The Cost to Australia of Early School-Leaving – Technical Paper

Dusseldorp Skills Forum

National Centre for Social and Economic Modelling
University of Canberra

October 1999

Acknowledgements: This report stems from a request to NATSEM from the Dusseldorp Skills Forum for an Australian replication of a report on early school-leaving in Canada. Brenda Lafleur and Maryann McLaughlin, from the Conference Board of Canada, provided helpful information on aspects of the Canadian estimates. Assistance from Poh Ping Lim and Gillian Beer with aspects of the research at NATSEM is gratefully acknowledged, as is the useful advice provided by Helen McDonald, Phil McKenzie, John Spierings and Eric Sidoti. The report has also benefited from useful comments on an earlier draft from Katrina Ball, Bruce Chapman, Ann Harding, Adriana VandenHeuvel, Mark Wooden, and officers from the Commonwealth Departments of Education, Training and Youth Affairs, Family and Community Services, and Prime Minister and Cabinet. Responsibility for the estimates remains with the author.

Dusseldorp Skills Forum

Suite 6 Level 2,

13 – 15 Smail Street,

ULTIMO 2007

Sydney Australia.

Email: info@dsf.org.au

Website: www.dsf.org.au

Telephone: 61 2 9212 5800

Fax: 61 2 9212 1533

NATSEM

University of Canberra

ACT 2601

Canberra Australia

Email: hotline@natsem.canberra.edu.au

Website: www.natsem.canberra.edu.au

Telephone: 61 2 6201 2780

Fax: 61 2 6201 2751

The Cost to Australia of Early School-Leaving – Technical Paper

A report commissioned by Dusseldorp Skills Forum and

prepared by Anthony King

National Centre for Social and Economic Modelling
University of Canberra

October 1999

Contents

1 Introduction

This paper provides technical details of the estimates presented in the report on The Cost to Australia of Early School-leaving. Broadly, the method follows that used by the Conference Board of Canada (1992) in their estimates of the cost of early school-leaving in that country. There are, however, some differences in the approach and these are highlighted in the presentation of technical details below.

This is not designed as a stand-alone document and should be read as a supplement to the main report on on The Cost to Australia of Early School-leaving.

Aspects covered in this paper include:

- estimation of the number of early school-leavers;
- the valuation of costs and benefits;
- the choice of parameters for the calculations; and
- the presentation and specifications of an illustrative case.

The basic context for these technical notes is provided in the next section which outlines the terms and nature of the estimation.

2 Terms of the analysis

The task for this study has been to estimate the lifetime costs to the country of a single-year cohort of early school-leavers. Estimation of the size of this cohort is detailed in Section 3. The lifetime is taken to be over the ages from 16 to 64 years, and the estimate is undertaken separately for males and females.

The costs (and benefits) covered by the estimates include:

a) Direct monetary costs and benefits

- the additional earnings of early school-leavers over the school-age years (including disaggregation into income tax and after-tax components);
- the savings in education costs;
- the forgone earnings over the post-school-age years (including disaggregation into income tax and after-tax components);
- social security; and
- indirect tax.

b) Social costs

Details on the assignment of values to these costs and benefits are presented in Sections 4, 5 and 6. This valuation depends importantly on who the early school-leavers are compared with. The basic comparison underlying the estimates is between:

1. people whose highest level of education attainment is incomplete secondary schooling (assumed to attend school up to and including the age of 15 years in the case of 'Year 10 leavers' and 16 years in the case of 'Year 11 leavers'); and
2. people whose highest level of education attainment is completed secondary schooling (assumed to complete two further years of schooling).

For sensitivity purposes, a supplementary comparison is undertaken between the first group above and the group of all people with educational qualifications – that is, all those who have advanced beyond incomplete secondary. This latter 'all qualifications' group includes those whose highest qualification is secondary school, and those with degrees, but mainly includes people with post-secondary non-degree qualifications (certificates and diplomas).

Section 7 provides material on the choice of key parameters in the estimation: the so-called alpha coefficient, the discount rate, and the real rate of earnings growth.

The estimation of the total costs of early school-leaving in the main report is supplemented here with presentation of an illustrative case in Section 8.

3 How many early school leavers?

What we need here is the number of school students from from an annual cohort who:

1. do not complete secondary schooling; and

2. subsequently acquire no further formal education or training qualification.

The estimate of this number is made in two steps – obtaining, firstly, the number who do not complete secondary school (the 'interim' number of early school-leavers) and, secondly, estimating how many of the interim school-leavers do not subsequently return to complete a course of formal education/training ('lifetime' school leavers, as compared to 'returning' school leavers)[1].

The derivation of the estimated number of 'lifetime' early school-leavers is shown in table 1, with the basis for the estimate set out below. Early school leaving very largely takes place after Year 9 and, accordingly, the number of Year 9 students is used as the starting point for this calculation.

Table 1 Derivation of number of lifetime early school-leavers

	Males	Females	Persons
Number of Year 9 students[a]	130 001	124 982	254 983
Retention rate to Year 12[b]	65.9%	77.7%	-
Number who do not commence Year 12	44 330	27 871	72 201
Number who commence but do not complete Year 12[c]	1 371	1 656	3 027
Interim number of early school-leavers	45 701	29 527	75 228
Assumed proportion who return to education/training[d]	65%	35%	-
Number of 'lifetime' early school-leavers	15 995	19 192	35 187

Source: a ABS Schools 4221.0, 1998,Table 22
b ABS Schools 4221.0, 1998,Table 51
c Derived from Rumberger and Lamb (1998), Table 4
d From Rumberger and Lamb (1998), Table 8

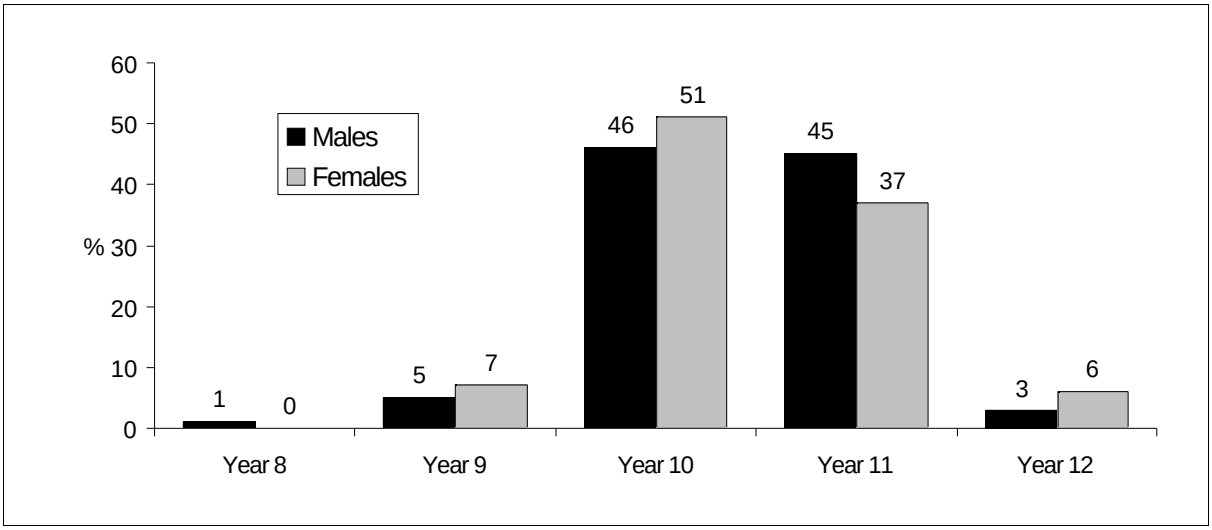
[1] While the Canadian study acknowledged the existence of 'drop backs' (early school-leavers who return to education / training), it did not include any allowance for them in the estimates.

3.1 The interim number of early school-leavers

Estimate of the 'interim' number is relatively straightforward. It begins with application of an 'apparent retention rate' to the cohort. The retention rates (separately for males and females) used are the 1988 apparent retention rates of secondary students to Year 12 provided by the Australian Bureau of Statistics (ABS, Schools, Cat. no. 4221.0). This retention rate gives the percentage of students who continued to Year 12 from their cohort at the commencement of their secondary schooling.

Because the Year 12 retention rate does not account for those who start but do not complete Year 12, we also need an adjustment for these. Recent data on the highest level of schooling attended by Australian early school-leavers (Rumberger and Lamb 1998) is shown in Figure 1. We see that 3 per cent of male early school-leavers and 6 per cent of females had commenced Year 12. These figures are used to inflate the retention rate based estimate of early-school leavers and arrive at the 'interim' number of early school-leavers shown in Table 1. Thus, for example, the application of the retention rate gives 44 330 male early school-leavers. To this figure are added an additional 1371 (44330 * 3/97), being the estimated number who commenced but did not complete Year 12.

Figure 1 Highest school year attended by 19 year-olds who had dropped out of secondary school: 1994



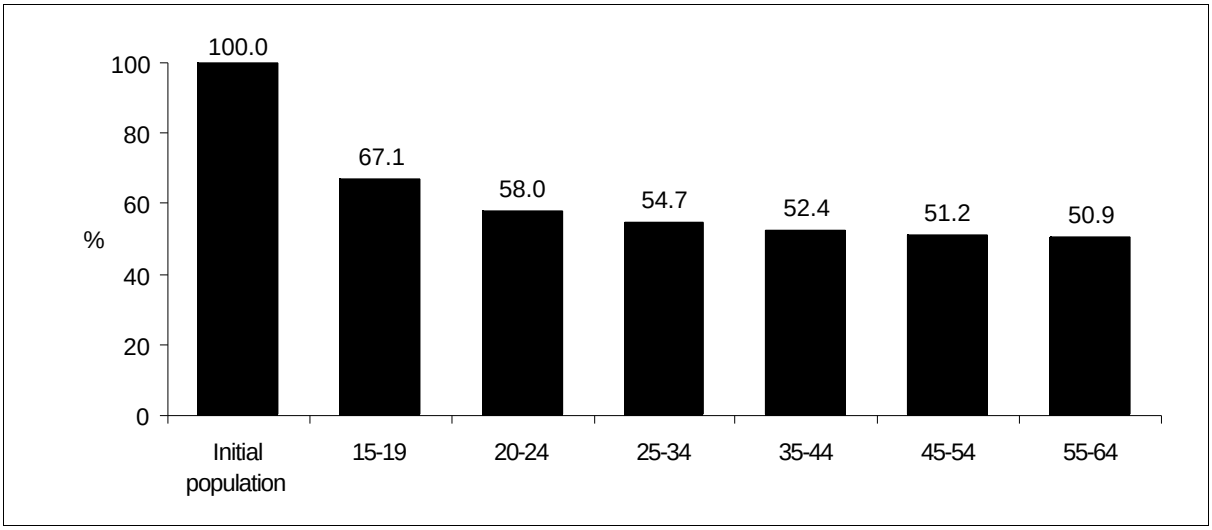
Data source: Youth in Transition data reported by Rumberger and Lamb (1998), Table 4

3.2 Lifetime early school-leavers

Given the interim number of early school-leavers, we now need to work out how many do not subsequently return to obtain a higher level of educational attainment. There is no direct figure available for this, though there are indicative data.

Data from the ABS Transition from Education to Work (Cat. no. 6227.0), for example, allow us to look at the numbers of those with incomplete secondary schooling and no post-school qualifications who are undertaking tertiary study at different ages. This shows that a substantial proportion of early school-leavers do go on to further study, with this happening primarily at younger ages. If we assumed that the age-specific pattern revealed by the Transition from Education to Work cross-sectional data applied to people's lifetimes, and that those who undertook tertiary study completed it, then we can derive the lifetime profile shown in Figure 2. This shows, for a cohort of early school-leavers, the simulated proportion of the cohort still without post-school qualifications as age increases.

Figure 2 Simulated proportion of a cohort of early school-leavers without post-school qualifications as their age increases



Data source: Derived from ABS Transition from Education to Work, May 1998, Cat. no. 6227.0, Table10.

This indicator suggests that 50 per cent of early school-leavers could be considered 'lifetime' early school-leavers, though it remains a relatively crude indicator. Another measure is provided by the Youth in Transition Survey data reported by Rumberger and Lamb (1998). Looking in 1994 at the cohort born in 1975 (that is, 19 year olds in 1994), they show the proportions of early school-leavers who have since participated in further education and training (Table 2).

Table 2 Participation in post-school education and training to October 1994 by members of the 1975 birth cohort who did not complete secondary school.

	Males	Females
	%	%
No further education or training	36	64
Further education and training		
University	0	0
TAFE – apprenticeship	43	13
TAFE – traineeship	4	4
TAFE – other	20	19
Subtotal (further education and training)	66	36
Total	100	100

Source: Youth in Transition data reported by Rumberger and Lamb (1998), Table 8

The main appeal of the Youth in Transition data here is its longitudinal nature. It provides a direct picture of the post-school experiences of recent early school-leavers – albeit only over the first few post-school years, though these are the years when most early school-leavers who return to further education and training will do so. Also, we should not be too concerned about leaving in our lifetime early school-leaver population those who return to further education and training much later in their lives. Such people will have no further education or training in the early part of their post-school lives which is what counts most in this type of analysis where effects later in life are progressively more heavily discounted.

While using the Youth in Transition data would thus result in an underestimate of the numbers returning to education, it would, on the other hand, result in an overestimate of the numbers later obtaining educational/training qualifications. This is because the data in Table 2 refer to participation in education rather than completion of a course of education/training. It is true that any participation in education/training could be seen as leading to a higher level of educational attainment, though our estimates are based on people moving between specified formal levels of educational attainment.

On balance, we use the Rumberger and Lamb (1998) data as the basis for our estimate of the number of ‘lifetime’ early school-leavers. Specifically, we assume that 65 per cent of male early school-leavers and 35 per cent of females go on to further education and training.

3.3 Year 10 and Year 11 leavers

As noted above, we need to further disaggregate early school-leavers according to when they left school. Again, the Youth in Transition data from Rumberger and Lamb (1998) shown in Figure 1 is useful here. We count Year 10 leavers as those whose highest year of school attended was Year 10 or lower, and Year 11 leavers as those whose highest year attended was Year 11 or Year 12. This gives the breakdown of early school-leavers shown in Table 3.

Table 3 Year 10 and Year 11 shares of early school-leavers

	Males	Females
	%	%
Year 10 leavers	52	57
Year 11 leavers	48	43
Total	100	100

Source: Figure 1, see text.

Applying the shares in Table 3 to the estimated numbers of 'lifetime' early school-leavers in Table 1 gives the size of the components of our cohort of lifetime early school-leavers (Table 4). These are the basic population numbers used in the analysis to calculate the aggregate cost of early school-leaving.

Table 4 The cohort of 'lifetime' early school-leavers

	Males	Females	Persons
	No.	No.	No.
Year 10 leavers	8 317	10 939	19 256
Year 11 leavers	7 678	8 253	15 931
Total	15 995	19 192	35 187

Source: See text

4 Earnings profiles

4.1 The earnings concept

In this estimate of the costs of early school-leaving to the country, earnings are basically used as a measure of productive output. The gross earnings someone receives are seen as a measure of economic gain for the country – the after-tax component of these earnings is initially pocketed by the individual, while the tax on the earnings is available to the whole of society.

It is worth noting that this use of earnings is likely to understate overall economic gain as it does not include the producer's surplus (or profit) from labour. This profit appears as income (including capital gain) in forms other than earnings such as dividends. It is not proposed to attempt to include this element, only to note that its exclusion means that the earnings-based estimate is conservative.

4.2 A difference between the Australian and Canadian approaches

The measure of earnings needs to capture the differences between early school-leavers and others in terms of both wage rates and the level of employment.

The Canadian approach

The Canadian approach was to derive age earnings profiles for males and females by averaging earnings across those who had at least some earnings. This would capture the effects of differences in part-time and full-time employment, but ignores any differences between the early school-leaver population and the comparison group in terms of their likelihoods of being unemployed or out of the labour force. Given, for example, that early school-leavers have higher unemployment rates than others, the Canadian approach will under-estimate the cost of early school leaving. This has been acknowledged by CBC who argued that it was done so as to avoid consideration of transfer payments.

Transfer payments, such as social security, should not, however, cause a problem here. This is because they are simply transfers within the population. They do not affect the estimated cost to the country of early school-leaving, but would be important if the concern was to distinguish fully between the costs borne by individuals and by government. Accordingly, there seems to be no need to be

constrained by the transfers argument and we use a different measure of average earnings.

Alternative approaches

a) Average earnings across the whole population

A first alternative to the Canadian approach is to take average earnings across everyone (i.e. including those people who have no earnings). This approach would take into account the impact of early-school leaving on both earnings and labour force activity – unemployment and being out of the workforce due to discouragement.

However, it will implicitly regard any period without earnings as being economically unproductive. Given that women with a lower level of education attainment tend to have more children and also tend to have a lower level of employment when there are young children present, do we want to count this as a cost to society attributable to early school leaving? We do not. There are, of course, other examples of periods without earnings which should be seen as economically productive – for example, other forms of caring, unpaid domestic work, voluntary work etc.

Ideally, the analysis should assign an economic value to all activities, not just those which are rewarded with earnings. This, however, would be a very large task and, instead, a compromise is used here. Note that account of these activities, which can be broadly described as unpaid work, might be thought to be covered by the social costs component of the estimates. However, the range of social costs considered by Haveman and Wolfe (1984) (the study which underlies our estimate) suggests that this is not the case.

b) Average earnings across the population excluding those with young children

The second alternative approach – which is the one used in our estimates – is to construct earnings profiles on the basis of average earnings across all people except those deemed to be the primary carers of young children. This has been operationalised by excluding from the averages:

1. sole parents with a dependent child under 6 years old; and
2. female members of couples with a dependent child under 6 years old.

There are clear arbitrary elements to this exclusion – notably the age cut-off and the implicit assumption that females in all couples are the primary carers – though it is adopted as an approach which will take account of the major part of the concerns

identified in the previous section. Caring for young children is the most important of the unpaid activities for our purposes not only because of its scale but also because it occurs early in the lifetime and is thus subject to relatively little discounting in our calculation of the total present value of costs.

This exclusion removes the ‘cost’ of greater childcare activities for the early school-leaver group from the comparison of earnings – at least with respect to children under 6 years old. In doing so, it does implicitly equate the value of these childcare activities to the earnings of counterparts without young children. This has the uncomfortable effect of valuing childcare by males more highly than by females, and by the completed-school group more highly than by the early school-leavers. With more work, a more sophisticated solution could be devised. Compared to the first alternative approach outlined above, this feature of the adopted approach is preferred as the lesser of two evils.

The earnings concept used can thus best be described as one which takes into account differences in earnings and differences in labour force activity, while also going some way to take account of differences in unpaid work.

4.3 Derivation of the earnings profiles

Data source

The lifetime earnings profiles are estimated from the unit record data from the ABS 1990 Income Survey. This survey is the most recent which provides the required information on incomes and level of educational attainment across the lifetime. More recent surveys do not distinguish between those who did and did not complete secondary school and age left school, which could be used as a rough proxy, is also not available. The 1996 Census does not have the required educational attainment category, does have age left school, but has very rudimentary income data.

The definition of earnings is gross annual income from wages/salary and self-employment.

Form of the profiles

The question here is the choice between non-parametric and parametric expressions of the earnings profiles. Basically, a non-parametric expression simply takes the profile revealed by the empirical data (e.g. a profile of average earnings for each age

group) while a parametric expression estimates a relationship between earnings and age on the basis of the empirical data.

The Canadian study used parametric profiles, and their use was investigated in this study but not pursued. The use of a parametric expression here would simply be a way to fit a neat curve to an otherwise sometimes irregular profile. The result may look good in a chart, but do we lose more than we gain? A belief that we do centres particularly on the possible effect of using fitted curves on the apparent earnings differences in the early years (a feature to which our overall cost estimates are particularly sensitive). Experiments with parametric forms showed that a summarising expression may appear to provide a good fit, but seemingly small divergences in places from the 'raw' data can result in considerable differences when two profiles are being compared.

As a result of these considerations, these estimates do not use parametric earnings profiles. Instead, they use smoothed non-parametric profiles.

Steps in the derivation of earnings profiles

The earnings profiles are derived using the following four steps:

1. Average earnings are calculated for each age group, with this done separately for males and females and for each level of educational attainment. The age groups provided by the income survey data are 16, 17, 18-20, 21-24, 25-29, 30-34, … , 60-64. Due to small cell sizes, the 16 and 17 year-old age groups are amalgamated. Profiles are generated from the age of 16 for early school-leavers, from the age of 18 for those with completed-secondary only, and from age of 21 for the 'all qualifications' group.

   The averages are taken across all persons in each age/sex/qualifications group after the following deletions:

   a. sole parents with a dependent child under 6 years old (see above)

   b. female partners in couples with a dependent child under 6 years old (see above)

   c. full-time students (since periods of study are explicitly taken into account elsewhere in the estimates); and

   d. any people with negative annual earnings (to avoid complications with the tax calculation – see below).

2. The profiles are smoothed in a simple manner by setting the average earnings for each age group as the average of the figure for that age group and the age group either side. The figures for the lowest and highest age groups remain unchanged.

3. The profiles are specified for single years of age by linear interpolation between the midpoints of the age ranges, and by linear extrapolation for the ends of the age range.

4. The profiles, which are up to this point in 1989-90 terms, are inflated to 1999 levels using factors derived from ABS average weekly total earnings data. The factors used were 34.5% for males and 36.4% for females.

Income tax

The distinction in the estimates between the costs of early-school leaving which fall on the individual, and those that are borne by government requires that gross earnings be split into taxation on earnings and disposable (after-tax) earnings. The Income Survey data include total income tax paid, but how do we identify that portion which is attributable to earnings? It is only straightforward where earnings are the sole source of income.

The approach taken here to identifying the earnings-related component of income taxation is based on the following two assumptions:

1. No income tax is paid on government cash benefits (social security). This assumption is very close to the actual situation with the non-taxable nature of a number of benefits and the tax rebates for pensioners and allowees meaning that negligible tax is paid on government cash benefits.
2. All income tax is thus attributed to private income and the earnings-related component is assumed to be proportional to the earnings component of private income. Thus, for example, if earnings account for 75 per cent of someone’s private income, then 75 per cent of their income tax is deemed to be the earnings-related component. While this will not always be true, with certain tax deductions, for example, attached to particular sources of income, it would seem to be a very reasonable broad assumption.

Having calculated the earnings-related component of income tax, this is deducted from gross earnings to give disposable (after-tax) earnings, and profiles of disposable earnings produced in the same manner as for gross earnings.

4.4 The earnings profiles

The resulting gross and after-tax earnings profiles are shown in Figures 3, 4, 5 and 6:

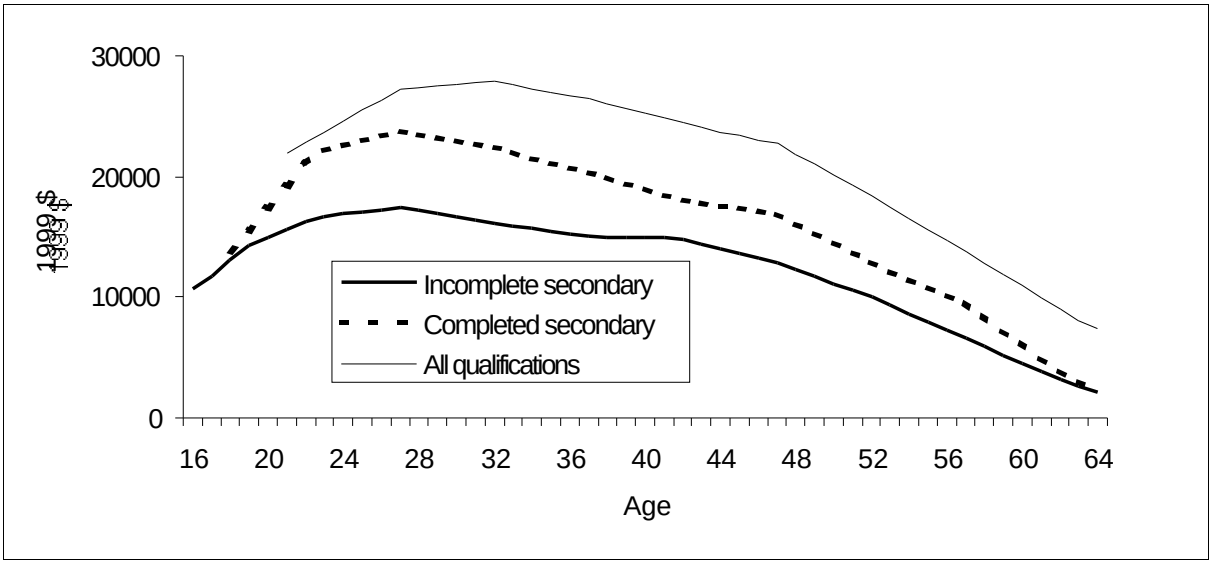
- Figure 6 – male gross earnings
- Figure 7 – female gross earnings
- Figure 8 – male after-tax earnings
- Figure 9 – female after-tax earnings

Comparison of the after-tax earnings profiles then provides the information on forgone after-tax earnings, while comparison of the differences between the gross and disposable earnings profiles provides the information on forgone income tax revenues.

Figure 3 Gross earnings profile: males, 1999

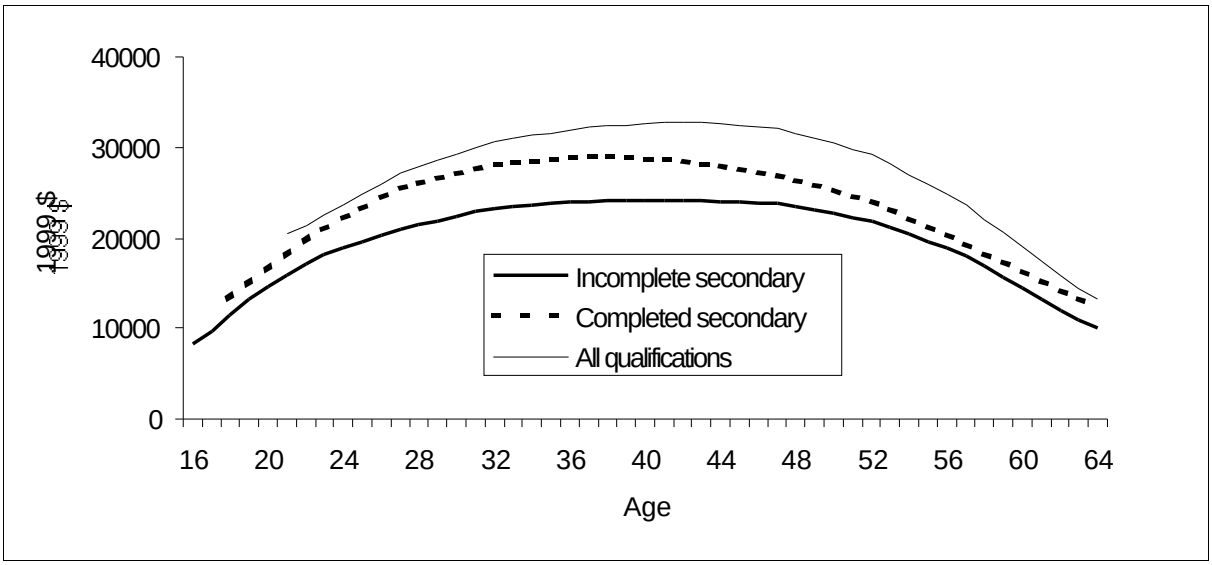
Data source: See text

Figure 4 Gross earnings profile: females, 1999



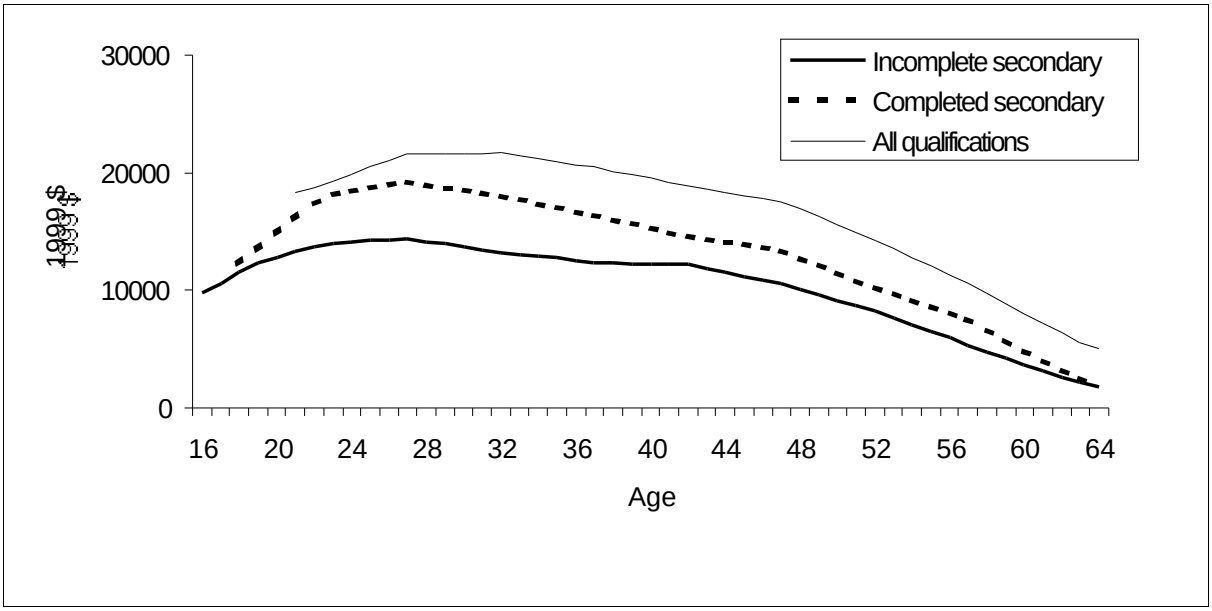
Data source: See text

Figure 5 After-tax earnings profile: males, 1999



Data source: See text

Figure 6 After-tax earnings profile: females, 1999



Data source: See text

5 Other direct monetary costs and benefits

5.1 Earnings of students

Secondary school students

Information on the earnings of secondary school students was obtained from the combined ABS 1994-95 and 1995-96 Income Surveys. The figure used was average annual earnings for 17 year old school students (i.e. the average across all students, not only those with earnings). These earnings refer to the financial year prior to the survey interview, while their age refers to the time of survey interview. The 17 year-olds thus provide a reasonable midpoint for the 16-17 year olds in question.

The figures used, in 1999 dollars, are $623 for males and $972 for females.

TAFE students

As was noted in Section 2, the ‘all qualifications’ sensitivity group assumes part-time TAFE study with a 0.67 full-time fraction. These students are assumed to work part-time and receive 50% of the earnings indicated on the earnings profile for someone whose highest qualification is completed secondary. This figure is based roughly on information from the ABS Income Survey (the Income Surveys do not show the full-time fraction for part-time students so a direct estimate from this source is not possible).

5.2 Education costs

Individual education costs

The individual education expenses which need to be covered here are items such as fees, the cost of books and materials needed for the course, and any additional costs of particular activities associated with the course. Essentially, these costs are an individual’s co-payment for the cost of providing the education service.

Note that the analysis is concerned with secondary education in a government school and, as such, we do not include the general private school fees.

The individual education expenses included here do not include clothing costs (such as school uniforms) and the costs of transport incurred in attending an education institution. While, for many purposes, these costs could justifiably be considered important parts of the costs of obtaining education, they are indirect costs rather than service costs. Moreover, if included in the analysis for periods of education, the corresponding costs of working or looking for work would need to be applied to periods of employment and unemployment.

Secondary school

The Brotherhood of St Laurence (1996) provides useful illustrative information from a small survey on the range and scale of private costs associated with government schooling and, in particular, on their impact on low-income families. These costs included school fees, books, uniforms, stationery, course fees, activity fees and transport costs.

A larger survey conducted by the Smith Family in 1996 produced figures on average yearly costs for secondary school students attending government schools. This information was used as the basis for the school expenses component in the major budget standards study undertaken recently by the Social Policy Research Centre (Saunders et al 1998), and that material is also used here as the basis for the figure on the private costs of government secondary schooling.

The results of the Smith Family survey, reported by Saunders et al (1998) are reproduced in Table 5. It will be noticed that many of these costs are optional, as nominally are ‘voluntary’ levies and some, such as the costs of sport and excursions, might be thought more as personal recreation costs. However, as both the Brotherhood of St Laurence (1996) and Saunders et al (1998) note, payment of these costs is necessary to allow a student to fully participate in the school community and in the full range of opportunities offered.

The figure for the private costs of a secondary state school education used in this report is derived from the totals in table 5. Firstly, a weighted average of the totals is taken (according to the numbers of year 11 and year 12 secondary school students in the five states/territories covered). This gives an overall average for 1996 of $862 per student per year. Inflating the figure by a 2.4 per cent gives a 1999 figure of $883.

Table 5 Average yearly costs for secondary school students (aged 12-18 years) attending state schools: 1996

	New South Wales	Victoria	Queensland	South Australia	Australian Capital Territory
	$	$	$	$	$
General fees	77	112	124	136	102
P&C Club contribution	21	22	27	18	10
Text books	51	165	96	56	54
Paper/photocopying	15	22	16	13	14
Computer disks	19	13	10	10	17
Material for assignments	27	35	32	29	38
Elective subject (1)	44	70	68	110	41
Elective subject (2)	42	63	46	55	54
Fundraising	19	27	28	13	24
School photos	21	19	13	20	17
School camps	116	199	120	130	160
School excursions	49	48	46	47	63
Sport (summer)	39	49	40	61	32
Sport (winner)	41	48	54	70	25
School entertainment	33	34	40	20	39
Total	906	926	760	788	690

Source: Smith Family reported in Saunders et al (1998), Table 7.7.

Tertiary

The most recent representative information on the expenditures of tertiary students appears to be the information collected in the 1991 Survey of Student Finances conducted by the ABS. Results of this survey have been presented in Department of Emplyment, Education and Training (1994) including average ‘academic expenses’ of $16 per week for tertiary students (DEET 1994, Table 4.1). This figure covers expenditure by students on books, materials, institutional fees and levies and other course-related expenses.

Excluding the summer vacation, and thus counting the academic year as covering 43 weeks, and applying an inflator of 14.0 per cent to bring the value from 1991 to 1999 prices, gives an annual average private cost of tertiary education of $784. Because the tertiary student is assumed to have a 2/3 couse load, annual costs are set at 2/3 of this figure: that is, $523.

Note that this figure does not include any charges under the Higher Education Contribution Scheme (HECS). These are not relevant in the case of our ‘typical’ tertiary student who is a VET student and not subject to HECS.

Government education costs

Secondary school

The Productivity Commission (1999, Table 2A-8) shows a total cost to government per ‘in-school’ student in a state secondary school to have been $6578 in 1996-97. As shown by Burke (1998, p147), however, the cost for senior secondary students is markedly higher than the average for all secondary students. His figures for 1995-96 show the average cost of senior secondary students to be 1.22 times the average cost of all secondary students. Our concern here is with senior secondary students, and the relativity reported by Burke is applied to the figure from the Productivity Commission, which has then been inflated to give a 1999 value of $8186.

Tertiary

Reflecting the diversity of VET courses, unit cost measures tend to be specified in terms of contact hours rather than in annual terms. The particular measure of costs used here is government cost per adjusted annual curriculum hours (AHC). AHC measures the hours of supervised learning or training in the course, with adjusted AHC then including amendments to take into account recognition of prior learning and invalid module enrolments.

Using data from the Australian National Training Authority, the Productivity Commission (1999) reports the Australia-wide unit costs of VET for 1997 shown in Table 2. For our exercise these need to be converted into annual full-time equivalent terms for 1999. This is done using the following:

- 20 contact hours per week for a full-time course;
- 36 tuition weeks per year; and
- 2.2 per cent inflation from 1997 to 1999.

This gives a figure of $9640 for the annual government cost of a full-time VET course. Again, with the assumed 2/3 course load for the tertiary student, the actual amount assigned for each year of study is 2/3 of $9640: that is, $6427.

Table 6 Government costs of VET per adjusted annual curriculum hour: Australia, 1997

Cost component	Unit cost ($ per adjusted AHC)
Recurrent expenditure	11.4
Cost of capital	1.7
Total	13.1

Source: Productivity Commission (1999), Tables 3A.26 and 3A.29.

5.3 Social security

Lifetime profiles of social security (including education allowances) were derived from ABS Income Survey data in a similar way to the earnings profiles – relying mainly on the 1990 survey data because it allows the clear distinction of early school-leavers. In this way average social security lifetime profiles were derived separately for males and females by level of educational attainment. The profiles were inflated to 1999 levels in line with the increase over the period in rates of social security payment – using a factor of 1.32.

These social security profiles were calculated from the population excluding students and are applied in the calculations to those parts of the lifetime when people are not students. For periods of study, levels of social security income are set by assigning a proportion of the social security income received by corresponding non-students. These factors were derived from analysis of social security incomes received by 16-20 year olds according to study status using the data from the combined 1994-95 and 1995-96 ABS Income Surveys. Two factors were used: 0.49 for 16-17 year-old full-time school students, and 0.55 for 18-20 year-old part-time students.

Where a real growth rate is applied to earnings in the calculations, it is also applied to social security so that the relative value of social security payments moves in line with earnings. Also, where only part of the difference in earnings is attributed to education (see Section 7.1), the same proportion of the difference in social security incomes is attributed to education. This follows the importance of factors such as labour force participation and earnings in people's social security entitlements.

The basis of the social security incomes on 1990 data means that the estimates will not capture any effects of changes in the social security system since that time. There have been a number of changes, though it is not easy to see what their broad impact on these estimates would be. Suffice to say that there is plenty of scope to add further sophistication to the treatment of social security in these estimates.

5.4 Indirect tax

Indirect tax effects are calculated as a fixed percentage of after-tax incomes (earnings and social security). The figure used – 10.4 per cent – was calculated from 1993-94 ABS estimates of the indirect taxes paid by households (Table 7). This will provide a conservative estimate as the ABS figures are recognised as capturing only about one half of all indirect tax (see Harding, Warren and Lambert 1998). Also, note that the estimates refer to the current indirect tax system, not to the situation with the GST.

Table 7 Indirect tax as a proportion of disposable income: households by age of reference person, Australia, 1993-94

Age of household reference person	Average disposable income	Average indirect tax	Indirect tax as proportion of disposable income
	$/week	$/week	%
< 25 years	526	60	11.5
25-34 years	635	68	10.7
35-44 years	693	70	10.1
45-54 years	755	74	9.8
55-64 years	509	57	11.2
25-64 years	651	68	10.4

Source: ABS 1993-94 Household Expenditure Survey: Effects of Government on Household Income, Cat. no. 6537.0, Table 2.

The calculation of indirect tax is undertaken after the application of any real growth factor to earnings and social security and after application of the ‘alpha coefficient’ (see Section 7.1). These elements are, accordingly, automatically taken into account.

6 Social costs

6.1 The difficult nature of social costs

The social benefits of education (or social costs of a lack of education) are widely recognised to be significant, though notoriously difficult to value. Often cited examples of these benefits include the impact of education on matters such as health, crime, social cohesion, more informed voting and more efficient labour market adjustment (see Chapman and Chia 1989 and Conference Board of Canada 1992).

The Industry Commission (1997) has noted how these benefits need to be recognised in studies of the returns to education.

Maani (1996), after noting the importance of these factors, recently reported that :

> '… since identifying and assigning dollar values … tend to be subjective, the international literature on social rates of return has come to exclude such external benefits. As a result, the social rates of return to education in the literature include the public expenditures on education but not external benefits such as the advantages of a well-trained labour force.' (Maani, 1996, p92)

Nevertheless, there have been attempts to place a value on the social costs/benefits of education. The most comprehensive attempt still appears to be a 1984 United States study (Haveman and Wolfe 1984) which combined what evidence was available with a series of assumptions to reach some broad conclusions about orders of magnitude. The Conference Board of Canada (1992) drew on some of the findings of Haveman and Wolfe.

One Australian estimate of the total value of these social benefits of education is that made by Chapman and Chia (1989) in the context of tertiary education. The estimate was based on the argument that the extent to which government subsidised education indicated the value society put on the social benefits. They proceeded to calculate the net present value of social benefits per tertiary student to be of the order of $20 000 in today's dollars.

6.2 A variation on the Canadian approach

The Canadian approach

The treatment by the Conference Board of Canada (CBC) of non-market costs (essentially social costs) relied on the 1984 US findings by Haveman and Wolfe as follows:

> 'They [Haveman and Wolfe] estimated that these non-market factors are equal in value to the market factors. Their procedure of equating the value of the non-market and market factors was adopted in this report.' (CBC, p9)

The CBC then described the way they incorporated non-market costs in their estimates:

> 'The estimated non-market costs … were obtained by first equating the value of the separate male and female non-market costs to their respective market costs. These amounts were then adjusted to reflect their present value and weighted by

> the number of male and female dropouts to obtain an overall non-market cost to Canada. These adjustments cause the value of the non-market costs to differ slightly from that of the market costs.' (CBC, PP 9-10)

While the above description does not completely explain how the CBC proceeded, it gives a good idea of the approach. Note that the CBC estimates apportion non-market costs between the 'dropout' and 'the rest of society' and have different non-market costs for males and females. This approach resulted in social costs amounting to 80 per cent of the total estimated costs of early school-leaving in Canada. This outcome seems inconsistent with Haveman and Wolfe's broad conclusion about similar orders of magnitude for 'market' and 'non-market' effects, though does appear to follow other conclusions made by Haveman and Wolfe. It is worth looking at exactly what Haveman and Wolfe concluded.

Revisiting Haveman and Wolfe

The key conclusion from Haveman and Wolfe (1984) is the statement that:

> '… a conservative estimate of the total annual value of the non-marketed effects of schooling would be … of the same order of magnitude as estimates of the annual marketed earnings-based effects of one more year of schooling … This, then, suggests that the annual value of incremental schooling reported in standard human capital estimates may capture only about one-half of the total value of an additional year of schooling.' (Haveman and Wolfe, 1984, pp 400-1)

Further, a footnote to this statement suggests that the 'annual marketed earnings-based effects', with which the magnitude of non-market effects are compared, refers to lifetime undiscounted forgone gross earnings for males divided by a 30-year working life.

Note that, while Haveman and Wolfe use forgone male earnings as a benchmark against which to put their rough estimate of non-market costs in perspective, they do not suggest that the non-market costs are different for males and females. Nor do they suggest any estimated breakdown in non-market costs between those which fall on the individual and those which fall on the rest of society.

An alternative broader approach

We are reluctant here to follow the Canadian approach to valuing the social (or non-market) costs, as it seems to read perhaps too much into Haveman and Wolfe's conclusions. Those conclusions, presented following a string of caveats and words of caution, are in terms of orders of magnitude. The apparent link to a specific estimate

of the annual marketed earnings-based effects would seem more of a matter of a convenient point of comparison than a suggestion of a valuation method.

Accordingly, we step back from the apparent sophistication of the Canadian approach, with a more cautious and simple assumption that the net present value of the social costs equals that of the direct monetary costs. This assumption naturally includes a large arbitrary element, but it would seem to accord with the spirit of Haveman and Wolfe's conclusions. As can be seen from our findings in the main report, this results in estimates of the average value of social costs which are greater than those suggested by Chapman and Chia (1989), though what those findings in the tertiary context mean for the social costs of secondary schooling is unclear.

7 Parameters

7.1 The alpha coefficient

It is standard practice in analysis of returns to education to acknowledge that not all the difference in earnings for people with different levels of education can be attributed to their education. Part of it may, for example, be attributable to natural ability or family background. The proportion of earnings differentials which can be attributed to education is known as the 'alpha coefficient' or 'alpha factor' and there is no definitive estimate of what the value of this coefficient is.

The Conference Board of Canada (1992) used a value of 0.8 (80 per cent of the difference is attributable to education). Looking at the values used in Australian work, Norris (1996) suggests a typical value is around two-thirds, though Australian studies have in fact tended tend to use higher values. Maglen (1994), noting the unavailability of any Australian estimate of the coefficient, used a figure of 0.8 which was seen as 'broadly in line' with that used in other overseas studies. Maani (1996) used a value of 1.0 in main results, but reports some sensitivity testing with a value of 0.8. The Industry Commission (1997) used a value of 1.0, though noted that this might overstate the measured returns from education.

We use a value of 0.8 on the basis that this seems to be a typical value used in other studies. Sensitivity testing is conducted using values of 0.6 and 1.0.

7.2 Discount rate

The discount rate used to convert the streams of future costs and benefits to net oresent value terms is another parameter for which there is no single clear best value. Chapman and Chia (1989, p25), for example, refer to ‘low’ social discount rates of 3-5%, ‘high’ discount rates of 12-15%, and 10% as ‘probably the least controversial figure to use’.

Where the spread of possible discount rates is centred, however, is likely to vary over time and, particularly, is likely to move in line with real interest rates. There are close conceptual similarities between the discount rate and real interest rate and, indeed, the Conference Board of Canada (1992) appeared to use a discount rate of 10 per cent on the basis of prevailing interest rates. Australian real interest rates were around 10 per cent at the time of Chapman and Chia’s (1989) estimate, while the fall in interest rates sees Chapman and Salvage (1997) using a figure of 8 per cent.

Figure 7 Real 90-day bond rate: Australia, 1983-98

Data source: RBA, ABS CPI

The trend in Australian real interest rates (the 90-day bond rate) since 1983 is shown in Figure 7 and provide the basis for our choice of discount rate. Over recent periods, the average rate has been as follows:

- 4.2% – average over the past 5 years;
- 5.3% – average over the past 10 years; and
- 6.0% – average over the past 15 years.

The discount rate used in our estimates reflects a view of long-term real interest rates. Accordingly, the 6% figure is taken as the central case discount rate. Sensitivity, using 4% and 8% discount rates is also conducted.

7.3 Real earnings growth

Real earnings growth is assumed in the base estimates at one per cent per annum, with sensitivity analysis of zero and two per cent growth. The real earnings growth rate is also applied to income tax receipts and to social security incomes.

8 An illustrative case

8.1 The case

Our estimates of the cost of early school-leaving deal with average costs and it is easy to lose sight of what it looks like in terms of an individual's lifetime. So, here a single case is used to illustrate the lifetime costs of early school leaving. In doing so, the opportunity is taken to add consideration of superannuation to give an indication of the impact of early school-leaving on retirement incomes.

The illustrative case is founded on the comparison between the lifetime costs and benefits for a male early school-leaver (who leaves after Year 10 upon turning 16) and a counterpart who completes secondary school but gains no higher education or training qualification. The illustration only covers the direct monetary costs – social costs are not covered here.

The elements in the specification of these two cases are set out below.

Labour force profiles.

A year-by-year labour force profile is specified for each person, with this based on age-specific labour force data. The shares of the lifetimes (to age 64) by labour force status are shown in Table 8.

Earnings

In periods of full-time employment, earnings are assigned according to earnings profiles derived from the ABS Income Survey data in a similar manner to the earlier

description. In this case, however, the earnings profiles are calculated as average earnings among full-time workers.

In years of part-time employment, the cases are assigned 30 per cent of corresponding full-time earnings, with this factor derived from Income Survey data.

Student earnings are as in the main estimate.

Table 8 Lifetime labour force status: cases in the illustrative example (no. of years in each category over the period from age 16 to 64)

	Early school-leaver	Comparison case (completed secondary)
	Years	years
Full-time employment	27	33
Part-time employment	3	3
Unemployment	7	4
Full-time study	0	0
Not in labour force (other than due to ft study)	12	7
Total	49	49

Education costs

School costs are as in the main estimate.

Social security and taxation

Social security entitlements and income tax liabilities are calculated according to the current provisions and formulae. Indirect tax is calculated as 10.4% of after-tax income, as in the main estimates.

Simulation parameters

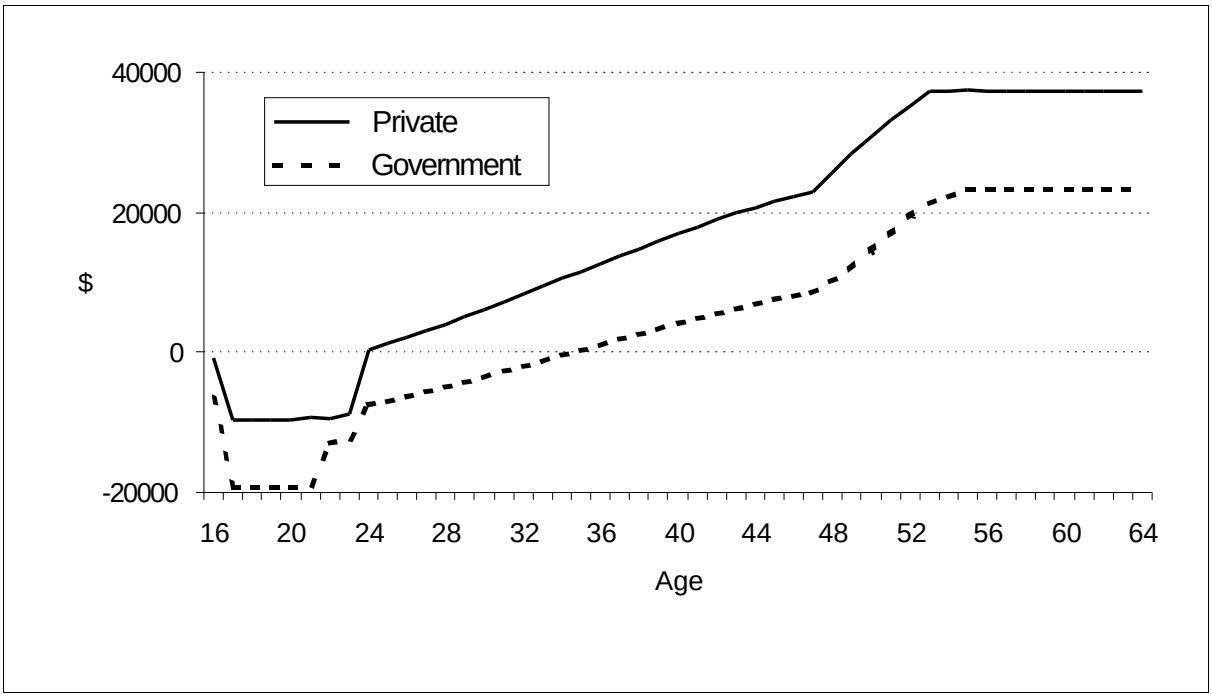
The discount rate is 6 per cent. The estimate is conducted in 1999 dollars with no inflation and no real earnings growth. The value of the ‘alpha coefficient’ in this example is 1.0.

8.2 Results for the illustrative case

The results for the illustrative case are shown in Figure 8. The figure shows the private costs borne by the early school-leaver and the government costs in

cumulative terms over the lifetime to age 64. Note that, for reasons of simplicity in calculation, the whole part of the earnings difference is attributed here to education. This will exaggerate the costs of early school-leaving shown, though will not have any major effect on the shape of the picture shown in figure 8 which is the main point of this exercise.

Figure 8 An illustrative case: male Year 10 leaver



Data source: See text

The first two years show a benefit of early school-leaving to both the individual and government. There is little change over the next five years or so, during which the earnings and labour force experience of the early school-leaver and the comparison person are similar. The benefits are then dissipated rapidly by the age of 24 as the early school-leaver has some unemployment and part-time work while the comparison person is working full-time. From then to the age of 47, the costs mount and are driven by earnings differences before accelerating as the early school-leaver withdraws from the labour force at an earlier age than his counterpart. From the age of 56, there is negligible difference in the circumstances of the early school-leaver and counterpart and the cumulative costs remain constant.

The case shown in figure 8 produces a private rate of return of 17.2 per cent and a government rate of return of 10.8 per cent. Continuing on to complete secondary education in this case looks like a very good investment both for the individual and for the government budget. And this is without any consideration of the social benefits of completing secondary school.

Turning to the issue of retirement incomes, in the above case we have the two individuals being compared making superannuation contributions of 2.5 per cent of gross earnings, their employers contributing 9 per cent (in line with the Superannuation Guarantee requirements in the near future), and a 6 per cent growth rate on superannuation funds. Under these assumptions, by the age of 65 the early-school leaver will have accumulated about 20 per cent less in superannuation than the counterpart who completes secondary school. This is another dimension of the costs of early-school leaving.

Remember that the case shown in Figure 8 is illustrative. Among early school-leavers, there is a great variety of possible lifetimes. This is particularly the case for females where there is much variation in labour force profiles associated with caring for young children. This diversity is averaged in the main estimates.

References

Brotherhood of St Laurence, 1996, 'State Schools – Costs and Dilemmas', Changing Pressures, Bulletin No. 2, Brotherhood of St Laurence, Melbourne.

Burke, G. 1998, 'Expenditure on education and training: estimates by sector and course', pp 141-55 in Dusseldorp Skills Forum, Australia's Youth: Reality and Risk, Dusseldorp Skills Forum.

Chapman, B. and T. Chia, 1989, Financing Higher Education: Private Rates of Return and Externalities in the Context of the Tertiary Tax, Discussion Paper No. 213, Centre for Economic Policy Research and Department of Economics, ANU, Canberra.

Chapman, B. and Salvage, T., 1997, 'The Consequences of Recent Changes in Financing for Australian Higher Education' (need full ref)

Conference Board of Canada, 1992, Dropping Out: The Cost to Canada, The Conference Board of Canada, Ottawa.

Department of Employment, Education and Training 1994, Role of AUSTUDY in Student Financial arrangements, EMB Report 2/94, Department of Employment, Education and Training, Canberra.

Harding, A., Warren, N. and Lambert, S., 1998, Who bears the tax burden?, Income Distribution Report No. 8, National Centre for Social and Economic Modelling, University of Canberra.

Haveman, R. and Wolfe, B. 1984, 'Schooling and Economic Well-being: the Role of Non-market Effects', The Journal of Human Resources, 19(3), pp 377-407.

Industry Commission, 1997, Industry Commission Submission to the Review of Higher Education and Policy, Industry Commission, Melbourne.

Maani, S. 1996, 'Private and Social Rates of Return to Secondary and Higher Education in New Zealand: Evidence from the 1991 Census', Australian Economic Review, 1st quarter, pp 82-100.

Maglen, L. 1994, 'Education expansion and the private returns on a university degree', Economic Papers, 13(4), pp 57-71.

Norris, K. 1996, The Economics of Australian Labour Markets, Longman, Melbourne.

Productivity Commission, 1999, Report on Government Services 1999, Productivity Commission, Melbourne.

Rumberger, R. and Lamb, S. 1998, 'The Early Employment and Further Education Experiences of High School Dropouts: A Comparative Study of the United States and Australia', paper prepared for the Organisation for Economic Co-operation and Development, May.

Saunders. P., J. Chalmers, M. McHugh, C. Murray, M. Bittman and B. Bradbury, 1998, Development of Indicative Budget Standards for Australia, Policy Research Paper No. 74, Department of Social Security, Canberra.