IS THE TREASURY SUBSIDISING AUSTRALIAN UNDERGRADUATES?
OR, INVESTING IN HIGHER EDUCATION

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ABSTRACT

On average, graduates earn more than non-graduates and pay more tax. Over a lifetime, the discounted value of the extra income is almost $200,000 for a graduate with average characteristics. If all or most of the income difference is due to higher education, then the Treasury will receive a splendid net return on the education investments that students and government are making in higher education. Through HECS payments but mostly through extra income taxes, the Commonwealth Treasury will gain more than half of the extra net income, assuming current tax rates apply. In present value terms, the gross fiscal benefits for the Commonwealth Treasury are over three times Treasury costs; the internal rate of return for the Commonwealth Treasury exceeds 13%, well above the usual standards for public investment. The paper presents some speculations about the marginal rate of return for various policy changes.

Keywords: higher education, education policy

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Is the Treasury Subsidising Australian Undergraduates?
Or, Investing in Higher Education*

1. Introduction

In a leader which claimed that "...investment in human capital is the most important way advanced economies can lift productivity", a leading Australian financial newspaper denied that there were sufficient beneficial spill-overs to warrant any public subsidies to undergraduate education. Because students themselves did or should gain so greatly from their education, by way of extra incomes, no public support was needed, it was claimed. Thus, grants to universities for undergraduate education were deprecated as "middle class welfare", not an investment that produces returns for the public sector and the economy.[1] By implication, the Commonwealth Treasury is assumed to spend more on tuition grants to universities than it receives in return.

This paper presents estimates of the financial returns to the graduate, to the Treasury and to the Australian economy from undergraduate education. In addition, the paper indulges in some speculations about the efficiency of policy changes. It concentrates entirely on efficiency aspects, rather than distributional, not because efficiency is important and distribution is not, but as a part of an exploration of the question of how close the policy outcomes that can be supported on efficiency grounds approach those commonly justified by equity (see also Miller and Pincus 1998a).

The second section of the paper outlines briefly the methodology used to evaluate the average return on educational investment, and reports on the calculations. Based on simple commercial methodology, the estimates of returns rely on census data on the incomes earned by graduates and by non-graduates at various ages; and on the income tax scales. That is, they ignore non-pecuniary benefits derived by students from education as well as unmeasured and unmeasurable 'externality' or spillover benefits to the rest of society. Considered as a commercial investor, the Commonwealth Treasury seems to do very well out of its funding of undergraduate education in Australia: on an outlay of less than $4b annually, it gains more than three times that amount, by way of extra income tax collections and HECS payments. The internal rates of return are modest for the graduate, and moderately high for the Treasury and for the economy.

As these sorts of calculations relate to average returns, they do not give much guidance to policy. In particular, the fact that graduates earn moderate rates of return (or high, or low) does not indicate that the amount of Treasury investment is about

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* This paper draws heavily on joint work with Paul W Miller of the University of Western Australia, particularly that behind chapter 13 of *Funding Higher Education: Performance and Diversity*, (Evaluation and Investigations Program, Higher Education Division, Department of Employment, Education, Training and Youth Affairs, 1997); and Miller and Pincus (1998a and 1998b). I have benefited from comments by Paul Miller, Lee Hansen and Sue Richardson, all of whom are absolved of any remaining errors.

[1] "Cut middle class welfare", Editorial, *Australian Financial Review*, May 27, 1997.

right (or too low; or too high, respectively). For efficiency investment, what matters is the return on the margins (section 3), and so the latter part of the paper considers the consequences of fiscal changes in higher education, to investigate if the marginal returns are very low or negative. Rough estimates are made of the possible efficiency effects of three policy variations: tax credits for fees paid; extending to de-regulated undergraduate fees the system of income-contingent loans (as in New Zealand); and the 70 rise in the HECS charges introduced in the 1996 Commonwealth budget. Whereas the first two would possibly improve economic efficiency, the last most likely did not.

2. Treasury Returns

This section outlines the results of calculations of the returns obtained by the Treasury from higher education, and those obtained by graduates and the economy. The method used is standard, and relies on estimates of the age earnings profiles of graduates and non-graduates; on tax rates; on fees and their payments; and on information about the cost of tuition. Presented are estimates for present values of life-time returns (using a five percent discount rate) per graduate and per graduate cohort; as well as estimates of the internal rates of return.

Table 1 presents estimates of the direct financial outcomes of the undergraduate education of an 'average' graduate; the estimates are based on assumptions mostly derived from the average characteristics of undergraduates, but otherwise chosen to simplify calculations. The underlying data relate to the academic year 1997. On average, graduates earn more income than do non-graduates, and pay more income and Medicare taxes. Education involves forgone earnings and tuition costs (for some of which the graduate recompenses Treasury, through HECS payments). During study (which is assumed to be full-time for 3.3 years, starting at age 19) no income is earned. After graduation, earnings are assumed to equal the average income of graduates by age (to age 65), calculated from the 1992 census, up-dated for rises in average earnings; a similar assumption is made for non-graduate income.

If we attribute to higher education *all* of the extra income of graduates, over that earned by non-graduates, then over a life-time a person with the average earnings profile of graduates would earn almost $225,000 more than what would have been earned if higher education had not been undertaken. For the economy as a whole, the costs of tuition must be deducted, leaving about $200,000 as the net gain (last entry in the last row of Table 1).

Table 1 shows that the net economic gain of $200,00 is distributed approximately fifty-fifty between the graduate and the Treasury, after accounting for HECS repayments of over $9,000, *extra* income and Medicare tax payments of $115,000, and Treasury tuition grants to universities of about $26,000. A relatively equal split was expected, as income-related taxation dominates the tuition costs and HECS payments, and the relevant marginal rate of taxation is almost fifty percent.[2]

[2] The ratio of the present values of extra tax to extra income is 0.51 (= 115/225), and exceeds the maximum marginal rate of tax, which is 0.485: in early years the income forgone by the student is large in relationship to the tax avoided.

Table 1: Distribution of the Direct Financial Benefits and Costs of Education of an Undergraduate, (Present Values at Entry to University, in Dollars)

	Graduate (1)	**If Non-graduate** (2)	**Difference** (1) - (2) = (3)	**Treasury** (4)	**Economy** (3) + (4) = (5)
Earnings during tuition		48,000	-48,000		-48,000
Earnings after graduation	876,000	502,000	274,000		274,000
Total Earnings	876,000	650,000	225,000		225,000
HECS payments	-9,000		-9,000	9,000	
Income Taxation	-285,000	-170,000	-115,000	115,000	
Treasury Outlays on Tuition				-26,000	-26,000
Total	582,000	481, 000	101,000	99,000	200,000

Notes: Totals and sub-totals may not add because of rounding. Discount rate is 5 percent. Calculations assume that 100% of the income enhancement is due to higher education; that there are no earnings while student is in 3.3 years of full-time study; that HECS of $4,217 is deferred on tuition costing $9,230 p.a.; that incomes are equal to simple average of males' and females'.

The internal rates of return are also shown in Table 2: 11.7 percent for the graduate, 13.8 percent for Treasury and 12.4 percent for the economy as a whole.

According to the Dearing Review of UK higher education, there is a consensus that it is reasonable to attribute to higher education about 80 percent of the excess of graduate earnings over those of non-graduates; that is, those who continue education and become graduates possess, at the end of high school, a superior earnings capability of about 20 percent, over those who do not undertake higher education. If so, then higher education adds about $166,000 to a graduate's lifetime gross earnings. Once again, this increment is shared approximately fifty-fifty between the graduate and the commonwealth Treasury. Under these assumptions, the internal rates of return decrease to 10.1 percent for the graduate, 11.7 for the Treasury and 10.8 for the economy (Table 2).

Table 2:
Internal Rates of Return from Higher Education, 100 and 80 percent Attributions (%)

Attribution of Income Difference to Higher Education	**Graduate**	**Public Sector**	**Economy**
100 Percent Attribution	11.7%	13.8%	12.4%
80 Percent Attribution	10.1%	11.7%	10.8%

Note: Assumptions as in Table 1, except for attribution of income difference.

Table 3:
Present Values of Treasury Outlays and Receipts, for a Cohort of 125,000 graduates ($b)

	100 Percent Attribution	**80 Percent Attribution**
HECS Payments	1.2	1.1
Extra Income-Related Taxation	14.3	11.2
Gross Gain to Treasury	15.5	12.3
Less Costs of Tuition	3.8	3.8
Net Gain to Treasury	11.7	8.5

Sources: See Table 1 and text; Miller and Pincus (1997a) for costs of tuition.
Note: The costs of tuition used here refers to outlays in a year for the enrolments of 1997 by course type; the cost derived from Table 1 above, for the present value of 3.3 years of tuition for the student with the average tuition cost, is less by $0.6b.

In order to focus on Treasury, present value calculations are given in Table 3 for a cohort of graduates of size 125,000,[3] under the two alternative assumptions about the share of graduate's extra earnings that should be attributed to higher education. The simplifying assumptions used probably introduce an upward bias in the estimate of Treasury returns. The extra taxation has been exaggerated because no allowance has

[3] There were about 410,000 full-time-equivalent enrolments in 1997; I have assumed that all graduate after 3.3 years.

been made for students failures (nor for periods of unemployment[4]); Austudy payments have been neglected; ignoring the dispersion of income earned imparts an upward bias to the estimates tax receipts and HECS payments (due to the non-linearity of the tax systems); the Treasury cost of post-graduate education is ignored. Although there are some downward biases, they probably are less important than those just listed: part-time study; employment while in study; taxes other than income-related.[5]

What Table 3 shows is that Treasury annually outlays less than $4b on undergraduate tuition grants to universities and expects to receive about $15b (or $12b) by way of HECS repayments and *additional* personal income taxes, in present value. The benefit/cost ratios for Treasury are 4.1 and 3.2 respectively. Therefore, according to these calculations, and with the reservations just made about upward bias, I conclude that, through medium of the Commonwealth Treasury, non-graduate Australians gain handsomely from the systems of higher education and taxation.[6]

The argument was made by Blaug (1970, cited in Harrison 1997, p. 22) that it is an error to suggest that the additional taxation paid by graduates always supports a case for subsidies to higher education. Yet it is common, when calculating 'social' rates of return, to include taxes as a benefit; the distinction between averages and margins, explored in the next section, helps reconcile the two positions. Meanwhile, note that the calculations reported above take the existing income tax system as given. The current income tax rates are not the result of any close balancing of cost and benefit, nor of fine discriminations on the basis of capacity to pay, nor of any readily rationalised financial nor economic calculation. They are the somewhat arbitrary results of political compromises. If the income tax were reformed so that the high marginal rates were not reached so quickly up the income scale, then the estimates would change.[7]

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[4] Unemployment tends to be less among educated workers, but the loss of earnings is greater per period of unemployment; and, as the tax system is non-linear in income, the loss of taxation revenue is disproportionate to the loss of earnings.

[5] For a survey of the biases in estimates of private and social returns, see Ehrenberg and Smith (1997). The assumption that all HECS is borrowed makes virtually no difference to the estimates in the cases reported here because, coincidentally, the present values of up-front HECS and the deferred HECS are both $9400 to the nearest hundred dollars.

[6] Harrison (1997, p. 22) points out that "Usually estimates of the social return are lower [than the private], implying that the extra taxes raised from graduates do not in fact cover the government subsidy to higher education". Unfortunately, as Maani (1997, p. 135) noticed, such an inference is not secure unless the internal rate of return is the appropriate discount rate.
If the effect on graduate earnings is less than the 80%, then the estimates fall. For example, if the *extra* earnings power of graduates at the date of high school matriculation is already about half what it will become after the addition of higher education, the Treasury still gains $34,000 per graduate, or $4.2b from the cohort, net of grants to universities—assuming that 125,000 students undertake further study in these less favourable circumstances, in which the graduate gains less financially from university graduation (about $23,000, not $95,000).

[7] Under the income tax rate structure proposed by the Howard government in August 1998, the three internal rates of return in Table 1 all become 12.4%, as $10,000 of NPV would shift from the Public Sector to the Graduate; for Table 2, about $9,000 shifts to the Graduate column, per graduate.

If interpreted as estimates of the effects of a complete withdrawal of Treasury support of undergraduate education, the numbers reported in Table 3, are flawed in that they ignore supply and demand responses, and their partial and general equilibrium consequences for markets. The first matter, behavioural responses, is taken up later.

3. Efficient investment[8]

The estimates just reported relate to the overall or average returns to Treasury, graduate and the economy from public and private investment in undergraduate education; ignoring market imperfections and the like (discussed below). Given an estimate of the average economy-wide rate of return of about 12 percent, is it likely that the marginal rate is as low as, say, the 5 or 6 percent that are the usual rates used as standard for investment?

It is tempting to infer something about the case for public policy from the fact that students earn rates of return of the kind shown in Table 2 (or from the calculations of the Industry Commission, shown in summary in Table 4). Unfortunately, often there are no valid inferences that can be made, about the case for public subsidy. *What matters for efficient public policy is whether or not additional public sector support for higher education will produce more economic benefits than costs.* In the absence of additional information, it can be foolish to conclude that, because the student's rate of return is high, that there is a case for a reduction in public sector support for higher education.

Table 4: Private internal rates of return to higher education (%)

		No fees	HECS system		Extent of cost recovery				
					40%	50%	75%	100%	100%
Course	Length (yrs)		$2,478 fee	Differential fees	Deferred with income-contingent repayments				Up-front fees
Architecture	5	8.9	8.4	7.8	7.9	7.8	7.4	7.1	4.9
Computing	3	23.3	21.7	20.8	21.0	20.7	20.2	19.7	12.8
Education	4	11.9	10.8	10.4	10.3	10.1	9.6	9.2	6.6
Engineering	4	17.4	16.2	15.6	15.3	15.1	14.8	14.6	9.4
Law	4	18.1	17.2	16.3	16.9	16.7	16.4	15.8	11.7
Nursing	3	13.6	12.3	11.5	11.2	10.9	10.2	9.3	5.5
Science	3	22.3	20.7	19.7	19.4	19.1	18.6	18.5	11.9

Source: Complied from Industry Commission, *Industry Commission Submission to the Review of Higher Education Financing and Policy* (July 1997) Appendix 4.
Notes: Attributes all income differential by level of education to education. Income is after tax. Average for males and females.

There are three major kinds of argument for public intervention in undergraduate education: problems of the capital market; externalities; forecasting errors and lags in the labour market (listed in what I regard as the sharply descending order of policy importance). To simplify discussion, initially assume that the only source of inefficiency is the capital market; and that the only reason students undertake study is the possibility of higher incomes. Then it is the case that high private rates of return do indicate the need for policy intervention—which in Australia has been made in the

[8] The framing of this section owes much to a comment by Susan Richardson.

form of the unconditional offer of fee loans with income-contingent repayments, and by the Austudy arrangements.[9] However, when there are other sources of market failure, then matters are more complicated, and observations of private rates of return no longer serve as sure indicators of policy direction.

In particular, the presence of non-pecuniary benefits destroys the usefulness of the privates rates of return as indicator of a continuing problem of capital market imperfection. If income were all that mattered to graduates from education, we would expect in equilibrium that the graduates' rates of return would be high enough to justify the financial sacrifices they make and risks they take. With severe capital market imperfections, that rate will be high. When high, policy intervention is called for. With a perfect capital market, the rate will be 'normal'. However, it is more realistic to assume that graduates enjoy advantages that are not captured in income. In these realistic circumstances, the equilibrium financial rate of return would be lower than in the absence of non-pecuniary advantages. Were the number of undergraduate places set by policy so as to achieve a 'normal' rate of financial return for graduates, or were financial conditions of set so as to achieve that outcome, then, in the absence of externalities, the quantity of investment in undergraduate education would be too low.

Now say that the alleged source of market failure is the presence of significant positive externalities from graduates. For the sake of argument, again assume that the labour market was in some sort of equilibrium and that graduates were earning a moderate or high private rate of return. I know of no economic theory nor empirical 'law' that relates the size of the private rate of return to the size of the <u>marginal</u> externality, which is the relevant magnitude for public policy.

A plausible case for inference from private rates of return to policy occurs when the sole source of market failure is that higher education produces 'positional goods' (as well as other kinds of goods), and that credentialism is a zero-sum game (as is stressed by Marginson 1995). With a perfect capital market, we would expect graduates to earn a privately satisfactory rate of return that exceeds the social rate of return; and a restrictive policy is called for. Although the policy direction is indicated in this case and not in the others, it requires more information than private rates of return for government to calculate the desirable extent of policy intervention; and if all kinds of imperfections are simultaneously present, then optimal policy settings cannot be calculated in the absence of information about marginal magnitudes.

The last form of alleged market failure relates to forecasting errors and lags in the operation of labour markets: high rates of return may indicate that supply has responded slowly to the prospects of high income, for example. There is widely-held scepticism (which I share) about the ability of government to make better decisions for educated individuals than can be made by those individuals themselves; the consensus seems that the appropriate policy direction for intervention lies in the provision of information. Putting scepticism to one side, what is the policy relevance in this case of the estimates of moderate or high private rates of return. Since the calculations are based on historical data concerning cross-sectional incomes, it

[9] Whether such interventions actually improve efficiency is matter taken up in section 5.

requires some heroic assumptions to conclude, from moderate (or high) private rates of return of the kind here reported, that economic efficiency requires that the government should reduce its grants, or raise graduate taxes and fees.[10]

There are many directions upon which to estimate the marginal rate of return, including the number of entrants to higher education; the length of course; the extent of full-time rather than part-time study; the number of degrees per student; the tuition inputs per student; the level of non-tuition consumption of students; the tax treatment of the industry. On the investment margin, it is an open question as to how much the Treasury or the economy would gain (or lose) by Treasury's being more selective or more parsimonious with university grants; or more taxing or generous with HECS charges and repayment schedules; or if Treasury extended the system of income-contingent loans to all university fees; or how much would be the gain (or loss) from a more appropriate tax treatment of tuition fees (as advocated in Miller and Pincus 1997a and b). To provide answers, we need a notion of what an efficient investment pattern would look like; and we require estimates of the responsiveness of students and universities to changes in various financial magnitudes. For neither do we have much by way of estimates.

If we consider each potential student's higher education as a specific investment project, then the efficient quantities of investment are those which drive the marginal rates of return to an appropriate level for each individual project.[11]

How can we judge how close are the average returns are to the margins? Although it is easy to hypothesise a change in policy, unfortunately we lack information on the responsiveness of students and universities to such changes. Given the nature of university management systems and regulation, quantitative information is scarce about the behavioural responses of the suppliers of educational services. Where students and their families have some control over their choices, it is reasonable to assume that they have made decisions are as good as can be expected, which translated means that they attempt (roughly) to equalise on all available margins. Unfortunately, this does not reveal the relevant elasticities; and some decision variables are lumpy, not continuous (Garratt and Marshall 1995, 1996).

It being difficult to make definitive statements about the marginal effects of variations in public and private spending on higher education, as an alternative I highlight the information required for the calculation of estimates of the marginal rates of return on

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[10] More market information is available than rates of return, and so the government labour market policy adviser would look to quantities as well. However, as many economists and others have pointed out, there are economic explanations for the fact the universities and colleges do not charge 'what the market will bear'; use criteria other than willingness-to-pay for admission decisions; and so on. We do not observe points on an ordinary demand curve, even in a deregulated environment. Therefore, it is dangerous to use what Gordon Winston (1996, p. 1) calls "the economic analogy--...to draw on parallels between universities and firms, students and customers, faculty and labour markets and so on".

[11] One useful way to characterise the efficient outcome is to note that it would reflect in a zero income elasticity of demand, when estimated cross-sectionally (Epple & Romano 1998, p. 37, n.8). The income of the student or family would have no effect on the quantity of investment made 'in the student', all other things being equal. An alternative characterisation is that everyone, for whom the private-plus-public benefits exceeds the costs, is in education.

investment in higher education; and illustrate the orders of magnitude of the relevant (marginal) elasticities.[12]

4. Tax treatment of fees

Qualitative assessments can guide policy choice, but quantitative calculations make more potent cases. Consider tax treatment of tuition fees. In Australia, the income tax law permits the deduction of fees paid as a current expense, when they are a necessary cost of earning taxable income. There are two connected objectionable features to be noted, the first being that for most undergraduates, even those in degree courses leading to employment in regulated professions, like law or medicine, for which university degrees or similar formal qualifications are required for practice, tuition fees are not deductable. For most undergraduates, tuition fees are incurred in the hope of a job, and not as a necessary expense of a current job, and so they fail the test for deductibility. Thus, university education is not regarded in the tax law as an investment; if it were treated as an investment, then the costs would be amortised against future income attributable to it.

As the tax law stands, therefore, it discriminates against many forms of investment in human capital (Goode 1962; Steuerle 1996). On the conventional case about a 'level playing field', there is a presumption that, so long as Australia relies on income taxation, tuition expenses should be effectively tax deductable (ie, capitalised and amortised over, say, ten years, as discussed in Miller and Pincus 1997a and b, and 1998a and b).[13]

A decisive case, against capitalising and amortising fees for income tax purposes, would be if the cost to the Treasury were excessive, compared with the economic benefits obtained. Strangely, no one uses such an argument against the deduction of capital or recurrent costs of earnings of self-employed farmers, professional and trades-persons.[14] Yet, from an economic point of view, undergraduates can be regarded as being self-employed in producing human capital (creating about $200,000 worth in a little over three years, not an inconsiderable outcome in the case of young adults recently out of high school).

Despite this theoretical case, the question still remains as to how great would be the net economic benefit from tax deduction of capitalised fees.

It is possible to estimate the costs to Treasury of such a tax change, on the assumption of unchanged behaviour. From that cost, it is possible to estimate the efficiency cost

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[12] The 'marginal' investments discussed in this paper are not those identified by Maani (1997) in her study of returns to higher education in New Zealand, namely, the investment necessary for the student to achieve the next highest level of award, eg, to go from a Bachelor's to a Master's degree). Maani's calculations say something about the motivations of students and about the rate of adjustment to changes in supply and demand for educated workers; but they do not have immediate relevance for the quantitative evaluation of the kind of policy changes discussed in the present paper.

[13] Bentick (1997) explores an indirect alternative to tax deductibility, which is to vary the ratio of HECS fees to cost of course. He also stresses the significance of forgone earnings, especially under a progressive tax system.

[14] Baldry's (1998) case for abolishing income tax deductions for work-related expenses concerns minor categories of spending by employees, like clothing and union dues, rather than major cost items like rent of premise, vehicle costs and the like, incurred by the self-employed.

to the economy. Then we can speculate on the likelihood that induced behavioural responses will be great enough to produce net gain in efficiency. To take an example, Miller and Pincus (1997b) recommended that operational grants to universities be made proportional to standardised costs of tuition; that universities be permitted to charge students fees; that all students be able to borrow all fees on the same terms as under the present HECS system; and that capitalised fees be amortisable against future income.

On the assumption of no behavioural changes, and in present value terms, this package of measures, including over $0.5b for tax credits on fees worth about $1.9b, would cost the Treasury no more than the current arrangements: the tax credit would be about 30 percent of the fees charged by universities. The appropriate test is not about what would happen to Treasury flows, but what would be the economic costs and benefits. Without behavioural changes, there can be no economic benefits. That is, the purpose of the policy change is to change behaviour: to encourage more investment in the kind of education that enhances incomes. If the economic cost of one dollar of extra tax revenue were $1.50, then the required rise in economic benefits would have to be about half the Treasury cost of $0.5m.[15] The required $0.25b gross economic gain could, for example, come from induced rises in graduate earnings from the base of about $110b; or differential earnings on a base of $27b (calculable from Table 1).

For the policy of permitting amortising of fees for tax purposes to be efficient, the required elasticity of earnings with respect to the rate of return is less than 0.2; or an elasticity of taxable income with respect to the average income tax rate around -0.1.[16] These are low enough to add plausibility to the case for a change in the tax law concerning tuition fees.

5. Loan System with Income-Contingent Repayments

It has been estimated for the US that over the period 1976-1995, the removal of liquidity constraints for a two digit industry would have increased investment by an average of 34 percent.[17] Possibly, the removal of liquidity constraints from potential students could have a larger proportional effect. For reasons well canvassed in Australia and elsewhere (see Chapman 1997), there are major deficiencies in the market for human capital; much greater than those for industrial capital. Therefore, the chief source of improvements in economic efficiency in higher education in Australia in recent decades has most likely been the introduction of the system of

[15] At $1.50, the marginal cost of taxation used here is towards the upper end of the range of estimates given by Freebairn (1995) and by Browning (1987), but less than one-fifth of those for New Zealand in Dallas (1996). A high estimate of marginal cost of taxation prejudices the case against tax deductions.

[16] The tax amortising of fees would increase the graduate's rate of return from about 11.70 percent to 11.85 percent. The alternative calculation concerns the elasticity of income with respect to the tax rate. With the tax credit, on a life-time basis the average income tax rates falls from 32.8 to 32.1 percent, or 2 percent, but with no change in the marginal rate structure. These are clearly long-run elasticities; in general, only compensated elasticities are relevant for efficiency calculations.

[17] Pratap and Rendon, cited in Raquel Fernandez (1998), note 5.

automatic access to 'fee' loans with income-contingent repayments. These loan systems have eased the liquidity constraint on students and their families; and have permitted more efficient 'consumption smoothing' on the part of students and their families (see Miller and Pincus 1998a, p. 53).

To the limited extent, the income-contingent loans system for fees has been broadened to include sustenance loans (more so in New Zealand than in Australia; there are of course grants as well as loans, on a means-tested basis). However, the Australian government has not extended the system to post-graduate course-work students; nor to TAFE students; nor to fee-paying Australian undergraduate students; nor to study abroad. In recent times, the terms of repayment of these income-contingent loans have been made more stringent, and additional incentives introduced for early repayment.

It would be desirable to estimate the economic (efficiency) returns from policy changes in this area. There are difficulties, however, with a lack of information on both costs and consequences.

On the cost to Treasury, my educated guess is that a large extension of the system of income contingent loans could have a recovery rate of around fifty percent, in present value terms. Miller and Pincus (1997b) estimated that the repayment by the 'average' student would have a present value of about 85 percent of loans made for purposes of payment of tuition fees in 1997, at the 1997 pattern of enrolments, grants and HECS fees (ie., 85 percent of HECS debts incurred).[18] This is too high an estimate of recovery if the system was extended to permit much larger loans (associated, for example, with much more generous loans for maintenance). In particular, Miller and Pincus simulated an arrangement in which university grants were set at a constant, fifty percent of standardised costs; universities permitted to charge fees; all students borrowed to pay these fees. On the assumption of no behavioural change, additional tuition loans of about $800m would be made over the amount under the actual 1997 arrangements, and that an additional $550m would be recovered, for a recovery rate of under 70 percent, not 85 percent. Even this is too high, for it was calculated for the average graduate and not for the cohort: it ignores the distribution of graduate earnings[19], periods of unemployment, death, emigration and so on. In addition we assumed that all students borrow and none make voluntary early repayments, and so we ignore the problem of adverse selection.[20]

On this basis, the *Treasury* costs of the sort of tax reform advocated by Miller and Pincus, arising only on the loan side, is about $400m per cohort of students. On the

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[18] Miller and Pincus (1997b) take the tuition fee to be the so-called 'discounted' or 'up-front' HECS. The fact that, apart from the capitalised interest charge included in the front-loading of the fee when it is borrowed, a zero interest rate is charged, gives rise to the loss in present value in Miller and Pincus' calculations.

[19] See Miller and Pincus (1997a), n. 26 on the relationship between income and repayment.

[20] The whole package was estimated to be cost-neutral to Treasury, and so I am 'testing' only the loans component.

same estimate as before of the excess burden of taxation, the *economic* costs would be half that amount, or $200m.

What behavioural responses would we expect and would they repay the cost? Miller and Pincus speculated that some students would shift to cheaper courses; some would be dissuaded entirely by the higher fees in courses of their preference; but others would be attracted to university by the cheapening of their preferred courses. In addition, universities would be encouraged, by the changes we proposed, to offer better value for fees. The two hundred million dollars economic cost in question is about five percent of the costs of tuition in 1997, but less than two percent of the full resource costs of undergraduate education.[21] A radical change, of the kind that we proposed, would produce a net economic benefit if it induced genuine cost savings of less than two percent; or some equivalent response from students and universities.

6. Increasing HECS Charges.

The major changes during the last few years, in financial policy settings in higher education, have been the increases in and differentiation of HECS charges; the stiffening in the terms of repayment; the reduction in operating grants; the changes in the system of Austudy support. Of these, I will comment on the rise in HECS charges only, treating it as a switch in the tax mix in the economy.

In the process of differentiating HECS, the government raised the charges by a weighted average of 70 percent. That the extra HECS charges were graduate taxes is shown by the fact that the grants to universities were reduced in the same budget: for students as a whole, there was no *quid pro quo*, nothing in return. The extra payments went to reduce the budgetary 'black hole'.

A rough calculation of the Treasury benefits of these changes can be made on the following assumptions: unchanged enrolments; seventy-five percent of students deferring payment; fifty percent recovery rate on a present value basis (as argued in a previous section). On these bases, the present value of the increase in that form of graduate taxation is about $250m.[22]

Assuming that these Treasury savings are reflected in lower tax collections elsewhere, as was done in earlier discussion, then a net economic advantage occurs if the excess burden of the taxes saved elsewhere exceeds the excess burden of this form of graduate tax: the gains or losses in economic efficiency are those related to a switch in tax mix. Since the HECS debt repayment schedule is income dependent, then it seems reasonable to assume that it has the same excess burden as would an synthetic income

[21] Average forgone earnings of a full-time student was about $16,000 and average tuition cost was a little over $9,000 per year.

[22] The 410,000 enrolments in 1997 would have incurred $1000m HECS debt if all deferred and if HECS had remained at $2442 per full-time enrolment; and $1730m under the differentiated and increased rates. If 75 percent defer, then the rise in HECS debt would have been $550m, reduced to approximately $250m on recovery.

tax at rates equal to the sum of the ordinary income tax, the Medicare levy and the HECS repayments. That is to say, an income-contingent loan system should be evaluated as though it were an addition to the income tax schedule.

It is a well-known proposition in tax theory that the burden of taxation rises faster than the (marginal) tax rate. Therefore, considered solely as a switch in the tax mix, the rise in HECS charges involved a loss in tax efficiency. How great a loss is difficult to estimate, but 15 percent of the size of the tax switch is a reasonable quess, or say a $45m loss of economic efficiency.[23]

Apart from the effects of switching students into relatively cheaper courses, it is hard to specify sources of gain to offset this loss in tax efficiency.

7. Conclusions

This paper has discussed several issues connected to the question of whether Treasury spending on undergraduate education is too high, or misdirected, from the viewpoint of economic efficiency. First, using the approach typically taken to the estimation of the returns from education, it was argued that Commonwealth Treasury gains some multiple of what it spends on undergraduate tuition. In addition, the internal rate of return to the economy from undergraduate education is moderately high at around 12 percent (ignoring externalities and other problems discussed in section 3); the rate of return for graduates is lower at about 10 percent.

An indication of imperfections in the capital market is given by a persistently high private rate of return, but only in the unrealistic case when graduates enjoy no or insignificant non-pecuniary returns. This is one of a very few circumstances in which the private rate of return gives an unambiguous signal of the need for further policy intervention on efficiency grounds. However, the optimal level of intervention in this, as in all other cases, depends on marginal rates of returns, not the average rates typically reported.

Crude and preliminary attempts were made, in Sections 4 through 6, to estimate marginal returns to three policy changes—tax credits for capitalised fees; extension of the income-contingent loan system to cover fees imposed by universities; the 70 percent rise in government fees in the 1996 budget. Considered as a tax switch, the last seems to fail the test of efficiency, whereas the others likely would pass.

[23] On the assumptions that the burden rises with the square of the tax rate; that the burden at a marginal tax rate of 51 percent is 1.50; and that the tax rate rises by 3 percent, then the burden rises from 1.50 to 1.68; 0.18 times $250m is $45m. If the burden rose proportionately with the tax rate, then the estimated loss in economic efficiency from a $250m tax switch is just over $11m.

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