

MODELLING AUSTUDY

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Authors' Note

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About STINMOD

STINMOD is a static microsimulation model which has been developed by the National Centre for Social and Economic Modelling (NATSEM). STINMOD is NATSEM's first publicly available model. It is a general-purpose, static microsimulation model which has been developed to provide government and non-government organisations - as well as academic and other researchers - with an accessible and practical tool to allow examination of the *immediate* impact of a range of policy changes on family incomes and government expenditure.

STINMOD is a *general-purpose* microsimulation model, as it models a broad range of Federal Government programs. The programs currently modelled in STINMOD are Social Security pensions, allowances and family payments, Veterans' Affairs pensions, AUSTUDY, the Medicare levy and income tax. Estimates of the cash value of government expenditure on public housing and health have also been added to the STINMOD database. In later releases, other government programs will be added to the model, to improve the coverage of both cash and non-cash transfers.

As a *static* microsimulation model, STINMOD provides a 'snapshot' of the economic circumstances of the Australian population, both as it was just before the introduction of a new policy and as it would be immediately after a policy is introduced. By examining the changed economic circumstances of the model's population, it is possible to predict accurately the likely first-round effect of a new policy change on the real population.

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1. Introduction

Education plays a critical role in Australian society and is a major component of the national economy. Participation is compulsory between the ages of 6 and 15 and, for full-time students, is demanding of time and effort. In 1989 there were 165,000 persons directly employed as teaching staff for 3,031,400 students. At the same time, the cost of education in Australia represented 5.2 % of Gross Domestic Product (ABS, 1992: 151).

Since 1983 there has been a steady growth in education participation. The proportion of people aged 16 to 64 years studying has increased from 27% in 1983 to 39% in 1993, with the retention rate for secondary students increasing from 41% in 1983 to 77% in 1992 (ABS, 1994: 86).

This trend is not surprising as the relationship between educational attainment and future economic benefits has, in Australia as elsewhere, long been recognised (McNabb and Richardson 1989; Chapman and Iredale 1990; ABS 1992). Similarly, in Australia, the unemployment rate for persons aged 15 to 24 years is found to decrease steadily as a person's level of educational attainment rises (ABS 1994: 78).

Public support for education has both economic and social objectives. Recognising the importance of education to individual and national welfare, it seeks to promote equality of opportunity and, increasingly, to provide a skilled and internationally competitive labour force to meet the demands of the economy.

As a result, Governments spend a considerable amount on education. In Australia this cost is shared between the States and the Commonwealth. Between 1981-82 and 1988-89 total Government outlays on education increased (in 1988-89 values) from \$14,379 to \$16,234 million (ABS, 1992: 151). (Average outlay per student rose, in 1988-89 values, from \$4,813 to \$5,371 per annum.)

In Australia the principal source of direct support for students is provided in the form of cash assistance under the Commonwealth Government's AUSTUDY program. The following sections of this

paper describe how AUSTUDY has been modelled in STINMOD/94A.

Section 2 provides a brief overview of the AUSTUDY program.

Section 3 describes the elements of the AUSTUDY program that have been included in STINMOD, and how they were modelled.

Section 4 explains how information that was needed to accurately model AUSTUDY was added to the STINMOD base population data set.

Section 5 presents the outcomes of the modelling, including comparisons between STINMOD's simulations and benchmark administrative data.

Finally, Section 6 summarises and concludes the study and discusses the future development of AUSTUDY modelling at NATSEM.

2. The AUSTUDY Program

While the bulk of Government support for education goes towards meeting the capital and recurrent cost of educational institutions, substantial assistance is provided to students by the Commonwealth in the form of income support payments, mainly through the AUSTUDY and ABSTUDY programs.

AUSTUDY was introduced in 1986, when it replaced the existing Tertiary Education Assistance Scheme (TEAS), the Secondary Assistance Scheme (SAS), and the Adult Education Assistance Scheme (ASEAS) (Chapman, 1992).

The stated aim of the Commonwealth's student assistance programs, of which AUSTUDY is the largest provider of assistance, is:

[t]o promote equality of educational opportunity, by improving access to, participation and retention in, and completion of

education through the provision of financial assistance (DEET, 1992: 147) .

In 1993-94, \$1,745.10 million or approximately 18 percent of total Commonwealth outlay on education, was allocated to meet this aim (The Treasurer, 1994: 3.46). Of this, the greatest proportion, \$1,371.9 million, was to be disbursed in the form of AUSTUDY payments (The Treasurer, 1994: 3.60).

The AUSTUDY program is managed by the Commonwealth Department of Employment, Education and Training (DEET). Its main elements are to provide financial support to disadvantaged students over 16 years of age studying full-time at an approved educational institution. Financial circumstances are used to establish disadvantage under the AUSTUDY program which, according to the Government, "is income and assets tested so that it will benefit students most in need"(DEET 1991: 147).

The operation of AUSTUDY was reviewed by Dr. Bruce Chapman in 1992, who concluded that:

there is little doubt that the current arrangements sometimes target ineffectually, basically because there is relatively little sensitivity shown to the varied financial needs and circumstances of the potential clientele. The essential challenge for reform is to improve the targeting so as to ensure that the right amount of assistance is delivered to those who most need it (Chapman, 1992: viii)

Specifically, the report questioned whether the program was successfully meeting its stated aims of promoting equality of access to post-compulsory secondary and tertiary education. The report noted that "many receiving [AUSTUDY] have less need of support than the minority disadvantaged group who need more assistance" (Chapman, 1992: ix).

Many of the changes to AUSTUDY suggested by the report have subsequently been adopted - *eg.* raising the minimum AUSTUDY payment and providing additional support in the form of income-contingent loans. It is clear, however, that the program will continue to need to be evaluated against its stated objective of promoting equality. This objective will continually be challenged

by changing socio-economic conditions in Australia, changes to related government cash transfer programs, and by the inevitable amendments and innovations to AUSTUDY itself.

Microsimulation models such as STINMOD are able to play a unique role in analysing a program such as AUSTUDY against the complex and confusing background of such multi-dimensional change. Their advantage lies in their ability to produce very accurate, detailed distributional analyses which capture much of the socio-economic richness and diversity that is typical of national populations. It is this diversity - of income, family structure and labour force participation - which predominantly determines how individuals will be affected by government programs. Only when this diversity is captured at a household, family or individual level is it possible to comprehensively model policy impacts (Percival, 1994; Lambert et.al., 1994).

3. Calculating AUSTUDY Entitlements in STINMOD

3.1 General

AUSTUDY is an income support program available to students aged 16 years and older who are studying at an approved educational institution. The level of AUSTUDY payment is established by the student's age, family status and income (including, for many, their family's income) (Table 1).

Table 1 Maximum Annual AUSTUDY Entitlements, 1994.

Age	Rate	Allowance (\$ per annum)
Under 18 years	Standard	3,449
	Away/Independent	5,694

	Married with child	6,917
18 years & over	Standard	4,148
	Away/Independent	6,296
	Married with child	6,917
Special groups	Standard	5,089
	Away/Independent	7,649
	Sole Parent	8,132

Source: (DEET, 1994: 11)

The broad strategy adopted in modelling AUSTUDY was to:

- first, for each person recorded in the STINMOD database, determine if they were a student; and then
- second, calculate any entitlements they might be eligible to receive by applying the AUSTUDY rules to their personal economic and social circumstances.

That is, STINMOD calculates an AUSTUDY entitlement for each person who meets the basic eligibility criteria of being 16 years of age or older and is:

- at school;
- studying full-time at a tertiary institution; or
- otherwise eligible to receive the Pensioner Education Supplement.

Figure 1 shows how the AUSTUDY Module is structured in STINMOD.

Within STINMOD, AUSTUDY is calculated after any entitlements to payments from the Department of Social Security (DSS) and Department of Veterans Affairs' have been imputed (see Lambert et.al., 1994) for further details of STINMOD). AUSTUDY entitlements are affected when a person is a recipient of a DSS or DVA payment.

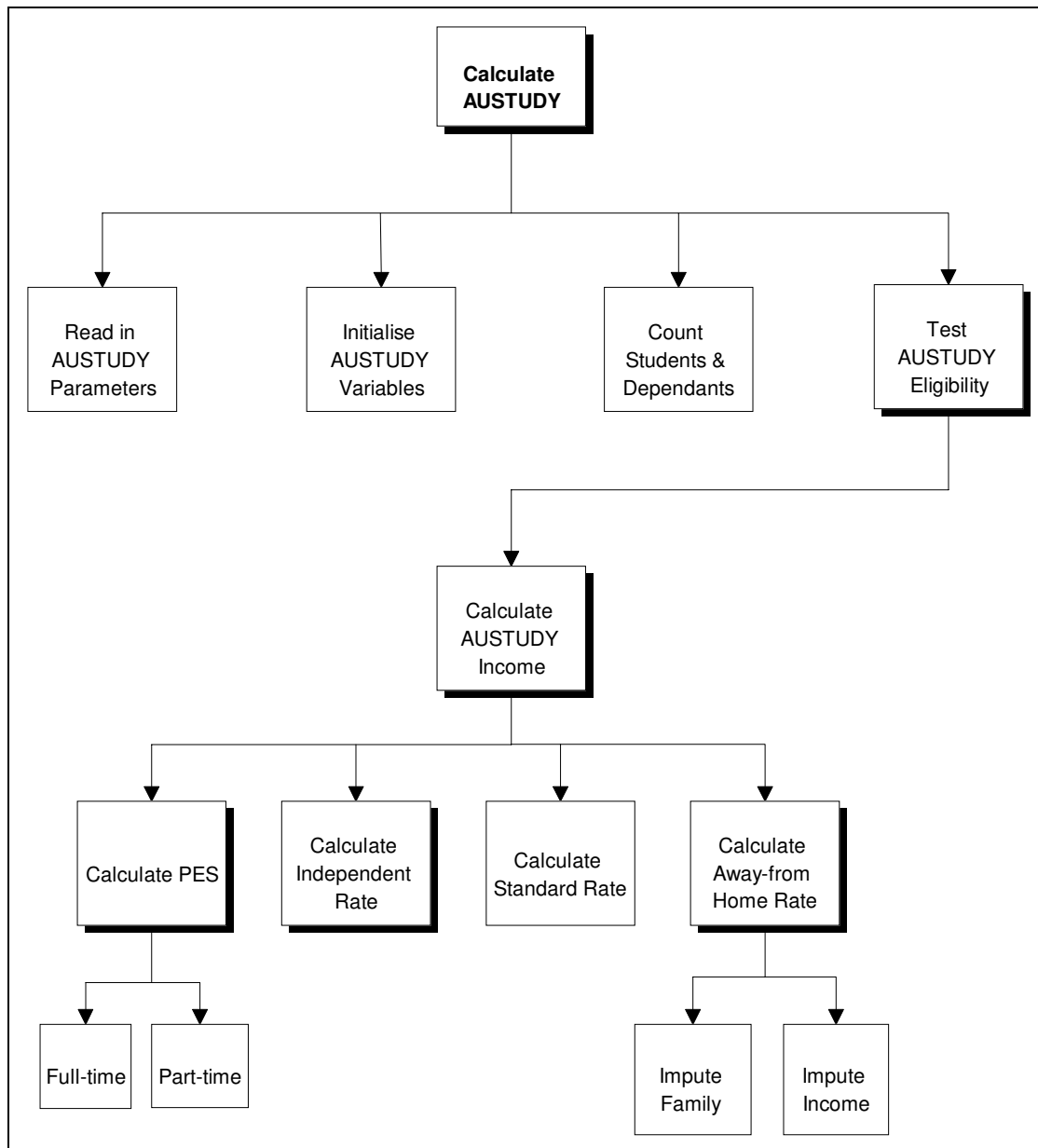


Figure 1: AUSTUDY Module Hierarchy Chart

3.2 AUSTUDY Parameters

In STINMOD/94A, many parameters of the AUSTUDY program are made accessible to users so that their values can be changed to simulate a policy change. These parameters are contained in parameter tables, which are displayed via STINMOD's interface. Figure 2 shows a typical parameter screen.

Figure 2: AUSTUDY Parameter Screen

TABLE 1	
Max adjusted parental income (\$ per annum)	: 21300
Min annual Austudy payment (\$ per annum)	: 1000
Max Std Austudy - 16-17 years (\$ per annum)	: 3449
Max Std Austudy - 18+ years (\$ per annum)	: 4148
Max Ind Austudy - 16-17 years (\$ per annum)	: 5694
Max Ind Austudy - married with dependent children (\$ per annum)	: 6917
Max Ind Austudy - 18+ years (\$ per annum)	: 6296
Max Ind Austudy - sole parents (\$ per annum)	: 8132
Pensioner Education Supplement (\$ per week)	: 30

The parameter tables include information such as;

- AUSTUDY rates and payments;
- the age of independence;
- maximum income levels before payments are reduced;
- the rates at which payments are reduced; and
- the reduction to family income allowed for additional children in the family.

3.3 Determining AUSTUDY Eligibility

As Figure 1 indicates, STINMOD currently models the four AUSTUDY payment rates: Standard AUSTUDY; Away-From-Home AUSTUDY; Independent AUSTUDY; and the Pensioner Education Supplement.

In the AUSTUDY module, STINMOD first determines whether a person meets the broad AUSTUDY eligibility criteria: that is, they are studying at a school or a tertiary institute and are aged 16 years or older. Records that are determined to be students are then assigned to one of the four AUSTUDY programs.

Assignment is sequential and exclusive; that is, all students are tested against the eligibility criteria of each program in succession until either the criteria are met or they are assigned to the last program by default. The order of testing is: Pensioner Education Supplement; Independent AUSTUDY; Standard AUSTUDY; and, finally, Away-From-Home AUSTUDY.

Tertiary students are only eligible for AUSTUDY if they are attending an accredited institution. As the IDS does not indicate the type of institution a student is attending, it was necessary to simulate whether it was accredited or not. This was done using information from the May 1993 ABS special labour force survey on education (ABS, 1993). The survey indicates that out of 491,000 tertiary students, only 421,900 were attending a higher education institution, including TAFEs. Accordingly, an equivalent proportion (14 per cent) of full time tertiary students in STINMOD were deemed - using random selection - to be attending an unaccredited institution.

It was also clear from the validation of STINMOD that Pensioner Education Supplement (PES) numbers would be overstated as many sole parents appear to be either attending part-time courses that are not accredited for AUSTUDY, or, although eligible, are not taking-up their entitlement to AUSTUDY. Accordingly, the take-up PES by eligible part-time students was simulated to match administrative data provided by DEET.

(Note: This version of STINMOD does not calculate ABSTUDY; Assistance for Isolated Children (AIC); or fares allowances as the

model's base population does not contain sufficient information to allow their recipients to be accurately identified.)

3.4 Calculating AUSTUDY Entitlements

3.4.1 Pensioner Education Supplement

AUSTUDY entitlements are not normally available to anyone receiving a Social Security or Veterans Affairs' pension. However, if a person is studying full-time and is a recipient of some DSS and DVA pensions, they are eligible for the flat-rate PES. As well, some sole parents who are studying part-time are also eligible to receive the PES. The PES is made available in STINMOD to all non-dependent students who;

- are studying full-time and are in receipt of a Sole Parent's Pension, a Widow's B Pension, a Special Benefit (and a sole parent), a Disability Support Pension, a Wife's Pension as the wife of a Disability Support Pensioner, a Carer's Pension, a Disability Pension, a War Widow's Pension, or a Service Pension; or
- are studying part-time and are in receipt of a Sole Parent's Pension or are a sole parent in receipt of a Widow's B Pension or Special Pension.

The PES, which was worth \$30 per week in 1993, is not income or assets-tested.

3.3.2 Independent AUSTUDY

The Government pays AUSTUDY entitlements at the independent rate to students who meet any one of the following criteria:

- their independent status has previously been granted;
- are aged 23 years or over;

- are or have been married;
- have or had a dependent child;
- have been supporting themselves for at least three of the last four years;
- are homeless or whose parents are unable to provide a home, care or support;
- are an orphan; or
- are a refugee.

In STINMOD, however, data limitations have meant that AUSTUDY is paid at the Independent only to students who:

- are aged 23 years or older;
- are or have been married;
- have children; or
- are the reference person or spouse in their own income unit; that is, are currently supporting themselves.

AUSTUDY calculates a student's entitlement at the Independent rate as follows:

Calculating Independent rate AUSTUDY

1. Independent rate AUSTUDY payment is calculated by subtracting from a student's maximum possible entitlement (see Table 1), deductions for the student's own income and deductions for the student's spouse's adjusted income¹.

¹The spouse income test is waived where the spouse is a recipient of a DSS or DVA pension or benefit.

- *Maximum entitlements* vary according to whether the student is aged under or over 18 years, is a member of a 'special group'², or is a sole parent with dependent children.
 - A *spouse's adjusted income* is calculated by subtracting, from a spouse's taxable income for the previous financial year, \$1,200 for the first dependent child under 16 and \$2,500 for each other dependent children under 16. The spouse's adjusted income then reduces the maximum AUSTUDY payment by 50 cents for each dollar over \$13,400.
 - The student's *own income* reduces the maximum payment by 50 cents for each dollar over \$6,000.
2. A separate (and additional) payment, the *Dependent Spouse Allowance*, is calculated where a student has a spouse who is dependent on them.
- The *Dependent Spouse Allowance* is calculated by subtracting 50 cents for each dollar a spouse's estimated income exceeds \$1,560 from the maximum AUSTUDY entitlement.
3. The final AUSTUDY payment is the sum of 1 and 2. It must, however, be greater or equal to the minimum annual AUSTUDY payment (\$1,000 in 1994).

In STINMOD, the maximum entitlement for independent rate AUSTUDY can be varied via AUSTUDY parameter screens (see Figure 2).

3.4.3 Standard AUSTUDY

AUSTUDY at the Standard rate is paid to full-time students if they are:

- aged between 16 and 22 years;

²Students aged 21 years or older who are transferring from Social Security Benefits or undertaking an English as a second language course.

- not eligible for independent or away-from-home rate AUSTUDY; and
- are living with their parents;

Calculating Standard rate AUSTUDY

1. Standard rate AUSTUDY payment is calculated by subtracting from a student's maximum possible entitlement (see Table 1), deductions for the student's own income and the student's family's adjusted income.
 - *Maximum entitlements* vary according to whether the student is aged under or over 18 years, or is a member of a 'special group'³.
 - *Adjusted family income* is calculated by subtracting, from the family's taxable income for the previous financial year, \$1,200 for the first dependent child under 16, \$2,500 for each other dependent children under 16, and \$3,600 for each other dependent student in the family. The adjusted family income then reduces the maximum AUSTUDY payment by 25 cents for each dollar over \$21,300.
 - The student's *own income* (estimated as expected earning for the current year) reduces their maximum AUSTUDY payment by 50 cents for each dollar over \$6,000.
2. The AUSTUDY payment calculated in 1 is only paid if the amount is greater or equal to the minimum annual AUSTUDY payment (\$1,000 in 1994).

3.4.4 Away-from-home AUSTUDY

³Students aged 21 years or older who are transferring from Social Security Benefits or undertaking an English as a second language course.

The Government pays AUSTUDY entitlements at the away-from-home rate to tertiary students who meet any one of the following criteria:

- received Away-from-home rate AUSTUDY in the previous year;
- lives too far from the educational institution;
- needs to meet compulsory residential requirement; or
- their home conditions make study difficult.

The away-from-home rate is also paid to secondary students;

- whose families are physically isolated or itinerant;
- who have a disability which prevents daily travel; or
- whose particular academic needs can not be met locally.

In STINMOD, because of data limitations, Away-from-home rate AUSTUDY is only paid to full-time students who:

- are not eligible for independent rate AUSTUDY; and
- who are shown as living away from the family home.

STINMOD's eligibility test applied to students living away from home is necessarily more liberal than that applied by the Government as information such as the remoteness of the family home from schools is not available on the original 1990 Income Survey which provides the base data for STINMOD.

Calculating Away-from-home rate AUSTUDY

1. Away-from-home rate AUSTUDY payment is calculated by subtracting from the student's maximum possible entitlement (see Table 1), deductions for the student's own income and the student's family's adjusted income.
 - *Maximum entitlements* vary according to whether the student is aged under or over 18 years, or is a member of a 'special group'⁴.
 - *adjusted family income* is calculated by subtracting, from the family's taxable income for the previous financial year, \$1,200 for the first dependent child under 16, \$2,500 for each other dependent children under 16, and \$3,600 for each other dependent student in the family. The adjusted family income then reduces the maximum payment by 25 cents for each dollar over \$21,300.
 - the student's *own income* (estimated as expected earning for the current year) reduces the maximum payment by 50 cents for each dollar over \$6,000.
2. The AUSTUDY payment calculated in 1 is only paid if the amount is greater or equal to the minimum annual AUSTUDY payment (\$1,000 in 1994).

In STINMOD, the family information needed to determine the appropriate level of AUSTUDY allowance (*ie.* the incomes of a student's parents and number of siblings) has been imputed for Away-from-home students. Similarly, as for Standard rate recipients, information on the student's own income has also been imputed for school students (see Section 4 on Imputing Missing Information).

⁴Students aged 21 years or older who are transferring from Social Security Benefits or undertaking an English as a second language course.

4. Imputing Missing Information

The administration of complex programs such as AUSTUDY requires a range of detailed information about clients to correctly establish entitlements. While the survey on which STINMOD is based, the Survey of Income and Housing Costs and Amenities, (commonly known as the Income Distribution survey, or IDS (ABS 1990)), contains a wealth of personal and financial information on individuals and families, there are several key pieces of information needed to model AUSTUDY payments which it does not contain. These are the incomes of school students and information on the families of students who are not living at home. As it was essential that this information be available to model AUSTUDY, it had to be added to STINMOD's files using external data sources.

4.1 Incomes of School Students

The amount of AUSTUDY a student receives varies according to their own income and the adjusted income of their family. As described in Section 3.4, AUSTUDY specifies income levels, for a student's income and the student's family's income, above which entitlements begin to be reduced.

The 1990 IDS did not record any information on the income of school students. As the 1988 Household Expenditure Survey (HES) (ABS, 1988) shows, however, many full time students, including those between the ages of 15 and 20, work and have significant incomes (Table 2).

Table 2: Average Student Incomes, 1988 (\$ per week)

Age				
Under 16 Years	16-17 Years	18-20 Years	21 + Years	ALL

Males	5.75	12.86	39.83	123.00	33.82
Females	8.07	17.40	52.37	145.00	39.06

Source: ABS, 1988 (unit record data)

Accordingly, student incomes were imputed onto the STINMOD base population using the distribution of incomes for students recorded in the HES. Incomes -which were inflated to November 1993 - were estimated by age and sex, and imputed across a range of incomes in \$60 steps (Tables 3a and 3b).

Table 3a: Distribution of Income for Male Students by Age (\$ per week uprated to November 1993)

Income (\$ p.w.)	Age			
	Under 16 years (%)	16 to 17 years (%)	18 to 20 years (%)	21 years + (%)
Males				
0	19.35	23.44	9.32	3.01
1-59	6.84	9.16	4.81	2.97
60-119	1.01	2.82	3.58	1.06
120-179	-	0.73	1.11	1.38
180-239	-	0.17	0.74	0.73
240-299	-	0.18	0.58	0.64
300-359	-	-	0.22	0.48
360-419	-	-	0.03	-
420-479	-	-	-	-
480-539	-	-	-	-
540-599	-	-	0.15	-
600+	-	-	-	-

Source: ABS, 1988 (unit record data uprated to November 1993)

Table 3b: Distribution of Income of Female Students by Age (\$ per week updated to November 1993)

Income (\$ p.w.)	Age			
	Under 16 years (%)	16 to 17 years (%)	18 to 20 years (%)	21 years + (%)
Females				
0	18.26	20.72	6.31	4.13
1-59	7.25	12.60	5.30	1.95
60-119	0.51	6.04	4.65	1.02
120-179	0.17	0.28	2.88	1.70
180-239	-	0.35	0.95	0.43
240-299	-	-	0.11	0.61
300-359	-	-	0.09	0.65
360-419	-	-	0.09	0.17
420-479	-	-	0.21	0.13
480-539	-	-	-	0.73
540-599	-	-	-	0.58
600+	-	-	-	1.15

Source: ABS, 1988 (unit record data updated to November 1993)

The student incomes imputed onto STINMOD were benchmarked by comparing the average incomes imputed onto STINMOD, by age and sex, with the equivalent average incomes estimated from the HES data (Table 4). For the comparison, the HES income estimates were inflated to November 1993 using estimates of average weekly earnings from the Australian Bureau of Statistics.

Table 4: Comparison of HES* and STINMOD Average Student Incomes by Age and Sex - (\$ per week)

		Age		
		Under 16 Years	16-17 Years	18-20 Years
Males	HES	7.31	16.34	50.62
	STINMOD	10.40	16.10	62.62
	Difference	42.27%	-1.47%	23.71%
Females	HES	10.30	22.21	66.87
	STINMOD	10.23	22.49	65.67
	Difference	-0.68%	1.26%	-1.79%

Source: ABS, 1988 (unit record data updated to November 1993)
STINMOD/94A

Despite the apparent correspondence between the two sets of incomes, this approach will produce some inaccuracies, principally due to changes in the economic conditions and youth employment between 1988, when the HES took place, and 1993. As well, the HES data does not differentiate between secondary and tertiary students, nor between States.

4.2 Family Composition and Family Income

AUSTUDY entitlements are paid at a higher rate to students who are living away from home and who meet specific eligibility requirements. While it is possible to identify students in STINMOD who are living away from home, there is no information on their family structure or family income. As this information is needed to calculate the student's AUSTUDY entitlement, details of family composition and parents' incomes

have had to be imputed for away-from-home students in STINMOD.

The information used to impute family composition (that is, the number of dependent and student siblings in a student's family) and family incomes for students living away from home was derived from the 1990 IDS (after reweighting and uprating to November 1993, see Percival, 1994). The first step in the imputation was to select only those families in the IDS who were likely to have one or more children aged between 16 and 20 years. These families were defined as those where the female reference person or spouse was aged between 35 and 64 years. This definition thus included both families who had students at home and those who did not, but who, by definition of the age of the female partner, might have student dependents living elsewhere.

Frequency distributions of the average number of dependents under 16 years of age, average number of dependent students, and average weekly family incomes (in ranges of \$100) were then calculated for this sub-population.

Each characteristic (number of dependents, number of sibling students, and average family income) was then imputed on to the records of students identified in STINMOD as living away-from-home using a process of random selection⁵ to match the distributions in the IDS. Tables 5,6 and 7 compare the distributions of each characteristic in the original IDS with the results in STINMOD produced by the imputation.

⁵The random selection process involved first assigning a random number (between 0 and 1) to each person record and then only selecting those records whose number is less than or equal to the probability of a certain event. For example, if it was known that 30 per cent of all students received a particular allowance, then the model would assign this allowance to those records whose random number was less than or equal to 0.3;

Table 5: Average Number of Children under 16 in IDS Families and STINMOD Imputed Families

Number Children	Percentage Families	
	IDS	STINMOD
0	49.7	45.2
1	32.0	31.2
2	12.5	15.5
3	3.8	8.1
4	1.4	0
5	0.4	0
6	0.2	0

Source: ABS, 1990 (unit record data);
STINMOD/94A

Table 6: Average Number of Students in IDS Families and STINMOD Imputed Families

Number Children	Percentage Families	
	IDS	STINMOD
1	81.	78.5
2	17	20.2
3	0.6	1.3
4	0.2	0

Source: ABS, 1990 (unit record data);
STINMOD/94A

Table 7: Average Income in IDS Families and STINMOD Imputed Student Families

Number of Children	Percentage of Families	
	IDS	STINMOD
0 - 99	24.9	17.1
100-199	3.5	2.3
200-299	5.4	3.1
300-399	7.1	7.7
400-499	8.2	9.4
500-599	7.6	6.8
600-699	7.8	4.5
700-799	7.1	7.0
800-899	5.6	7.8
900-999	5.5	8.4
1000+	17.3	25.9

Source: ABS, 1990 (unit record data);
STINMOD/94A

While the results are generally good, there has clearly been a shift towards the upper end of the income scale with 'families' of away-from-home students imputed to receive higher average incomes than other STINMOD students. This would be expected to result in an under-allocation of some AUSTUDY entitlements.

5. Validation and Benchmark Outcomes

The AUSTUDY module, along with the other modules in STINMOD, was tested during and after development to minimise any possible errors. The testing strategy adopted involved:

- systematically checking the module's computer code (including walking through the AUSTUDY code with other members of the STINMOD team);
- checking the results for individual records to ensure that the model produced the same outcomes for them as a manual calculation would; and
- benchmarking the model's outcomes against available administrative data.

As well, a major part of the development and testing involved close cooperation between the STINMOD team and officers of DEET responsible for managing the AUSTUDY program. DEET was one of the test sites for STINMOD and the Department's critical assessment of STINMOD, and its modelling of AUSTUDY was an important element in the model's development.

The following tables show the outcomes of STINMOD's validation simulation of AUSTUDY, when compared to actual Government outlays (Table 8) and program recipients (Table 9).

Table 8: AUSTUDY Outlays (\$ million), 1994⁶

DEET (\$m)	STINMOD 1993 (\$m)	Difference (%)
1,516.58	1,467.89	-3.21

Source: AUSTUDY Administrative Data; STINMOD/94A

⁶Annual expenditure was estimated using fortnightly expenditure for the June 1994 pay period.

Table 9: AUSTUDY Recipients, June 1994

	DEET	STINMOD	Difference (%)	
Standard	208,468	205,254	- 1.54	
Away-from-home	50,794	49,631	-2.29	
Independent		84,454	92,187	7.88
Pensioner Education Supplement		17,498	18,372	5.00
ALL	362,214	365,444	0.89	

Source: AUSTUDY administrative data; STINMOD/94A

As table 8 shows, STINMOD underestimates the overall cost of AUSTUDY by approximately 3.2 per cent.

Table 9 shows, while there is close correspondence in the total number of AUSTUDY recipients between STINMOD and DEET program data, with some over counting by STINMOD of the number of Independent rate students. This divergence arises principally from the limitations of the survey data on which STINMOD is based. In particular, STINMOD/94A does not model assets, which would be expected to reduce the entitlements of some students. In addition, the income of tertiary students was recorded over the period of the IDS survey, October to December. As many students work full time over the vacation period, their incomes would have been underestimated for AUSTUDY purposes.

6. Future Directions

There are two obvious areas for future enhancements to the modelling of education assistance in STINMOD. The first will be to address some of the limitations apparent from the results produced by STINMOD/94A. This will require a more sophisticated approach to imputing missing information on students, using techniques currently being developed at NATSEM (Schofield, 1994).

The second, will be to add to the four AUSTUDY programs currently being modelled in STINMOD other student assistance programs, such as the AUSTUDY Supplement program. This would involve imputing using administrative data students who are taking out AUSTUDY loans, and for what amount.

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