on completion may increase.

1.6.12 At this stage, there is no way of judging from the available data what the cause or the likely impact of the reduced up front payments will be.

1.6.13 In 1998, partial up-front payments of at least \$500 became subject to the discount arrangements applying to full up-front payments. Table 6 shows the proportions of students in different categories making full and partial up front payments in the 2001 calendar year.

Table 6: Proportion of Students Paying Up Front and deferring their HECS Liability

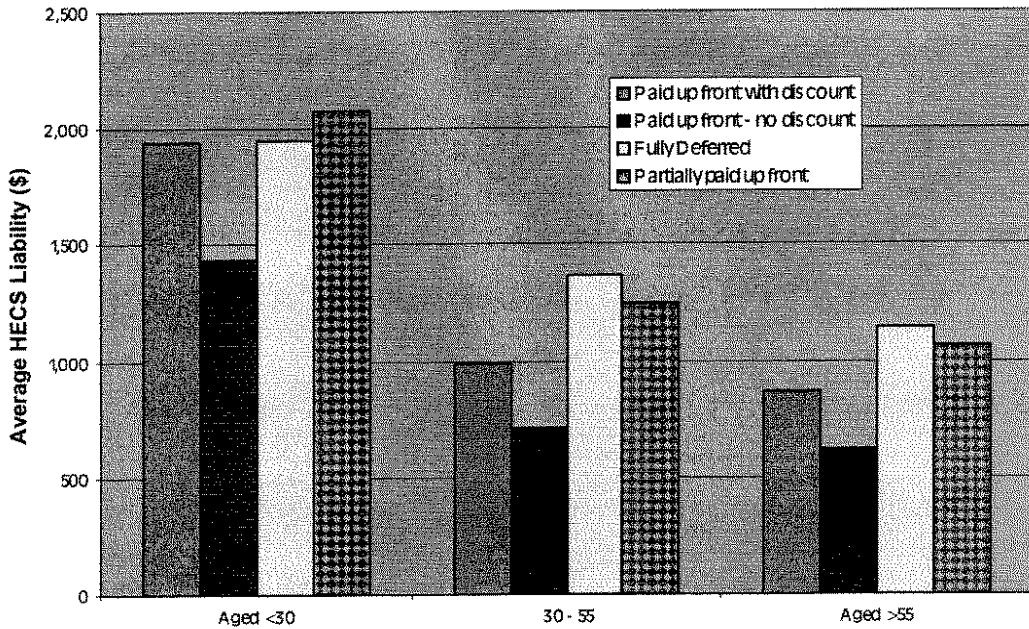
Age Group	Paying All Up Front - With Discount	Paying All Up Front - No Discount	Partially Paying Up Front	Deferring Total Liability
Males < 30	19.7%	1.0%	2.0%	77.3%
Males 30-55	36.4%	3.5%	1.4%	58.8%
Males > 55	39.9%	4.5%	1.9%	53.8%
Females < 30	19.4%	0.9%	2.4%	77.3%
Females 30-55	32.9%	2.7%	1.5%	62.9%
Females > 55	38.2%	3.2%	1.5%	57.2%

Note that rows may not add to 100% due to rounding.

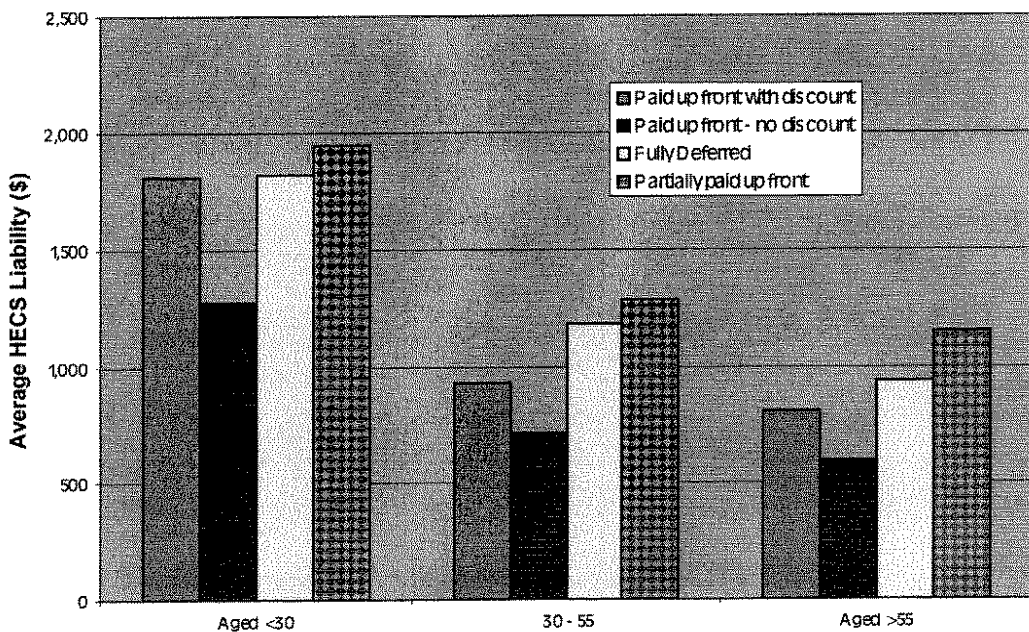
1.6.14 While the proportions making partial up-front payments appear small, they need to be compared with the figures applying before the introduction of the discount. In 1996, for example, less than 0.02% of students made a partial up-front payment. There has also been a slight increase for all age groups over the proportions making partial up front payments in 2000. This followed a similar increase from 1999 to 2000.

1.6.15 There appear to be significant differences in the size of the debt for students choosing the different payments options in calendar year 2001, as shown in Figure 10.

Figure 10: Average Charge by Payment Option Chosen
(a) Males



(b) Females



1.6.16 It appears that those making partial up-front payments are still facing higher HECS charges than the average charge overall, although this is not as marked as for previous years. Higher average charges for those making partial up-

front payments is consistent with a hypothesis that those making partial up-front payments are doing so because they cannot afford to pay off the entire amount.

1.6.17 Table 7 shows the revenue received through up front payment, voluntary repayment and compulsory repayments since the commencement of the scheme. It should be noted that the figures we report as compulsory repayments relate to the HECS assessments processed in that financial year and are not the PAYG deductions. That is, in this report, the 1997/98 figure relates to the assessment on 1996/97 taxable income (or earlier if there has been a delay between the income year and assessment) that has been paid in 1997/98. This differs from DEST's accounting treatment which is to attribute repayments to the income year which gave rise to the assessment. The amounts in Table 7 are all in nominal dollars.

Table 7: HECS Revenue by Type of Payment

Financial Year	Up front payments (\$m)	Voluntary repayments ⁽¹⁾ (\$m)	Compulsory repayments ⁽¹⁾ (\$m)	Total (\$m)
1988/89	41.99	0.09	0.00	42.08
1989/90	81.81	1.70	8.94	92.45
1990/91	91.29	6.49	28.23	126.00
1991/92	125.32	11.98	49.64	186.93
1992/93	134.77	11.03	57.49	203.28
1993/94	130.60	19.20	72.49	222.29
1994/95	157.11	16.48	132.91	306.49
1995/96	175.55	31.82 ⁽²⁾	168.96	376.33
1996/97	208.35	58.26 ⁽²⁾	217.82	484.43
1997/98	231.40	67.71 ⁽²⁾	265.02	564.13
1998/99	258.97	73.00 ⁽²⁾	472.38	804.35
1999/00	265.84	84.39 ⁽²⁾	496.66	846.89
2000/01	278.49	95.96 ⁽²⁾	532.41	906.86
2001/02	288.03	130.64 ⁽²⁾	586.29	1,004.95

⁽¹⁾ Note that these figures differ slightly from those reported in the Budget papers due to recording differences. There are also differences from the figures reported last

year due to additional transactions for previous years included on the latest transaction file

- (2) Does not include the debt eliminated due to the 15% bonus on lump sum voluntary repayments or the 10% bonus reduction on entire outstanding debt for those voluntarily opting to pay at the 2% rate, The estimated reduction in debt due to these arrangements according to our data is:

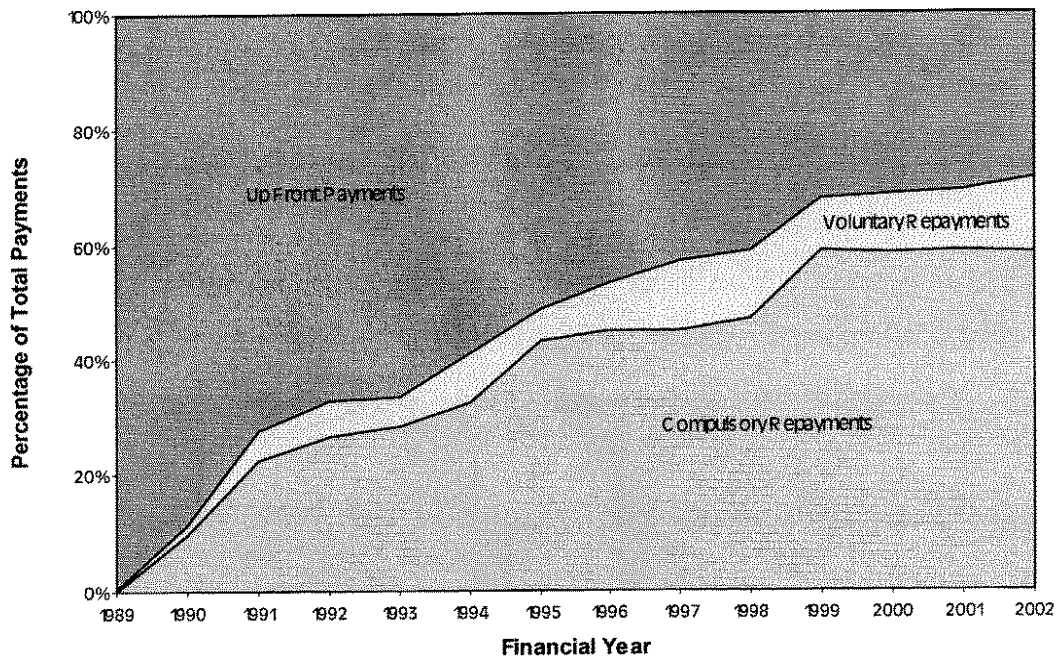
Year	95/96	96/97	97/98	98/99	99/00	00/01	01/02
Estimate (\$m)	3.97	17.37	12.41	10.90	12.52	14.26	19.38

1.6.18 The rapidly increasing importance of compulsory repayments over the early years of the scheme is evident from Table 7. In 1990/91, compulsory repayments represented 22.5% of HECS revenue. Five years later this had doubled to 44.9% of revenue. With the introduction of the lower repayment thresholds in 1997, revenue from compulsory repayments increased substantially, both in absolute terms and relative to voluntary and up-front payments. Over the past four years, however, compulsory repayments as a percentage of total revenue have remained virtually constant at between 58.3% and 58.7%. It would be expected that as the differential charge group, with its higher average debt, moves into the repayment phase, the average repayment period will become longer and compulsory repayments will increase again as a percentage of total revenue.

1.6.19 Table 7 also illustrates the volatility of voluntary repayments, particularly the marked increase in 1995/96 when the 15% discount of voluntary repayments was introduced and in 1996/97 when the 10% discount on all outstanding debt applied to those who agreed to make payments under the lower 2% repayment rate. This suggests that many students are aware of the different payment options and their financial implications and take these factors into account in deciding how to meet their HECS liability.

1.6.20 Figure 11 presents the information in Table 7 in graphical form.

Figure 11: Percentage of Revenue by Nature of Payment



2 Modelling Doubtful Debt in 2001/02

2.1 *The Current Model*

2.1.1 The current doubtful debt model has been in use since 1997/98. Major changes were made to the income module during 1999/2000 and further changes were made to this module over 2000/01, primarily to address the deficiencies in the modelling of the incomes of young female completers which were apparent in the results for the previous year. For 2001/02, a minor modification has been made to improve its performance in projecting voluntary repayments. The starting point for the income projections has also been updated to use 2000/01 HECS assessable incomes rather than 1997/98 incomes.

2.1.2 The model is split into three sub-models:

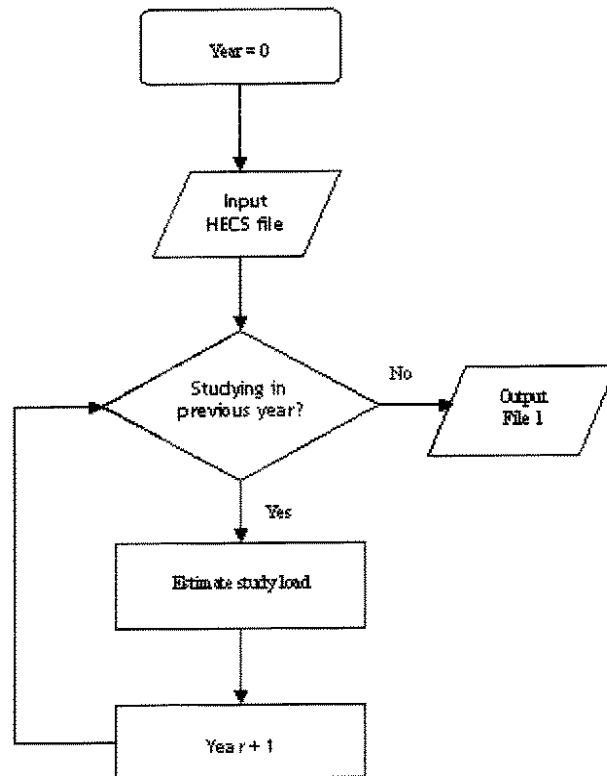
- a model of study status;
- the income model;
- the repayment model.

2.1.3 This structure allows the number of years until study is completed to be included as an independent variable in modelling income. It also allows the parameters to be changed in the repayment model without needing to run the income model - the most time-consuming part of the simulation.

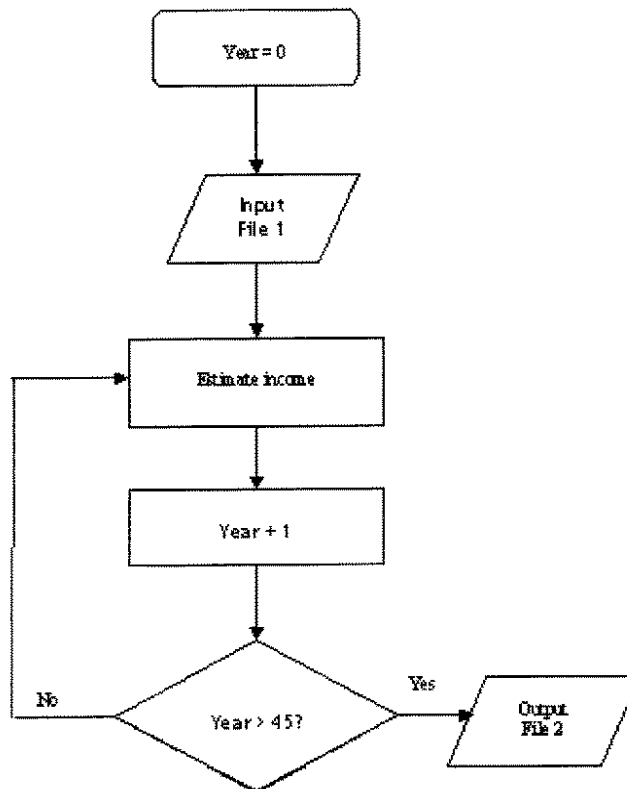
2.1.4 Figure 12 illustrates how the simulation process operates for each of these three sub-models. The final output of the repayment model is a dataset containing income and repayment details for every current debtor on our HECS file from 1 July 2002 over the next 45 years or to the point at which they are simulated to die, if this occurs earlier.

Figure 12: Schematic Description of the Microsimulation Model

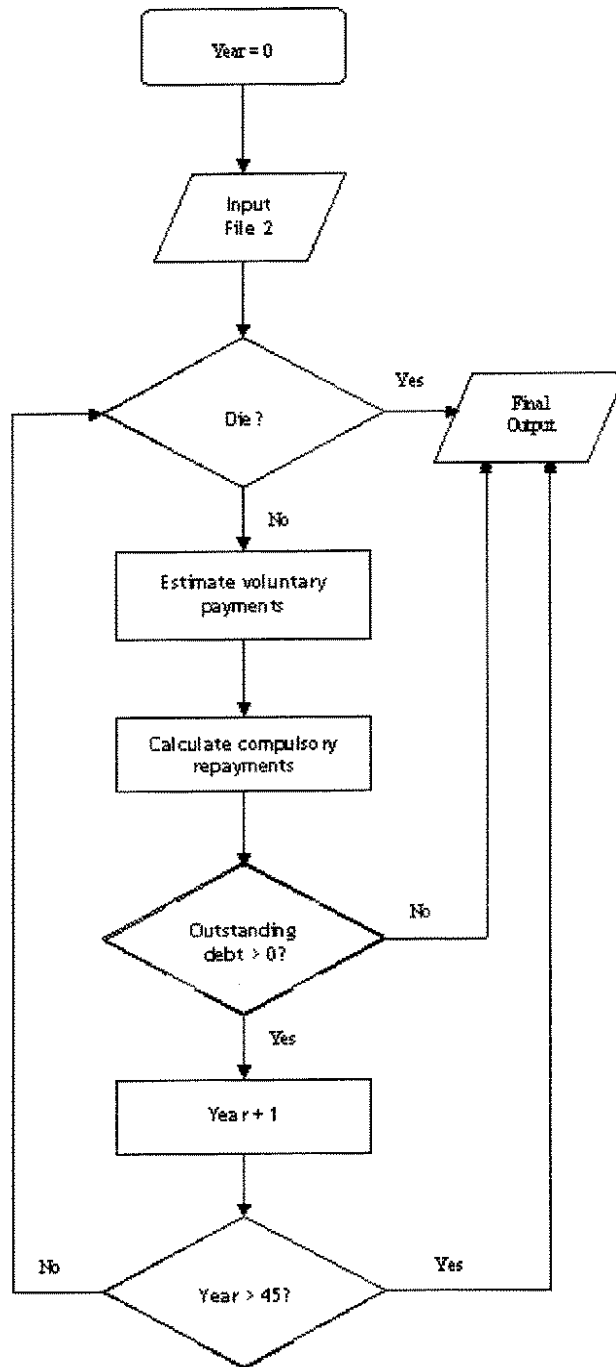
(a) Study Status Model



(b) Income Model



(c) Repayment Model



2.1.5 Each of the steps in the simulation depends upon a range of variables either available on the original file or simulated elsewhere within the model. Table 8 sets out these dependencies.

Table 8: Dependencies Incorporated in the Simulation Model

Variable	Depends Upon
Exit through death	Current age Gender
Study Status	Years of study to date Study load in previous year Gender
Income	Income in previous two years Number of years of nil income Years since last studied Years until completion of study (for those currently studying) Current age Gender
Voluntary Repayment Amount	Income Amount of outstanding debt Period since last made repayment Years since last studied
Compulsory Repayment	Income

2.1.6 The probabilities of death are the mortality rates from the latest published Australian population life tables (prepared by the Australian Government Actuary and published in the Australian Life Tables 1995-97).

2.1.7 Study load is modelled for each semester as a function of years of study to date and the load in the previous semester. The model allows for people to have a load from zero to five units each semester, where four units represents full time study and zero load corresponds to completion of study. Once a student is simulated to have a zero load there is no possibility of moving to a non-zero load in the future. In other words, study is assumed to be continuous.

2.1.8 Existing debtors are assigned an initial study load based on their most recent charge, taking account of the year in which the student first had a HECS debt accrual to determine whether they are subject to the differential charge rates.

2.1.9 The load transition probabilities have been derived from individual student record files provided by DEST.

2.1.10 The doubtful debt model is also used to generate the input files for the DEST revenue model. The revenue model is a separate model which produces

estimates of future revenue and doubtful debt outcomes. As a result, it is necessary to model future charges. For those under the differential HECS system, the subject choice affects the level of future HECS charges and, as a result, charges are likely to vary significantly from year to year even where load remains constant. It is not feasible, however, to model the changes in discipline mix, since the range of possibilities is effectively infinite. Instead, it is assumed that there are eight discipline categories corresponding to whether or not a student has load in each of the charge bands. Once a discipline category is assigned, it is not changed over the course of study.

2.1.11 Note that although future study load and associated charges are modelled, the resulting HECS debt is not used in the doubtful debt model. This is because the doubtful debt model is concerned only with current outstanding debt and the proportions of this debt that will not be repaid.

2.1.12 The income and voluntary repayment functions have been estimated from our HECS longitudinal data linked with a file provided by the ATO on HECS assessable incomes for 1994 to 1999.

2.1.13 A two stage process is used to model income, with the probability of having a zero income estimated separately from the projection of non-zero incomes. The probability of zero income was also modelled separately for those with zero incomes in the two previous years, those with zero income in the previous year but non zero income in the penultimate year and those with a non-zero income in the previous year. Gender, age, years since completion (or, for those still studying, years until projected completion) were significant determinants of the probability of having a zero income.

2.1.14 Income for those projected to have a non-zero income was then estimated based on their income in the previous two years, age, gender and years since completing study (or, for those still studying, years until projection completion of study).

2.1.15 Further details on the derivation of the transition probabilities and estimation functions were provided in the Appendix included with the 1999/2000 report on doubtful debt.

2.1.16 The estimate of voluntary repayments generated by the model in 2001 turned out to be a significant underestimate when compared to the actual experience. In the past, there has been a lot of volatility in voluntary repayments and initially we were not sure whether the substantial increase in voluntary repayments in 2001/02 was a one-off response to the high rate of indexation applied to outstanding debt on 1 June 2001.

2.1.17 If it were the case that 2001/02 was a one-off response, voluntary repayments would be expected to fall back to something like the 2000/01 levels in 2002/03. However, experience from the first months of 2002/03 suggests that voluntary repayments are likely to be maintained around the 2001/02 levels. As a result, it was necessary to adjust the model to allow for this higher level of

voluntary repayments. This was done by increasing the probability of making a repayment in line with the observed experience in 2001/02.

2.1.18 Three macroeconomic parameters are also required for the model:

- the annual growth in the consumer price index (CPI) which is used for indexing the outstanding debt at the end of each year;
- the general growth in wages
 - ◊ the income transitions were derived using incomes adjusted to constant dollars using Average Weekly Earnings (AWE) to remove the effect of general wage growth. In projecting future incomes, the growth in average wages needs to be superimposed on the increases predicted by the income transition functions;
- the discount rate used to value future repayments of debt
 - ◊ using a discount rate set equal to the inflation rate gives the doubtful debt figure in current nominal dollars. This can then be directly compared with the figure for current outstanding debt to give a percentage of debt that will not be repaid.
 - ◊ setting a non-zero real discount rate allows the deferral cost of applying indexation at the CPI rate to be quantified. It also enables a present value (akin to market value) of the repayment income stream to be calculated.

2.1.19 The assumptions used in the model were as follows

Doubtful Debt Calculation

CPI	2.5% p.a.
AWE growth	4% p.a. (1.5% real wage growth)
Discount rate	2.5% p.a. (equal to CPI)

Present Value of Repayment Income Stream

CPI	2.5% p.a.
AWE growth	4% p.a. (1.5% real wage growth)
Discount rate	6.0% p.a. (a 3.5% real discount rate)

2.1.20 The assumptions used for valuing the future repayment income stream allow for a higher real discount rate than we have used in previous reports (3.5% versus 3.0%). This reflects a decision to move to consistency with Treasury's medium term macroeconomic forecasts. The use of a higher real discount rate leads to a lower value being placed on future repayments. It does not alter the projected receipts when measured in nominal dollars.

2.2 Sources of Uncertainty in the Model

2.2.1 There are a number of sources of uncertainty in the modelling process:

- error arising from deficiencies in the raw data used for analysis
 - ◇ income details were not available for all HECS records and some income records were incomplete. This is mainly due to non-submission of taxation returns and is a particular problem for younger students who have only recently or not yet completed. Our experience is that we do not have income data suitable for use until two years after the end of the relevant financial year;
 - ◇ we still have a relatively short sequence of data when measured against the time scale of the scheme. For example, our expectation is that beyond a certain period after completion there will be virtually a zero probability of people making their first repayment on their outstanding debt. As discussed in Section 1.3, it is not apparent that we have reached this point.
 - ◇ there are a limited number of variables available on the individual records. Variables which might have been expected to have significant explanatory power, such as course of study, area of occupation, age of dependent children, etc, could not be incorporated;
- estimation errors arising from mis-specification of the functions adopted or the variables included
 - ◇ in developing the model, judgements needed to be made about how best a model can be fitted to the data, for example, what is the mathematical form of the relationships between different variables, and which variables should be included. If we have chosen an inappropriate functional form this will introduce errors into the model;
- uncertainty in the parameter estimates
 - ◇ regardless of the functional form chosen, the estimates of parameters have significant estimation errors associated with them and the resulting equations will only be able to explain part of the variation observed in the data;
 - ◇ in some cases, part of this uncertainty is incorporated in the model through the inclusion of stochastic variation in the parameters;
- differences between student cohorts
 - ◇ the model uses one set of assumptions to cover all cohorts. In practice, cohort experience is unlikely to be uniform. For example, the introduction of differential HECS may well have changed decisions about the type, if any, of any tertiary education undertaken. As a result, there may be

differences between the pre- and post-differential HECS cohorts which flow through into repayment patterns and associated doubtful debt;

- future changes in the processes being modelled
 - ◇ the processes governing the repayment patterns of tertiary students will change over time in many ways which it is impossible to predict;
 - ◇ we are not in a position to guess at these changes and the model simply attempts to model the observed behaviour over the period for which we have data as accurately as possible;
- the stochastic nature of the simulation process itself
 - ◇ each element of the model, apart from the calculation of the compulsory repayments and the resulting outstanding debt, is a stochastic process, using randomly generated numbers to determine whether an event occurs or the predicted value of a variable. For example, in deciding whether an individual dies, the model compares a random number between 0 and 1 with the probability that an individual of that age and sex will die. If the random number is less than that probability, the individual is assumed to exit the model; otherwise, the simulation continues;
 - ◇ each run of the model will therefore produce a different series of income projections and, hence, different repayment patterns. While this results in considerable variation in the projections for individuals, the size of the base dataset leads to the variation in aggregate results being very small.

2.2.2 The above discussion should make it clear that there are substantial areas of uncertainty. The limitations of the data available for estimation purposes were of great concern, particularly in relation to the estimation of the probability of zero income. The outcomes of the model are critically sensitive to the probability of remaining on zero income given that income in the previous two years was zero and, in our view, a longer series of income data will be required to obtain reliable estimates of these probabilities.

3 Results for 2002

3.1 Estimate of Doubtful Debt

3.1.1 Table 9 shows the estimated doubtful debt for each of the six groups which have been used for reporting in previous years.

Table 9: Estimated Doubtful Debt

Group	Outstanding Debt ⁽¹⁾⁽²⁾ \$m	Doubtful Debt \$m	Ratio of Doubtful Debt to Group Outstanding Debt %
Males aged less than 30 on completion	3,268.1	502.3	15.4
Males aged between 30 and 55 on completion	526.4	210.1	39.9
Males aged over 55 on completion	17.5	14.7	83.8
All males	3,812.0	727.1	19.1
Females aged less than 30 on completion	4,110.0	675.4	16.4
Females aged between 30 and 55 on completion	765.6	295.7	38.6
Females aged over 55 on completion	30.3	24.5	80.7
All females	4,906.0	995.6	20.3
Total	8,718.0	1,722.7	19.8

- (1) Note that the outstanding debt derived from the individual transaction records provided by the ATO differs slightly from the aggregate figure reported by the ATO as at 30 June (\$8,668m from the individual records used in the projection model compared with an aggregate figure of \$8,718m). We also exclude a number of records which do not have the necessary information required for the model or where the information provided appears

incorrect (eg, ages less than 14). The outstanding debt for the population which was modelled was \$8,650m. The model outputs have been pro rated up to ensure that the total outstanding debt is equal to the figure certified by the ATO.

(2) Note that column totals may not add exactly due to rounding

3.1.2 Because the model simulates repayment on an individual basis, it is possible to disaggregate the debt using any of the variables carried in the model. Table 10 shows the doubtful debt percentages by year of completion.

Table 10: Doubtful Debt by Year of Completion

Year of Completion	Outstanding Debt on Completion \$m	Current Outstanding Debt \$m	Estimate of Doubtful Debt \$m	Doubtful Debt as a % of Debt on Completion	Doubtful Debt as a % of Current Debt
1989	14.2	2.3	1.4	10.2	62.7
1990	124.3	17.8	11.0	8.8	61.6
1991	220.8	39.0	22.8	10.3	58.5
1992	341.6	73.6	40.5	11.9	55.1
1993	481.0	115.7	51.4	10.7	44.4
1994	581.5	160.9	65.1	11.2	40.4
1995	649.9	207.5	75.4	11.6	36.4
1996	681.4	258.6	83.2	12.2	32.2
1997	726.9	331.8	93.7	12.9	28.2
1998	795.1	447.4	103.3	13.0	23.1
1999	875.8	607.9	117.7	13.4	19.4
2000	1,019.8	848.1	154.3	15.1	18.2
2001	1,246.1	1,175.5	219.1	17.6	18.6
2002	4,432.0	4,432.0	683.7	15.4	15.4

3.1.3 This table suggests that there has been a gradual decline in the probability of repayment since the introduction of the scheme. This could be expected given

that average debt on completion is now more than ten times the average debt incurred by those who completed in 1989.

3.1.4 The pattern of doubtful debt as a percentage of debt on completion does not look unreasonable. The relatively higher levels of doubtful debt associated with 2000 to 2002 completers is likely to be, at least in part, the result of the higher levels of average debt associated with differential HECS. It can be seen that the highest doubtful debt (as a percentage of debt on completion) is held by the 2001 completers, who also have the highest average debt on completion. The lower average debt of the 2002 cohort reflects the fact that members of this group are only part way through their study and therefore are yet to accrue their full debt.

3.1.5 It should be noted that we have little reliable income data for those completing in the last couple of years, particularly those still studying in 2002. Recent income is a very important input for the doubtful debt model. The model results for these groups are, accordingly, subject to greater uncertainty and should be treated with some caution. With the introduction of differential HECS, greater levels of debt are being held by these recent completers. It is also possible that there may be differences in repayment patterns which depend upon the charge band. We will not have sufficient data to analyse these effects for many years.

3.2 Debt Creep

3.2.1 One of the simplest measures of the extent of doubtful debt is the percentage of total outstanding debt which it represents. However, it needs to be remembered that this measure will increase during the first few decades of the scheme without there necessarily being any deterioration in students' propensity to repay.

3.2.2 This is because debt which will not be repaid remains in the HECS system until it is written off on death, which may be over 60 years after it was incurred. By contrast, the great majority of the debt which will ultimately be repaid is likely to be repaid within 15 years of it being incurred.

3.2.3 As the debt which is expected to be repaid is in fact repaid, the remaining debt becomes increasingly dominated by the doubtful debt component. This feature is visible when a comparison is made between doubtful debt as a percentage of currently outstanding debt and a percentage of the debt on completion (indexed to current dollars) as shown in Table 11.

Table 11: Comparison of Doubtful Debt Measured as a Percentage of Debt on Completion and Currently Outstanding Debt

Group	Doubtful Debt as a Percentage of Debt on Completion %	Doubtful Debt as a Percentage of Outstanding Debt at 30 June 2002 %
Males aged less than 30 on completion	10.8	15.4
Males aged between 30 and 55 on completion	27.8	39.9
Males aged over 55 on completion	68.7	83.8
Females aged less than 30 on completion	12.0	16.4
Females aged between 30 and 55 on completion	27.0	38.6
Females aged over 55 on completion	66.9	80.7

3.2.4 The gap between the two percentages reflects both the age of the debt (as can be seen in Table 10 where the measure of doubtful debt as a percentage of outstanding debt is very much higher than the percentage of debt on completion for the early completion years) and how quickly the debt that is expected to be repaid is in fact repaid. Thus for the two older age groups, the doubtful debt as a percentage of outstanding debt is substantially higher than the debt as a percentage of debt on completion. On average, these two groups have lower debt on completion than the young age group and make their repayments relatively soon after completion. The outstanding debt for these groups quickly becomes dominated by debt which is not expected to be repaid. By contrast, the repayment period for the young completers is much longer. As a result, a higher proportion of the outstanding debt is still expected to be repaid. The progression of debt creep for this group is, therefore, correspondingly slower.

3.3 Present Value of Repayments

3.3.1 In order to calculate a present value of repayments, it is necessary to discount future repayments to 30 June 2002. The selection of an appropriate real discount rate is a matter of judgement and we adopted a rate of 3.5% p.a. based on the current Treasury projections of the gap between the inflation rate and the long term Commonwealth bond rate. As noted in Section 2.1, this is a bigger gap than has been used in previous reports and results in a lower present value of repayments than would have been the case using the 3% gap adopted previously.

Table 12: Present Value of Future Repayments

Group	Outstanding Debt \$m	Face Value of Repayments ⁽¹⁾ \$m	Discounted Repayments ⁽²⁾ \$m
Males aged less than 30 on completion	3,268.1	2,701.3	2,250.5
Males aged between 30 and 55 on completion	526.4	305.2	266.6
Males aged over 55 on completion	17.5	2.4	2.2
Females aged less than 30 on completion	4,110.0	3,352.6	2,742.5
Females aged between 30 and 55 on completion	765.6	454.0	394.2
Females aged over 55 on completion	30.3	5.1	4.7
Total⁽³⁾	8,718.0	6,820.6	5,660.7

(1) Note that the repayments do not include the value of the 15% bonus provided on voluntary repayments. As a result, the value of outstanding debt less the face value of repayments is not equal to the doubtful debt.

(2) The discounted repayments have been calculated using a real discount rate of 3.5% p.a. A higher discount rate would give a lower value of discounted repayments.

(3) Totals may not add exactly due to rounding.

3.3.2 Table 13 sets out a reconciliation between the nominal value of outstanding debt and the present value of repayments.

Table 13: Reconciliation of Nominal and Real Values of Outstanding Debt

	\$m
Nominal Value of Outstanding Debt	8,718.0
less Nominal Value of Doubtful Debt	(1,722.7)
gives Nominal Value of Debt Expected to be Repaid	6,995.3
less Nominal Value of 15% Bonus on Voluntary Repayments	(174.7)
gives Face Value of Repayments	6,820.6
less Deferral Cost	(1,159.9)
gives Discounted Repayments (Real Value of Outstanding Debt)	5,660.7

3.3.3 Note that each of the offsets shown in Table 13 (doubtful debt, bonus on voluntary repayments and deferral cost) represents a subsidy by the Commonwealth to HECS debtors.

3.3.4 The nominal value of the doubtful debt and the bonus on voluntary repayments are calculated by discounting the projected amounts written off (on death or at the time of making a voluntary repayment of more than \$500 respectively) by the inflation rate used to index outstanding debt. These are both explicit subsidies which are recognised in the financial statements.

3.3.5 The deferral cost is the difference between the value of repayments discounted at the indexation rate (the face value of repayments) and the value of repayments discounted at the Commonwealth's borrowing rate. It can thus be thought of as the cost to Government of applying an indexation charge to outstanding debt which is less than the Commonwealth's borrowing rate. The bigger the assumed gap between the indexation charge and the Commonwealth's borrowing rate, the greater the reported deferral cost will be. By contrast, the method used to calculate and report on doubtful debt means that it is not affected by this gap.

3.3.6 However, it is important to note that if the indexation rate applied to HECS debt were higher, the size of the deferral cost would be reduced but some of what is currently being reported as deferral cost would be reported as doubtful debt. In the extreme, if a real interest rate reflecting the Commonwealth's borrowing rate were used to index outstanding HECS debt, there would be no deferral cost. Under this scenario, the present value of repayments would be expected to increase and the total amount of subsidies reduced. Although the deferral cost would be zero, the subsidies provided through the doubtful debt and bonus on voluntary repayments arrangements would be expected to increase significantly.

3.4 Comparison with Outcomes from the 2001 Model

3.4.1 Table 14 compares the estimates of doubtful debt which we estimated in 2001 with the estimates derived this year.

Table 14: Doubtful Debt Estimates for 2001 and 2002

Group	Doubtful Debt as a % of Outstanding Debt	
	2001 %	2002 %
Males aged less than 30 on completion	13.8	15.4
Males aged between 30 and 55 on completion	36.2	39.9
Males aged over 55 on completion	83.7	83.8
Females aged less than 30 on completion	15.3	16.4
Females aged between 30 and 55 on completion	34.8	38.6
Females aged over 55 on completion	77.1	80.7
Total	18.0	19.8

3.4.2 The change in doubtful debt as a percentage of outstanding debt is mainly due to debt creep and the increase in the average debt on completion associated with the higher charges under differential HECS.

3.5 Revenue Estimates

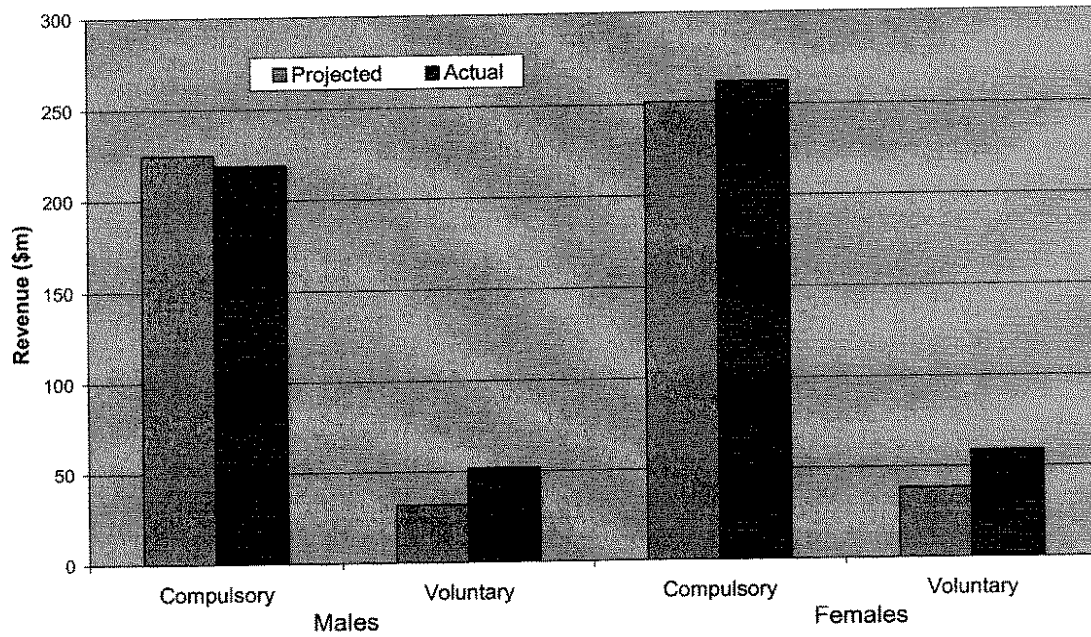
3.5.1 The AGA has constructed a revenue model which DEST can use to generate estimates of future revenue and other HECS variables, including debt accruals, remissions and write-offs. While the doubtful debt model now includes simulation of future study loads, it does not attempt to model repayments arising from the associated debt accruals. As a result, the revenue model rather than the doubtful debt model should be used for revenue estimates. However, the revenue figure derived from the doubtful debt model for the first outyear is considered to be reliable and provides a useful check on the operation of the doubtful debt model. Table 15 compares the estimates produced by the model last year with actual revenue in 2001/02 and shows the 2002/03 revenue predicted by the model this year.

Table 15: Revenue Estimates

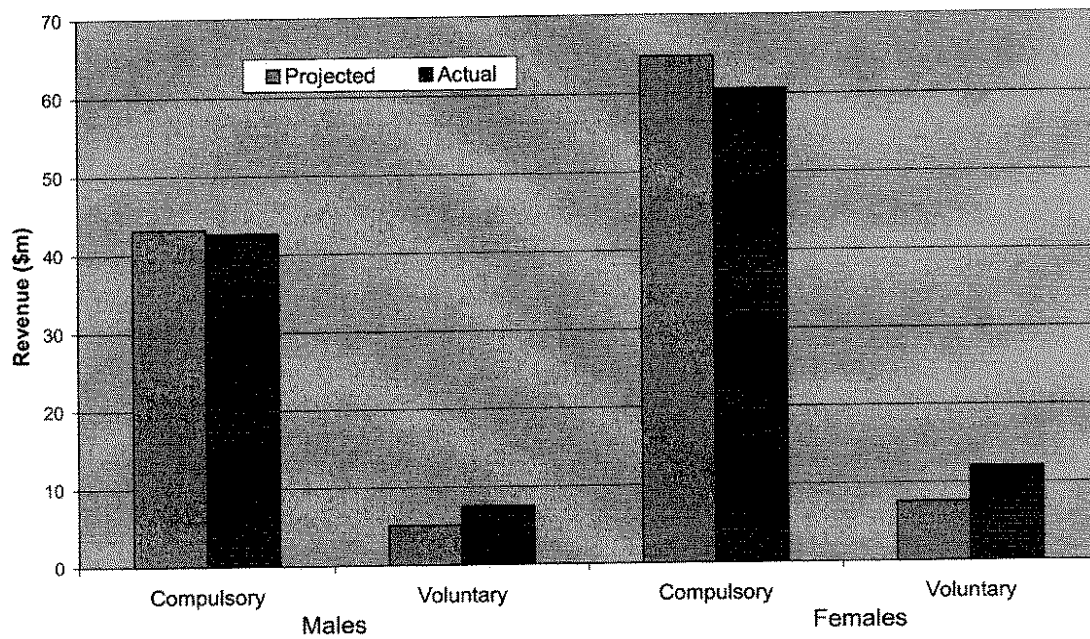
Group	Estimated Revenue 2001/02 \$m	Actual Revenue 2001/02 \$m	Estimated Revenue 2002/03 \$m
Males aged less than 30 on completion	256.5	270.7	295.3
Males aged between 30 and 55 on completion	48.3	50.2	55.9
Males aged over 55 on completion	0.6	0.7	0.7
Females aged less than 30 on completion	289.9	321.3	352.6
Females aged between 30 and 55 on completion	72.3	72.6	78.6
Females aged over 55 on completion	1.5	1.5	1.3
Total	669.2	716.9	784.4

3.5.2 Figure 13 shows the comparison between the estimated revenue and actual revenue for 2001/02 broken down between compulsory and voluntary repayments for each of the age and gender sub-groups.

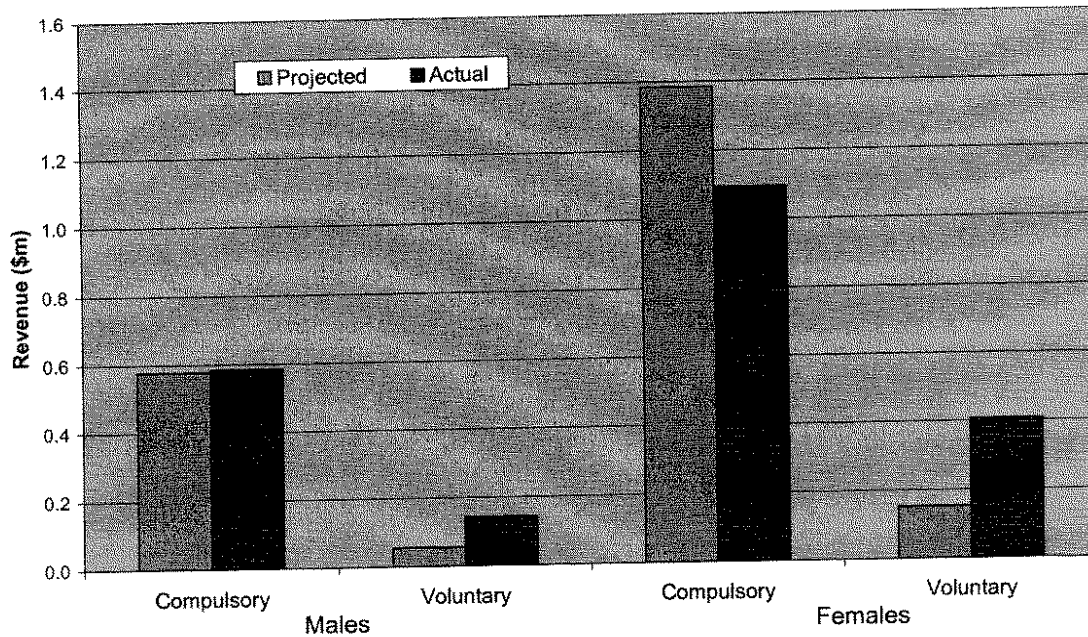
Figure 13: Projected and Actual Revenue 2001/02
(those aged less than 30 on completion)



(those aged between 30 and 55 on completion)



(those aged over 50 on completion)



3.5.3 The model predictions for compulsory repayments in 2001/02 were good for all but the old females. Repayments from the old age groups account for less than 0.5% of total repayments and this is not considered to be of concern. It can be seen that voluntary repayments were underestimated for all ages, with the most significant underestimates occurring for the young age group where actual repayments were almost 60% or \$41m higher than projected. As noted in Section 2.1, the model has been adjusted to increase the probability of voluntary repayments in order to improve performance in this area. However, voluntary repayments are quite volatile from year to year and a significant behavioural element makes them difficult to forecast with any accuracy. For example, it has been hypothesised that the large increase in voluntary repayments in 2001/02 was a response to the 6% indexation of outstanding debt applied in June 2001.

3.5.4 Looking ahead to 2002/03, total projected revenue is expected to grow by around 17%. This growth in revenue is the result of both the increased outstanding debt and the increase in the average period since study was completed.

3.6 *Conclusion and Future Work*

3.6.1 A substantial amount of work was done over 1999/2000 in redeveloping the income module of the doubtful debt model. Further refinement was undertaken in 2000/01 and 2001/02 and we consider that the model outcomes are reasonable for all groups.

3.6.2 The introduction of differential HECS and the higher levels of resulting debt on completion do give rise to added uncertainty. This is because it will take longer on average to pay off the HECS debt than it has in the past. The model suggests that there will be higher doubtful debt percentages as a consequence of these higher debt levels. It will, however, be many years until we have sufficient post-graduate income data to make a fully informed judgement about the effect of differential HECS on doubtful debt and whether the outcomes suggested by the model are borne out in practice.

3.6.3 The PELS program currently accounts for about 0.5% of the total outstanding debt. Although this percentage will grow over time, it is likely to remain a relatively small component, accounting for less than 10% of the total debt. Not surprisingly, PELS debtors have different demographic characteristics from HECS debtors in general. It will be many years before it is possible to determine whether and how this will affect repayment patterns by this group. We do not propose to undertake any major analysis of PELS repayments until we have at least four years of repayment experience.

3.6.4 In the short term and, importantly, in the absence of future policy changes, we believe that the model as it now stands should be able to be used with relatively little modification. We will continue to monitor model performance by checking outcomes against predictions and make adjustments where necessary.

3.6.5 It needs to be remembered that there will continue to be considerable uncertainty associated with the estimates of doubtful debt. The fact that we are still seeing those from the first two years of completion starting to make their first repayment eleven or twelve years after completing their study gives an indication of the sort of timeframe involved in the repayment process.

3.6.6 If and when a stable estimate of doubtful debt as a percentage of debt on completion becomes apparent, doubtful debt as a percentage of outstanding debt will nonetheless continue to deteriorate as a result of the debt creep described in Section 3.2.

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