AN INVESTIGATION INTO THE EQUITY AND EFFICIENCY OF AUSTRALIA'S HIGHER EDUCATION SYSTEM

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Abstract

This thesis examines the impact of changes in higher education policy in Australia on equity for students and efficiency in resource allocation. This involves measuring the impact of the 2005 budgetary changes in the Higher Education Contribution Scheme (HECS) on the Private Rate of Return (PRR) and Social Rate of Return (SRR) to higher education for both males and females across different occupations and for different qualifications. This thesis examines the proposition that the movement of Australia's higher education system towards a user pays model with price flexibility will deliver greater efficiency. It also considers the argument that students should pay a greater proportion of the cost of higher education as they are the direct beneficiaries.

This thesis shows that the increase in HECS fees has coincided with a fall in the quality of university graduates and the demand for a university education by higher achieving and low income students. In addition, this study also found that not only is the SRR positive but is greater than both the real rate of return on Commonwealth Government bonds and Government Trading Enterprises. These findings suggest that there is an inefficient allocation of resources and a need for the Government to allocate relatively more funding to the discipline areas with high Social Rates of Return and graduate skills shortages.

This thesis suggests ways to improve the equity and efficiency of Australia's higher education system. These policy recommendations aim to increase the quality of and opportunity for higher education in Australia.

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Chapter 1: The Higher Education Contribution Scheme and Government funding

In Chapter One, the role of Higher Education Contribution Scheme (HECS) and Government funding of universities are discussed. The transformation of Australia's higher education system from a Government funded system towards a user pays system is characterised by the series of changes that have unfolded since the introduction of HECS in 1989 to the recent 2005 changes to Australia's higher education sector. This thesis will especially focus on the 2005 changes in HECS including the introduction of both the Higher Education Loan Programme (HELP) and institutional price autonomy.

1.1 The role of Human Capital Theory in higher education policy in Australia

The main economic theory that relates to decisions in regard to further education is Human Capital Theory. Becker (1993 p. 16) argues human capital unlike physical or financial capital 'cannot separate a person from his or her knowledge, skills, health or values' but can be enhanced through expenditure on areas such as education, training and medical care. In economics, education represents a form of investment in human capital. Husz (1998, p. 9) defines human capital as 'the time, experience, knowledge and abilities of an individual household or a generation, which can be used in the production process'. The investment in education that will be discussed in this thesis will be confined to higher education, as it is at this point that the individual chooses to privately invest in human capital. In Chapter Three it will be demonstrated that this investment decision will affect the individual's income earning potential.

In the 1960's, Human Capital Theory (HCT) became the rationale for Australian public policy to expand higher education. The 'birth of a new faith' as described by Marginson (1997b) was marked by the technological advantage of the Communist bloc over industrialised countries with the first unmanned space satellite 'Sputnik' launched in 1957. This created a challenge

for Western educational systems and sparked discussion of the value of human capital in the 1961 OECD conference in Washington. The Martin Committee (1964), who were responsible for the expansion of tertiary education in Australia, recognised the direct relationship between education and economic growth underpinning the 'first wave of Human Capital Theory'.

The 'birth of a new faith' related to the Australian political economy embracing the Human Capital Theory, following the recommendations of Coombs, Chairman of the *1961 OECD Conference*, and the work of Schultz (1961) but not its earliest conception. The economic benefits of human capital were noted by both Sir William Petty in the 1660's and Adam Smith (1776 p. 42) in *The Wealth of Nations*:

> A man educated at the expense of much labour and time to any of those employments which require extraordinary dexterity and skill, may be compared to …expensive machines. The work which he learns to perform, …will replace to him the whole expense of his education.

As Marginson (1997b) acknowledges, even though there was some early dissent to the Human Capital Theory, the time taken to implement this economic theory was atypically short. The role of the state in expanding higher education in the 1960's reflected the 'Welfare-Keynesian strategies' of the time. Marshall argued individuals, unlike the state, under invest in education due to the unforeseen marginal benefits. Therefore,

> the wisdom of expending public and private funds on education is not to be measured by its direct fruits alone. It will be profitable as a mere investment, to give the masses of the people much greater opportunities than they can generally avail themselves of (1890 p. 216).

However, the 'first wave of Human Capital Theory' was under scrutiny in the 1970's with doubts surrounding the direct benefits of education with the presence of a recession in the US and rising opposing views. Berg (1970) and his publication, *Education and jobs: The great training robbery*, is thought to be the earliest discussion of the 'screening hypothesis',

however, it was the work of Arrow (1973), Riley (1975) and Stiglitz (1975) who created the greatest awareness of the 'screening hypothesis' in the 1970s. Blaug (1976) disputed Human Capital Theory proclaiming education is a 'screening device' and not the precondition for rising labour productivity. Thurow (1975) supported this view that skills are acquired in the labour market (on-the-job knowledge and skills) in his 'Job Competition Model'. Kaufman and Hotchkiss (2000) further argued that education is a 'screening device' used to identify the right applicant at the least cost but does not directly increase productivity[1].

Although the 'screening hypothesis' contradicts the Human Capital Theory in regards to the role of education and proclaims to be universal, these two theories were linked together in public policy or as Marginson (1997b p. 113) states 'were theoretical antagonists, but were united in Government policy'. However, Human Capital Theory would change in less than a decade with the continual demise of the direct relationship between education and economic growth, as theories embracing the growing importance of technology became more popular. Wozniak (1984) highlighted that innovation was related to education and not experience and Bartel and Lichtenberg (1987) argued education drives technological change whereby technological change generates economic growth, which promotes demand for education. Consequently, Human Capital Theory became complex and Government funding was allocated to programmes promoting new technological skills.

Arguably, one of the most fundamental changes in Human Capital Theory coincided with the movement from Keynesian based policies to a market based system of education in 1989. The rationale for shifting the cost of higher education to students was based on Friedman's (1962) economic theory and was supported by the World Bank (Chapman, 2001 p. 2). Friedman (1962) argued that all monetary benefits of vocational education are received by the individual promoting no added positive externalities and therefore no reason for Government subsidisation. This created an environment where individuals had to weigh up the costs and benefits of further education in making the decision to pursue or not to pursue higher education.

[1] The conflicting views of Human Capital Theory are discussed in greater detail in Section 3.2.

1.2 The introduction of HECS

The Higher Education Contribution Scheme (HECS) was conceived by the Wran Committee, set up in 1988. The Labour Government of the time followed its recommendation of abolishing the policy of 'free' education and in 1989 implementing the *Higher Education Funding Act 1988.*

The objects of the *Higher Education Funding Act 1988 Cwlth, Sect 2A* were:

(a) to support a higher education system that:

(i) is characterised by quality, diversity and equity of access; and

(ii) contributes to the development of cultural and intellectual life in Australia; and

(iii) is appropriate to meet Australia's social and economic needs for a more highly educated and skilled population; and

(b) to strengthen Australia's knowledge base and enhance the contribution of Australia's research capabilities to national economic development and international competitiveness and the attainment of social goals.

The introduction of HECS and the movement away from free education encompassed a reduction in the proportion of funding of higher education provided by the Commonwealth Government and a movement to partial funding of their own private investment in human capital by students. Table 1.1 shows that in 1981, during the period of free higher education, the contribution made by the Commonwealth Government towards the funding of universities equaled 82.9 percent of total university income. After HECS was introduced in 1989 the Commonwealth Government's contribution towards the funding of universities fell to 66.7 percent of total university income. Meanwhile, the contributions made by students as a proportion of total university income rose from 2.3 percent in 1981 to 16.3 percent in 1989.

Table 1.1 Sources of university income before and after the introduction of HECS

Source of income	1981 (%)	1989 (%)
Student contributions	2.3	16.3
Commonwealth Government	82.9	66.7
State Government	1.0	4.6
Other sources of income	13.7	12.4

Source: Modified from Jackson 2001 pp. 2-3

Students had the option of either paying 'full up-front', or deferring 'all or part' of their HECS with the option of 'partial up-front' payment. Students deferring 'part' or 'all' of HECS were required to take 'out a loan' with the Commonwealth Government. Students who paid 'full up-front' received a 25 percent discount, as did students with a 'partial up-front payment' of $500 or more. Only when the income of HECS debtors reached the compulsory repayment threshold were they required to repay the loan.

1.3 Features of the 1996-97 higher education system

The characteristics of the 1996-97 HECS system were a consequence of several changes that had unfolded since 1989. The Wran Committee proposed in 1989 a three-tier income contingent charge system that would be fixed at 20 percent of the costs of higher education. Students would be required to make repayments when the individual's income was above average weekly earnings.

The Commonwealth Government initially rejected the three-tier system based on the cost of the course ($1500, $2500, $3000 per annum), introducing instead a uniform student rate of contribution ($1800 per annum) and an 'up-front' discount of 15 percent[2] (Dawkins 1988 p. 2401). The repayments ranged from one percent to three percent of taxable income depending

[2] The 1992-93 Federal Budget raised the discount to 25 percent.

on the level of a person's taxable income. The structure remained in place for the following six years.

Arguably the most significant changes in HECS, prior to the 2005 changes, were introduced by the newly elected Liberal Government, after the *Higher Education Amendment Bill 1996* was passed in the 1996-97 Federal Budget. The changes included student charges increasing approximately 40 percent and a three tier system replacing a uniform rate of contribution (band one, $3300, band two, $4700, band three, $5500)[3].

Vanstone (1996) stated that the student contribution equalled on average 23 percent of the cost of higher education. These increases, coinciding with greater fiscal consolidation, were justified by Vanstone on the premise that previous private contributions of students did not match the private benefits received. Furthermore, the new levels of student contributions were much lower than the 50 percent that American students contributed.

The three-tier system replicated the proposition put forward by the Wran committee in 1989 except that the different levels of fees would be based not only on the cost of the course but also potential income of graduates. Further changes in HECS announced in the 1996-97 Federal Budget consisted of the dropping of, the two percent voluntary repayments when income equalled $20,000, which was introduced in 1995-96, and changes to the income thresholds (Table 1.2).

According to Chapman and Ryan (2003 p. 3) the lowering of income thresholds was the most significant change, with 'effective repayment obligations' increasing approximately ten percent. Aungles et al. (2002 p. 11) stated the 'sharpest effect was experienced by persons with incomes of $51,293. They experienced falls in disposable income equivalent to $10 per week'.

[3] Band one includes Arts, Humanities, Education and Nursing. Band two includes Mathematics, Computing, Architecture and Sciences. Band three includes Law, Medicine and Dentistry.

The changes in the 1996-97 Budget had an even larger impact on individuals, as not only were course fees increased and income thresholds lowered but income support for students was tightened, as addressed in the *Social Security (Family Allowance and Related Matters) Legislation Amendment Bill 1999.* Youth allowance replaced Austudy for the ages 16-24 in 1998, featuring a more stringent means test and increasing the age of independence from 22 years to 25 years, effectively reducing the number of individuals eligible for assistance with income now based on family income instead of the student's income.

Table 1.2 Income threshold ($ pa) and repayment rates (%)

Year	Rate (%)	Threshold ($ pa)
1995-96	3.0	$27,675–$31,449
	4.0	$31,450–$44,029
	5.0	$44,030 and above
1996-97[4]	3.0	$28,495–$30,049
	3.5	$30,050–$32,381
	4.0	$32,382–$37,563
	4.5	$37,564–$45,335
	5.0	$45,336–$47,718
	5.5	$47,719–$51,292
	6.0	$51,293 and above

Source: Modified from the Australian Taxation Office (ATO) 2005

The other major 1996-97 budgetary change was the introduction of the Higher Equity Merit Scholarship Scheme (HEEMS), which, according to Vanstone (1996), aimed to complement HECS in facilitating access and promoting equity. The scholarships were to equal $36.38 million over the next four years, however, the scheme was abolished in the 1999-00 Federal Budget, due to its ineffectiveness. DETYA's (1998 p. 10) *Informal Survey of Equity Officers* stated '85 percent of respondents claimed that the scheme was ineffective in attracting people into higher education. There was no agreement on whether the scholarships improved retention'.

[4] The income threshold is referred to by the Australian Taxation Office as HECS Repayment Income (HRI) equal to taxable income plus net rental losses whereas prior to 1996-97 it was called Taxable Income.

The introduction of HECS, followed by the 1996-97 budgetary changes, would ultimately shift the cost of higher education from the Commonwealth Government to individuals or as Marginson (1997b p. 235) states, HECS at first 'slowed its contribution to Government revenue, but by 1993 it provided 13.1 per cent of the total income of higher education institutions'. As a proportion of total income, Commonwealth Government assistance has decreased from 56.7 percent in 1996 to 40.2 percent in 2001 while student contributions had increased from 11.6 percent to 17.4 percent respectively (DEST, 1996, 2001a).

The NTEU (2003b p. 8) concluded that:

> Universities receive approximately $1,200 less per subsidised student place in 2001 than they did in 1996…(yet)…it costs the Government approximately $2,300 less per subsidised student place in 2001 than in 1996…(as)…the average student paid approximately $1,750 more towards the cost of their education in 2001 than they did in 1996.

Despite this, the Department of Education, Science and Training (DEST) (2003a p. 1) states that the Commonwealth will pay the 'major part' of the costs involved, while students should pay 'part' of the cost. The terms 'major part' and 'part' resemble grey areas as both the level and nature of student contributions have certainly undergone significant changes since HECS was first implemented in 1989.

According to Jackson (2001 p. 1), at the time when student fees were abolished in 1974, the real contribution by students to the cost of higher education was less than six percent, given the extensive number of scholarships and contributions by State and Commonwealth Governments totalling more than 78 per cent. The 1996-97 budgetary changes, however, resulted in students in band one and band two subsidising the highest band. Jackson (2001 p. 1) states:

The standard HECS rate for Arts and Science is equivalent to 33 percent of the median fee and 40 per cent of total costs, whereas the HECS rate for dentistry is only 25 per cent of the median fee and 33 percent of total cost (see Table 1.3).

Table 1.3 Student contributions towards HECS per band

Field of study	HECS 1997 ($ pa)	Total costs 1997 ($ pa)
Arts	3300	8110
Law	5500	8110
Economics	3300	8110
Science, Engineering	4700	12,110
Dentistry, Veterinary Science	5500	16,700

Source: Modified from Jackson 2001 p. 2

1.4 HECS an income contingent charge

According to Chapman (2001 pp. 1-6)[5] HECS was the world's first income contingent charge. It replaced the Higher Education Administration Charge (HEAC) introduced in 1986. HEAC involved students paying a universal annual cost of $250 for award courses regardless of student workload. HECS was established to avoid the problem of free education, deemed as inequitable and regressive, as the subsidy from all Australian taxpayers was redistributed to mainly the advantaged groups of society, giving rise to the labeling of 'middle class welfare'. In addition, Chapman and Ryan (2003) also acknowledged fee abolition in 1973 was implemented by the newly elected Federal Labour Government as fees were considered a barrier to participation in higher education for the disadvantaged.

[5] A fundamental aspect of the existing literature is that several reports were written or co-written by Professor Chapman, who was an architect of the original HECS system. He supports and aims to justify the role and importance of an income contingent system.

Aungles et al. (2002) argue that income contingent loans were the Government's solution to financing growing demands for higher education and a greater skilled workforce that would replicate the global 'knowledge economy' but remain within a fiscal budgetary constraint. A deferred income contingent charge, interest free, was further justified by the Wran Committee featuring no up-front costs. This reflected the free market theories of Friedman (1955), where the cost of education should be dependent upon future student income and not family income (capital market problem).

Schreuder (AVCC, 2003c p. 1)[6] proclaimed HECS as 'its system of a loan repaid in the future only when the student earns sufficient income is unrivalled for its apparent fairness'. The justification for HECS and the movement towards a 'user pays' system is derived from a new meaning of equity, as Marginson (1997a p. 227) explains, 'in place of equity as equal economic conditions and rights, it substituted equity as participation'. The Wran Committee (1988 p. 79) claimed, an income contingent charge would create greater 'access and equity' as 'contributions from direct beneficiaries will alleviate current inequities, finance growth and enhance greater access to education'.

Marginson (1997a pp. 230-231) argued that the Wran Committee did not solve the conflict between 'universalism and redistribution' with the development of HECS embracing neither objective. Marginson suggested that the proponents of fees were not concerned with either establishing a system of redistribution or a universal system, based on shared citizenship, egalitarianism and social solidarity but rather, protecting the bourgeoisie's value of private investment in higher education from 'scholastic competition from poorer families'.

Marginson further argued that supporters' claims of free education as regressive and inequitable were 'ahistoric'.

> The claim there had been little or no improvement in the social composition of higher education was never comprehensively tested - there was no ongoing longitudinal

[6] Schreuder was President of the Australian Vice Chancellor's Committee (AVCC) from 2000-2003.

> study of the social composition of the student body conducted by either Government or academic researchers - and the available evidence appeared to contradict it (Marginson: 1997a p. 229).

Aungles et al. (2002) emphasised that most important to the successful implementation of HECS was Australia's position in the business cycle. Australia being in a major recession meant higher education was an appealing alternative. Nevertheless, higher education had become a subsidised market and the individual an investor in human capital.

1.5 Alternative approaches to the income contingent charge

Income contingent charges were considered superior to its alternatives by the Wran Committee and according to Chapman (2001 p. 2) were later adopted in the UK and New Zealand and recommended by the World Bank. The first of two main approaches considered inferior to the income contingent system, was a system of 'up-front fees and no Government assistance'. This system was disregarded on the premise that students would be required to have immediate resources which for several students would create the need for borrowed funds. The likelihood of a student gaining a loan for higher education costs would be minimal, as human capital would not be sufficient collateral, and students may not necessarily be in a position to re-mortgage a house or their parents' house.

Furthermore, considerable political attention would surround a system that replaced free education with a system of up-front fees and no Government assistance. It would be considered no less regressive and unfair. According to Chapman (2001 p. 4), this policy option would create 'a loss of opportunity to individuals, and a cementing of the nexus between family background and a person's lifetime income'.

The other alternative, 'up-front fees with Government-assisted bank loans', may also have provided little assistance to students, as students would be required to pay interest and be means-tested for the loan. Even if allowances were made for students who would not

normally have passed the means test, the possibility of students defaulting the loans would still exist and as a result potential poor credit histories and debt. This system was also rejected as the possibility that students could default a loan would be costly for both the Government and taxpayers. Chapman (2001 p. 5) argues that an income contingent system avoids the problems associated with the above two alternatives, firstly, by featuring an 'efficient collection mechanism' and secondly, through deferred income repayments.

1.6 The 2005 changes to Australia's higher education system

The Australian Government announced their intention to continue the partial-deregulation of Australia's higher education system in *Our Universities: Backing Australia's Future Package*, which was outlined in the 2003-04 Budget. This higher education package is arguably the most controversial development in Australia's higher education system's history. According to the Senate Standing Committee (2003), these reforms are universally agreed to represent the biggest change in higher education since the abolition of free education in 1987.

The higher education package was the product of the Government's *Higher Education Review 2002*, which displayed a 'broad consensus that the current arrangements for funding universities were not sustainable' (DEST, 2004b p. 3). The 2005 higher education changes were based on the premise that the gradual movement towards a user pays higher education system through the establishment of institutional price autonomy would promote a more sustainable, diverse and equitable system necessary to deliver a world class education.

The Senate Standing Committee (2003 Ch. 1) received an unprecedented 486 submissions with few in support of *Our Universities: Backing Australia's Future Package*. Not only were there a greater number of submissions than both the 364 submissions the Senate received for the *Senate Inquiry into Higher Education 2001* and the 373 submissions the Government

received for the *Higher Education Review 2002,* but a majority of submissions opposed the new reforms set out by the Government. The Senate Standing Committee (2003 p. 2) states 'very few indeed were steadfast in their support for the *Backing Australia's Future Package* in all aspects'. In response to the public's reaction the Senate Standing Committee released a report *'Hacking Australia's Future' Threats to Institutional Autonomy, Academic Freedom and Student Choice in Australian Higher Education*. The Senate Standing Committee (2003 p. ix) states:

> These bills will initiate a regime which will shift costs to students. It will stifle student choice and impose a heavy burden on families. These bills will deepen inequities in society, and undermine economic and social prosperity.

Following several of the Senate Standing Committee's recommendations the legislative structure of the bill was amended. The *Higher Education Support Act 2003* (HESA) was passed by Parliament on the 5th December 2003 to be implemented from 2005. However, HESA would still result in a reduction of Government funding to universities and the shift in the cost of education to students. The most radical changes involved the establishment of the Higher Education Loan Programme (HELP), which included both the establishment of HECS-HELP and FEE-HELP and the introduction of price flexibility. The changes in both the levels and nature of Government funding and changes to the Higher Education Equity Program and Commonwealth Learning Scholarships program were also implemented.

1.6.1 Higher Education Loan Programme

One of the most important initiatives under the 2003 legislation was the establishment of the Higher Education Loan Programme (HELP). HELP consists of a modified version of the Higher Education Contribution Scheme (HECS) known as HECS-HELP and the extension of Australia's income contingent scheme to include FEE-HELP. According to Beer and Chapman (2004 p. 1) the Higher Education Loan Programme (HELP) has not only introduced changes to HECS but has also changed the nature of the income-contingent scheme to include FEE-HELP.

1.6.1.1 HECS-HELP

The key changes to HECS-HELP included the establishment of Student Learning Entitlements, the introduction of institutional price autonomy and changes to the level of repayment rates and income thresholds.

1.6.1.1.1 Student Learning Entitlements (SLE)

Changes to the Higher Education Contribution Scheme (HECS) included changes to both student eligibility and student access to Commonwealth Supported Places (CSP). Under the new arrangement, the establishment of Student Learning Entitlements (SLE) has limited student access to CSP to a total of seven years equivalent full-time study. According to DEST (2005c) the new arrangements of student financing will encourage greater access and lifelong learning and according to the Minister, Nelson (2005b p. 1), it will equip Australians to 'create the kind of future they want'. However, by limiting student access to seven years, Jodie Jansen, President of the National Union of Students (NUS) (2004 p. 1) considers:

> Limited learning entitlements are an assault on life-long learning. This era of rapid technological and globalisation-driven economic change means that life-long learning is needed more than ever. The AVCC has predicted that the average working life in the 21st century will consist of six or seven different careers, each requiring new skills, attitudes and values.

Under HESA 2003, there is no immediate replenishment of SLE rather guidelines for accruing additional and lifelong SLE. Additional SLE are granted only in the following circumstances: if a course is longer than a six year full-time undergraduate degree; an honours degree; a graduate entry bachelor degree; or a postgraduate degree. The conditions for life-long SLE are, if the student is 20 years or older as of January 1 2005, they will accrue one year of Equivalent Full-Time Study Load (EFTSL) each year from 2012. If the individual is less than 20 years of age on January 1 2005, the individual will accrue 0.25 EFTSL each year from the age of 27.

In addition to the restricted student access to Commonwealth Supported Places with the establishment of SLE under HECS-HELP, there are conditions placed on the eligibility for a HECS-HELP loan. Even though Australian citizens, New Zealand citizens and persons with Australian permanent visas can obtain SLE, only Australian citizens and persons with humanitarian visas have a choice for paying their student contribution, including the option of deferring their student contribution in the form of a HECS-HELP loan. New Zealand citizens and persons with Australian permanent visas have only the option to pay their student contribution 'full' up-front.

Further changes to the old Higher Education Contribution Scheme (HECS) included the payment discount. Previously students who paid their contribution in 'full' up-front received a 25 percent discount. Under HECS-HELP this has been reduced to 20 percent. The discount for voluntary student repayments has also been lowered under HECS-HELP from 15 percent to 10 percent.

With the exception of Student Learning Entitlements, the most disputed change to the Higher Education Contribution Scheme was the introduction of institutional pricing. From 2005, universities were able to set fees up to a ceiling price of 25 percent above previous HECS rates with the exception of the national priorities (nursing and education) (Table 1.4). In order to encourage competition between institutions the Government also set no minimum level of student contribution.

Table 1.4 The level of student contribution before and after the 2005 changes

Student contribution band	Student contribution pre-2005 students (indexed to 2005)	Student contribution range post-2005 students
Band three (Law, Dentistry, Medicine, Veterinary Science)	$6414	$0 – $8018
Band two (Accounting, Administration, Economics, Commerce, Mathematics, Statistics, Computing, Built Environment, Health, Engineering, Science, Surveying, Agriculture)	$5479	$0 – $6849
Band one (Humanities, Behavioural Science,	$3847	$0 – $4808

Social Studies, Foreign Languages, Visual and Performing Arts)		
National priorities (Education, Nursing)	$3847	$0 – $3847

Source: Modified from DEST 2005b

1.6.1.1.2 The introduction of institutional price autonomy

Price flexibility was introduced by the Government as the main mechanism by which universities could access greater revenue. This has resulted in Government indexation being substituted by an expansion of private contributions from students towards the cost of higher education, consequently increasing the financial burden on students and their families. Beer and Chapman (2004 p. 14) state 'the Government will be transferring the problem associated with indexation shortfalls away from taxpayers to students'.

The Government justified the introduction of price flexibility on the basis that the movement towards a free market would promote greater efficiency, improved resource allocation and quality learning outcomes. According to Nelson (2005b) a 'one-size fits all' funding model constrains teaching excellence, diversity and student choice. Nelson's (2002a) principles for establishing a sustainable higher education system are that higher education providers should be flexible, learning-centred, cost effective and publicly accountable.

The 25 percent increase in HECS was recommended by Chapman (2001 pp. 6-10) to create institutional price autonomy. Chapman (2001) and Norton[7] (2003a) argue that institutional price autonomy would provide more choice for both institutions and students and has the possibility of improving service delivery. Beer and Chapman (2004) suggest Australian universities supply services for a large and diversified market whereby resource allocation will improve, if universities are able to charge prices that reflect their circumstances and goals. Beer and Chapman (2004) further argue that the benefits of price competition together with the implementation of price caps would ensure that equity and student participation from low socio-economic backgrounds are maintained as opposed to an unfettered free market.

[7] Norton was the advisor to the former education minister, Dr Kemp.

However, unlike Beer and Chapman (2004), Norton (2003a) does not support the Government's move to establish price caps and disallow unlimited price discretion. According to Norton, price caps reduce the competition on price, as they narrow the range of price differences. Norton supports this argument by suggesting that the removal of maximum prices for overseas students would lead to greater price differences between universities and stronger incentives to expand markets. Norton (2003a p. 1) states Nelson's reforms follow Kemp's previous attempt at reforming Australia's higher education system except 'the fully price-deregulated model David Kemp took to cabinet in 1999 is too easy to portray as a threat to access. Price caps are a policy liability but a political necessity'.

Jansen (2004) argues that the Government's main reason for the establishment of price flexibility with price caps, together with the introduction of Student Learning Entitlements, is ideologically based. It is the starting point to the process of developing a free market for higher education and eventually shifting the full cost of university education to the students. Despite this, Nelson (2003a) suggests institutional pricing will promote a more flexible higher education system and empower students by providing them greater choice in deciding which institution and which course will offer them the best value for money.

On the contrary, Kemmis et al. (2003) suggest that the higher education reforms are founded on competitive mechanisms based on the efficacy of markets and the provision of normal goods and services. It does not consider education as a public good but rather a private good based on one's purchasing power. Kemmis et al. (2003) argue that higher education is a 'positional good' based on class, status and occupation-based power and therefore cannot operate on classical market principles. They suggest (2003 p. 1) 'Federal Government reform efforts to introduce market mechanisms and competition have produced convergence and isomorphism'. Instead of recent higher education reforms protecting the diversity of Australia's institutions, treating universities as the same encourages conformity. According to Kemmis et al. (2003), universities are systematically and programmatically diverse, that are not only different in regards to the types of universities, but different in the kinds of programs for teaching and research employed.

Instead of encouraging innovation and diversity further deregulation of Australia's higher education system encourages all universities to aim for one goal, to maximise resources. Maximising resources in this case means lowering costs and increasing revenue. In turn, the issue of the availability and quality of the educational output is not a prime consideration. The movement of Australia's higher education system towards a user pays system coincides with the market for higher education challenging the role of universities as centres of learning or as profit maximising business enterprises. Australia's future higher education system, embracing institutional price autonomy, hinders both student choice and university independence, with universities in the future dependent upon the Government and market for higher education funding. In this increasingly revenue driven environment, most universities have moved to maximising operating revenue by opting to increase fees by 25 percent. In the case of some universities such as Sydney University, they preferred to offer those courses where fees could be raised by the 25 percent. Pollard and O'Malley (2004) argue that Sydney University closed the undergraduate program of Nursing in 2005, due to the high costs involved in running the course and because it was one of the two courses prevented from any increase in fees. This challenges Chapman's (2001), Nelson's (2003a), and Norton's (2003a) justification for institutional price autonomy of greater choice and improved service delivery.

1.6.1.1.3 The 2005 changes to the level of repayment rates and income threshold under HECS

Even though the introduction of Student Learning Entitlements and price flexibility are key changes under new legislation, Beer and Chapman (2004) suggest equally important features are the changes to repayment rates and the income thresholds. Beer and Chapman argue these changes differ from Student Learning Entitlements and price flexibility as they will show the impact of the 2003 policy reforms on a graduate's financial position. One of the major amendments to the *Higher Education Support Bill 2003* included raising the income threshold for 2005 to $35,000 from $30,000. Despite Nelson's (2003b) initial objection to increasing the income threshold to $35,000 arguing this would mean a loss of repayments totaling of $100 million each year, Nelson responded to the recommendations of the overwhelming majority of higher education stakeholders, including, the AVCC (2003a), the Go8 (2003), NTEU (2003c)

and NUS (2003) that the income threshold should be in line with the average graduate starting salary.

Nelson (2004b p. 3) states that the income threshold of $35,000 for 2005 and $36,185 for 2006 will 'significantly improve the financial position of many graduates with low incomes'. Beer and Chapman (2004) suggest that the higher income threshold will save students in 2005 between $750 and $1400 each year.

This increase in the income threshold, however, will only benefit students or graduates working casual or part-time or with an income less then the average graduate starting salary. The 2005 and 2006 changes to the rates of repayments will mean graduates earning an income between the income threshold and $52,658 for 2005 and the income threshold and $54,440 for 2006 will have lower repayments but graduates earning an income higher than $52,658 for 2005 or $54,440 for 2006 will pay significantly higher repayments. Before the 2005 changes, the maximum repayment rate was six percent (refer to Table 1.5). This has increased to eight percent (refer to Table 1.6).

Table 1.5 Repayment rates and income threshold for 2003-04

HECS Repayment Income (HRI[8])	Repayment rate
Below $25,348	Nil
$25,348–$26,731	3% of HRI
$26,732–$28,805	3.5% of HRI
$28,806–$33,414	4% of HRI
$33,415–$40,328	4.5% of HRI
$40,329–$42,447	5% of HRI
$42,448–$45,628	5.5% of HRI
$45,629 and above	6% of HRI

Source: Modified from Australian Taxation Office (ATO) 2005

Table 1.6 Repayment rates and income threshold for 2004-05 and 2005-06

Repayment rate	HECS Repayment Income (HRI*) 2004-05	HELP Repayment Income (HRI*) 2005-06
Nil	Below $35,001	Below $36,185

[8] HRI equals taxable income plus any net rental losses, total reportable fringe benefits amounts, except for 2005-2006 this also includes the exemption of foreign employment income.

4% of HRI	$35,001–$38,987	$36,185–$40,306
4.5% of HRI	$38,988–$42,972	$40,307–$44,427
5% of HRI	$42,973–$45,232	$44,428–$46,762
5.5% of HRI	$45,233–$48,621	$46,763–$50,266
6% of HRI	$48,622–$52,657	$50,267–$54,439
6.5% of HRI	$52,658–$55,429	$54,440–$57,304
7% of HRI	$55,430–$60,971	$57,305–$63,062
7.5% of HRI	$60,972–$64,999	$63,063–$67,199
8%	$65,000 and above	$67,200 and above

Source: Modified from Australian Taxation Office (ATO) 2005

These slower repayment rates introduced by the Government are supported by both Beer and Chapman (2004) and Gittins (2005). They suggest a greater financial advantage accrues with the longer it takes for a graduate to repay their HECS debt. They argue that given HECS is an income contingent loans scheme with no interest rates attached, students are better off the longer it takes them to pay back their debt, as the true cost of study reduces over time.

A limitation of this argument is that the HECS debt is indexed to the Consumer Price Index (CPI). According to Australia's Taxation Office (ATO) (2005) indexation is applied to the portion of the student's outstanding debt which has remained unpaid for 12 months or more. This means that if the CPI is at 2.4 percent as of June 1st 2005, then an additional 2.4 percent is added to the student's total debt as of June 1st 2004. This means that students' debts will increase, even if no interest rates are attached, due to the CPI. This suggests students may not necessarily be better off the longer it takes them to pay back their debts as the debt retains its 'real' value. The student would benefit in delaying their payment, if the inflation rate was below the market interest rate that they could earn with that money. (The issue here of discounting is discussed further in Chapter Three).

Although many graduates will benefit from both the increase in the incomes threshold and reduction in repayment rates, Bookallil (2004) suggests two reasons why this will not necessarily encourage students to study at university. Bookallil (2004) firstly argues HECS repayments that are based simply on the level of HECS liability and level of student income are unfair. Repayments should also consider the financial obligations of the graduate. Bookallil (2004) uses the example of a mature age graduate with children and a younger

graduate with no children earning the same graduate income who have the same level of debt. Despite the mature age graduate having more financial obligations, they both have the same level of repayments. Bookallil (2004) suggests these financial obligations will deter mature age students from going to university, rather than the lower repayment rates attracting them. This challenges the Government's objective of reforming higher education to encourage life long learning.

Bookallil (2004) also suggests that for many students their concern is not with the level of the repayments but rather the size of the debt. Bookallil (2004) suggests several students are debt-averse particularly from low income areas, discouraging them to enrol in university. This is supported by Halpin (2004 p. 23) who states a survey of secondary school students in the United Kingdom revealed that male school students had shown a 'sharp loss of interest' in university since the Government's announcement to increase fees to £3000 (pounds) or $7700 Australian dollars in 2006. Halpin suggests the percentage of male students who expressed that they were likely to go to university had dropped from 70 percent to 66 percent and 20 percent of the students who said they would not go to university cited worries of student debt. For students who had both parents unemployed this rose to 30 percent.

Karvelas (2004 p. 3) reported that a James Cook University survey of year 10 to 12 students, parents and teachers in 15 regional areas in Australia, commissioned by the Howard Government, also revealed students were worried about both an accumulating HECS debt and living away from home expenses. However, Minister Nelson's response to this report's findings was:

> The report's findings showed some students did not understand HECS was an interest-free loan which is only repayable through the tax system when they are earning more than $36,000 a year (Karvelas, 2004 p. 3)

Bookallil (2004 p. 5) states:

> Whether the HECS debt is interest free is probably irrelevant to these students. It is the bottom line with debt of between $20,000 and $50,000 for the possibility of earning a figure of $36,000 that they would hear, and that does not sound appealing.

This issue will be discussed further in Chapter Two when considering the effects of changes in HECS.

1.6.1.2 FEE-HELP

Another fundamental change to the funding of Australia's higher education system and an important initiative of the Higher Education Loan Programme (HELP) was the extension of the income contingent loans scheme to include FEE-HELP. In 1998 the option of full fees for Domestic Undergraduate Full Fee Paying Students (DUFFS) was introduced, on the basis that Australian undergraduate students should be granted the same rights as international students. Vanstone (1996) suggested DUFFS would address the anomaly of universities being allowed to offer fee paying places to international students but being prohibited from offering similar places to domestic students. Vanstone suggested full fee paying places would provide greater flexibility to universities, increase choice and provide greater access to university for students.

This argument that full fee paying places will improve student access to university was also a reason for introducing FEE-HELP. FEE-HELP is an income contingent loans scheme available to both undergraduate and postgraduate students studying at both public and approved private institutions paying full fees. This extension of the income contingent loans scheme to include domestic full fee paying students is supported by Phillips and Chapman (2003). They suggest that by not needing up-front financial resources, a greater number of students will take up the opportunity to study at university as opposed to the previous system. However, Nelson (2004b p. 1) appears to contradict his own policy by stating that a system where Australian students are required to pay up-front fees to study is 'unfair and works against students with reduced financial means'.

The view that the introduction of FEE-HELP will promote a more equitable higher education system is challenged on a number of grounds. The first surrounds whether domestic students should be charged full fees to study at university. Gallagher (2004) argues granting domestic students the same rights as international students by introducing full fee places (regardless of whether there is an income contingent system in place) does not mean the higher education system will be more equitable. Gallagher (2004) argues international students and Australian students are not on equal terms. International students should pay more to study in Australia, at least at cost recovery levels, as unlike Australian students there will be no benefits to society, such as a lifetime of tax after they graduate.

Gallagher (2004) also suggests the core features of FEE-HELP have created uncertainty as to whether it will provide greater access and choice for students. One of the core features of FEE-HELP is the capping of loans at $50,000. Eligible students will be able to access a Government loan for a fee paying position up to the limit of $50,000. Not only will FEE-HELP loans be indexed to the Consumer Price Index (CPI) but a loan fee of 20 percent also applies. According to DEST (2004c), the $50,000 limit does not include the loan fee but is the maximum amount a student can borrow over their lifetime. Nelson (2004b) suggests the FEE-HELP system will create equity to access given the nature of an income contingent loans scheme. Gallagher (2004), however, argues that the implementation of a loans cap limits the effects an income contingent loans system will have in promoting equity to access. Norton (2003b p.5) states that the Government has placed a limit on the amount students can borrow as 'taxpayers should not endlessly sustain students enrolling in successive degrees' but admits the loans cap is a 'barrier' to education given so many courses cost more then $50,000. Hastings[9] (2004) suggests that the loans cap is self-defeating and problematic, as students will need to find commercial loans to make up for the shortfall. Chapman and Ryan (2003) argue that students will have to pay up-front fees to complete their higher education, as students are unlikely to gain commercial loans with no collateral.

Chapman considers that FEE-HELP is 'regressive':

[9] Hastings is a researcher for the National Union of students.

> The cap will guarantee some people will be forced to pay up-front fees and up-front fees are the worst thing you can do for tertiary education. HECS has been motivated by the goal of not having barriers to entry of study and this changes all of that (as quoted in Knight 2004 p. 3).

According to Doherty (2005 p.1), there are more than 50 undergraduate degrees that cost at least $100,000, while medicine at the University of Melbourne costs $210,000. Gallagher (2004 p. 9) suggests that this shows inequitable outcomes:

> Why else would the Government sanction $210,000 fees at Melbourne University when it caps FEE-HELP loans at $50,000? How many families can make up the $160,000 shortfall?

On ABC radio Nelson stated that it 'didn't surprise him' that the University of Melbourne were charging these fees (Eastley, 2004 p. 1). Nelson justified these fees, even though the FEE-HELP loan limit is $50,000, by stating 'no one is being forced to pay full fees' and that it is only a small minority of Australian students who will be affected by these fee charges (Eastley, 2004 p. 2). However with the exception of medicine, the maximum number of fee-paying domestic students that are permitted in each cohort has been increased under FEE-HELP from 25 percent to 35 percent. According to Hastings (2004), this reinforces the idea that the Government is pushing more students into fee paying positions, especially when the Government's initial recommendation before the amendments to the *Higher Education Support Act 2003* was to have the maximum number of fee-paying students at 50 percent of the cohort. These two features of FEE-HELP: the loans cap; together with allowing universities to enrol an even greater percentage of full fee paying students, challenges Nelson's (2004b) motive of encouraging lifelong learning and providing a system that does not work against students with reduced financial means.

Rood (2005) also challenges Nelson's claims that students are not forced to pay full fees and only the minority of students are affected by full fee prices by showing that in several courses more then 35 percent of students are paying full fees. Rood (2005 p. 1) states 51.2 percent of

students who are enrolled in law, 48.3 percent of students who are enrolled in optometry, and 37.2 percent who are enrolled in dentistry for 2005 at the University of Melbourne are paying full fees. This questions the Government's underlying reason for introducing FEE-HELP, that being, improving equity to access and providing more choice for students and supports Kniest (2005 p. 22) claims that the Government has placed tighter restrictions on over enrolments to encourage more students to take up full fee places. Macklin states:

> People who can pay $96,000 to study law at Melbourne University, now have more than twice the chance of getting in as those who don't have the money to pay full fees (as quoted in Rood, 2005 p. 1).

According to Marginson (2005a) of all the changes to Australia's higher education system FEE-HELP is the most important as it shows the movement of Australia's higher education system towards a user pays system. Marginson (2005a pp. 4-5) considers that the Government:

> only needs to lift the limits on maximum HECS, the limits on FEE-HELP places, the limits on FEE-HELP debt and the surcharge on full fee places, and reconfigure the current publicly subsidised HECS places as merit scholarships. Presto! A unified full fee student market.

Marshman, senior vice-principal at the University of Melbourne, suggests the reasons for the 38 percent jump in domestic fee-paying commencing students at the University of Melbourne, are the minimum entry scores for fee places and the option for students in combined degrees to split their enrolment between HECS and fee places with the guaranteed transfer from fee places to Government funded places for students with marks above 75 percent (Rood, 2005 p. 1). This raises the question of equity where entry is based on the ability to pay rather than the academic ability of the student.

Nelson (2003a p. 2) uses the following example to suggest that it is 'unfair', if a student misses out on a position at university through failing to achieve the university entrance score and therefore should have the option of a FEE-HELP place.

> A young woman at Frankston High School may have her heart set on studying law at Melbourne University. She works extremely hard and receives a VCE [Victorian Certificate of Education] score of 99.3. The kid in front of her at school gets 99.4 and gets a HECS place. Is she dumb? No. Is she rich? No.

However, Nelson's justification of a FEE-place resembles a different definition of equity that of the number of students attending university and not equity based on student merit irrespective of the student's socio-economic background.

The National Union of Students (NUS) (2002 p. 31) found only 11 percent of students from Government schools in Victoria had an Equivalent National Tertiary Education Rank (ENTER) of 90 or more, whereas 51 percent of private school students achieved this score or above. This is supported by Yaman (2005a p.3) who states 'year 12 students in private schools score higher marks than their counterparts in the public system'. According to Preston (2003 p. 10) 76 percent of students with a family income of less than $800 attend public schools in Australia, while only 24 percent attend non-Governmental schools. These figures would suggest that given the majority of low income students attend public schools, fewer students from low socio-economic backgrounds would receive a HECS-HELP place. Despite this unequal access to university, according to Nelson (2003a) low income students who do not achieve the entry score required for a HECS-HELP place would gain a FEE-HELP place. This may not be the case, as not all students can afford the difference between the loans cap and the fees universities charge. This constraint on FEE-HELP not only encourages elitism but supports Chapman's claims that FEE-HELP is 'regressive' and shows a correlation forming between the stratification of schools and the opportunity to study at university in a Government Supported Place (Knight 2004 p. 3).

Yaman (2005a) suggests this regressive policy is unfair as statistics show students from public schools when studying at university, on an even playing field as their counterparts from private schools, do better despite having lower entrance scores. According to Denniss (2004 p. 3) these changes to both the nature and extent of the income contingent system 'allow full fee paying students into university ahead of their better performing peers'. Denniss concludes

parents are now better off diverting money that they would have used for private schooling towards a full fee place for their children.

The equity issue surrounding a student's opportunity to go to university based on their ability to pay, not merit, introduces the issue of quality of education. Professor Tennant from the University of Sydney (2003 p. 2) suggests the privatisation of the Group of Eight (Go8) universities will be hard to resist and impossible to reverse once they become dependent on the increasing private income from FEE-HELP students. Tennant states (2003 p. 3) the Go8 'Vice Chancellors appear to support these funding proposals because they believe that this extra income will allow their universities to be truly world class'. He further argues that it is possible that the opposite outcome will result from a higher proportion of FEE-HELP places, as the admission of students with considerably lower UAI scores in challenging and high demanding courses will only reduce quality and student standards. Professor Tennant states (2003 p. 3) the Go8 'may thus be caught in an even tightening trap of increasing private fee income and diminishing Government funding, combined with declining undergraduate standards.'

These issues of equity and student standards are further questioned by the amendments to sections 36-15 and 36-35 of the *Higher Education Act 2003*. Section 36-15 grants the Minister the power to determine which courses do not receive Government subsidisation and along with universities declares which courses can be 100 percent full fee paying. Section 36-35 allows the Minister to lift the maximum number of fee-paying students in medicine from 10 to 50 percent.

Nevertheless, Nelson (2004b p. 1) considers FEE-HELP 'will help reduce the level of unmet demand for higher education places and enable students to access their preferred course or provider', including private institutions that may be classified as higher education providers (HEP) in the future. Kniest (2005 p. 22) states 24,000 fewer students commenced university in 2004 than 2000, contradicting any findings to support the Government's reason for reducing unmet demand. Norton (2004), however, supports the extension of FEE-HELP to students at private institutions, on grounds of discrimination. He also believes that students at private

institutions should have access to Government loans on the same basis as students at universities. Likewise, the Council Of Private Higher Education COPHE (2003) suggests all higher education students should be treated the same and that the dichotomy between universities and private institutions is artificial but admits the $50,000 loans cap would not cover several course costs for students.

The extension of FEE-HELP to approved private institutions coincides with another controversial change, the modification to the term 'university' to include private institutions. Modifying the term university involves changing the MCEETYA (Ministerial Committee on Education, Employment, Training and Youth Affairs) protocols so that universities are no longer required to be research institutions but may be simply specialist teaching institutions. If universities can be specialist teaching universities, then private institutions will become universities. Nelson (2005a p. 12) states 'while Government funding policies have traditionally directed public funding to the public sector, private providers have shared in the growth in the international and domestic student market'. Norton (2004) suggests the current MCEETYA protocols restrict competition and funding for private institutions. Norton argues under the current protocols establishing a university is costly, whereby research does not generate enough money to cover the costs of establishment. Secondly, financial incentives in universities favour research over teaching, therefore in most universities teaching is a second priority to research. A caveat of Norton's criticisms is the value of research spillover to the economy. The value of research spillover will be discussed in Chapter Three when assessing the Social Rate of Return on higher education.

Conversely, Marginson (2005c p. 11) states 'research universities have a more advanced capacity in teaching and offer more to professions, industry, foreign universities and bright overseas students'. Yet in 2004, according to Shanghai JiaoTong University, Australia had only 14 universities in the world's top 500 and only two universities in the top 100 (Feng, 2004). Nelson (2004b) argues Australia needs to become internationally competitive and Australia needs to be flexible to international and domestic demands. If research is the driver of a university's status and mission and creates better teaching, then encouraging teaching specialist universities will not deliver better international results necessary to meet

international and domestic needs. Rood (2005a and 2005b) supports Marginson (2005c) suggesting a large number of teaching universities could harm international status and suggests international students are worth an estimated $6 billion dollars to universities. The NTEU (2004 p. 4) suggests changing the MCEETYA protocols will not encourage diversity, rather they will reduce diversity as institutions compete for funding and student enrolments.

1.6.2 Changes in both the level and nature of Government funding

In order to create a sound policy with pragmatism, Nelson (2004b) suggests changes to both the nature and extent of Government funding is also necessary in addition to the establishment of the Higher Education Loan Programme (HELP).

1.6.2.1 Allocation of Commonwealth Supported Places (CSP) to universities

Under the 2005 reforms the Government has assigned $2.6 billion of public funding over the next five years and $11 billion over the next decade to higher education, with $838 million over the next five years for the Commonwealth Grants Scheme. Nelson (2004b) suggests that the Commonwealth Grants Scheme will provide an extra 34,000 Commonwealth Supported Places with 9100 fully funded places commencing in 2005 and 24,883 by 2008 to replace marginally funded places (see Table 1.7).

Table 1.7 The conversion of marginally funded places to Commonwealth Supported Places for each state and territory for 2005 and 2008

Year	NSW/ACT	VIC	QLD	WA	SA	TAS	NT	AUST
2005	3292	859	2303	1541	538	367	200	9100
2008	9002	2349	6297	4214	1471	1003	547	24,883

Source: Modified from DEST 2005d

From 2005, the methodology for the allocation of higher education places involves a formula driven model, consisting of four steps. The first step of the model involves projecting higher education participation rates, which according to the Government equals 6000 places for the nation for 2005 and 16,406 places by 2008. DEST (2005d p. 1) state this is calculated by dividing the number of fully funded places for 17-25 year olds in 2002 by the projected population in this age group in 2008. The second step allocates 2900 places to states and territories for 2005 in accordance to their share of the 26-65 year population, with the third step allocating 200 places to Tasmania for regional development. The fourth step ensures no state or territory has in excess of 3300 EFTSU or below 200 EFTSU for 2005 and between 547 EFTSU and 9023 EFTSU by 2008. Stage two is a consultation, negotiation, and competitive bidding process that allocates the places set out for each state and territory to each institution.

Hastings (2004) argues that there is only a small net gain in Commonwealth Supported Places for universities with the Government's decision to penalise over-enrolments and replace marginally funded places with fully funded places. The 24,883 places provided by the Government phased in from 2005 to 2008 are to replace 32,232 marginally funded places recorded in 2002. According to Hastings, this is a net gain of 1775 EFTSU or 0.47 percent growth in subsidised places.

Despoja (2004b p. 1) states:

> Providing less than 25,000 places nationally over four years to replace the removal of 35,000 marginally funded places, and the introduction of fines for exceeding the 5% over-enrolment limit, will result in less university places at a time of growing demand.

The Students Association of the University of Adelaide (SAUA) (2003) suggests that the conversion of marginally funded places is a strategy aimed at decreasing the number of university places subsidised by the Government. This is despite McWha of the University of Adelaide (2003 p. 2) stating:

> The University of Adelaide welcomes the conversion of marginally funded higher education places to fully funded higher education places; this is long overdue and will go some way to correcting the imbalance in funding of higher education that has developed in recent years.

Even though Hastings (2004) argues that there is a small net gain in university places, this is for the higher education system as a whole. The methodology for allocating higher education places involving both negotiation and a formula driven model means for some universities a loss in Commonwealth Supported Places with a mismatch between marginally funded and fully funded places. The Democrats (2004b) suggest that the allocation of 1471 places to South Australia by 2008 is well short of the number of places required, as 2800 eligible students missed out on a position at university in 2004 alone. Boumelha (2004) suggests the University of Adelaide is disappointed with the allocation of places to South Australia for 2005. Boumelha (2004 p. 1) states:

> The Minister claims that the new places have been allocated on the basis of "fairness". We do not believe that places have been distributed fairly and equitably, or that the allocation truly represents the situation in this state.

The unequal distribution of Commonwealth Supported Places is highlighted by Phillips et al. (2003 p. 2):

> There will be an increase in 'fully funded' places of between 8.3 and 12 percent in each State and Territory between 2002 and 2008. When the phase out of over-enrolment is taken into account, the change in total Commonwealth subsidised places varies from a reduction of 2.4 percent in New South Wales between 2002 and 2008 to an increase of 8 percent in Tasmania. The ratio of subsidised places (including over-enrolment) to the 15+ population fall in States and Territories other than Tasmania and the ACT.

1.6.2.1.1 Commonwealth Supported Places (CSP) for the national priorities teaching and learning

Of the 34,000 places offered by 2008, 6,700 are for population growth, 1,170 places are for medicine, 745 places are for the national priorities of teaching and nursing, with an additional 574 places for nursing in regional areas. Phillips et al. (2003) suggest there will be a marginal increase in the number of teacher education places but the high level of unmet demand remains relatively unchanged with no strategies in place for addressing shortfalls in particular teaching specialisations. They also suggest there is a marginal increase in the number of nursing graduates up to 2010 but (2003 p. 3) state 'there is only a partial reversal of the long term decline in nursing graduates'. A contributing factor to the shortage of both teachers and nurses is the insufficient number of university places. The AVCC (2003d) estimates in 2003 that 4861 eligible applicants did not receive a place in nursing or 36.8 percent of total eligible applicants and 9610 eligible applicants or 40.9 percent of total eligible applicants did not receive a place in education The AVCC (2003d), therefore, suggests that the number of places the Government has provided for both teaching and nursing is not sufficient to reduce unmet demand, with Nelson (2003c p. 1) stating 'unmet demand, particular in nursing and teaching, is just one manifestation of a sector in need of significant reform'.

The Australian Health Workforce Advisory Committee (AHWAC) (2004) estimates between 10,182 and 12,270 new graduate nurses are required to enter the workforce by 2006, and up to 13,483 from 2006 to 2010. This would suggest the Government's allocation of extra places for nursing is only a small fraction of the real number of places required to effectively reduce the shortage. According to Burton, these places are like a 'drop in the ocean', firstly in comparison with the shortage of nurses and secondly compared to the demand by students (Illing, 2005c p. 33). Illing (2005c) reports that in 2005 there were 800 applicants for 160 nursing places at the University of Queensland and Maiden (2005a p. 7) states 'at La Trobe University in Victoria, about 2000 students applied for 100 nursing places, with 600 qualified students turned away despite securing a cut-off score above 70'. Maiden also reports that for the 100 distance education nursing positions at Charles Sturt University there were 500 applications.

Despite the shortage of both teachers and nurses and the level of unmet student demand for places in these university courses, the Government did not fund any more places under the 2005-06 Commonwealth Government Budget except for 100 new undergraduate places in radiation therapy and 40 new aged care nursing places. Under the 2005-06 Commonwealth Government Budget (Australia Government, 2005), the main Government investments included $1.1 million allocated over five years for medical places and $14 million over four years for veterinary science and tropical agriculture positions at James Cook University. In addition, the Government allocated $16.5 million over three years to the Institute of Advanced Studies (IAS) at the Australian National University and $8 million to University of Western Sydney for infrastructure projects.

1.6.2.2 Changes to higher education funding under the Commonwealth Grant Scheme

Nelson (2004b) argues that the changes to the new higher education funding model, the Commonwealth Grant Scheme (CGS) based on funding clusters together with the introduction of price flexibility, will promote a more flexible and diverse higher education system. Under the previous funding model, 'block' lump sums were based on a negotiated student load and primarily in the form of Base Operating Grants (BOG). Under the Base Operating Grants system, grants to universities were determined by the average cost of a student place at a flat rate, adjusted each year for changes in the student load and cost indexation. The value of Base Operating Grants (BOG) for a given year was calculated as the Base Operating Grants in the previous year plus any additional student load multiplied by the average funding per student. Under the Commonwealth Grant scheme (CGS), the Government will set different levels of funding according to each discipline (funding cluster). The Government's allocation of funds for each funding cluster is derived by subtracting the student's contribution towards the course costs from the total cost of the course.

Table 1.8 shows the vast differences in 2005 in the Government's contribution under the Commonwealth Grant Scheme (CGS) ranging from $1472 for Law to $15996 for Agriculture. It also displays the differences in the student burden depending on the courses and subjects that they choose.

Table 1.8 The contribution of the Commonwealth Government and students towards the cost of higher education in 2005

Funding cluster	Commonwealth Government contribution ($)	Student contribution (HECS)[10]($)	Student contribution as a percentage of course costs (%)[11]
Law	1472	8018	84
Accounting, Economics	2420	6849	74
Humanities	4078	4808	54
Mathematics, Statistics	4817	6849	59
Behavioural Science	6475	4808	43
Computing, Built Environment	7212	6849	49
Foreign Languages, Performing Arts	8869	4808	35
Engineering, Science, Surveying	12,003	6849	36
Dentistry, Medicine	15,047	8018	35
Agriculture	15,996	6849	30
Education	7116	3847	35

[10] The student contribution is the level of HECS for each course plus the 25 percent increase in HECS that universities have generally imposed.

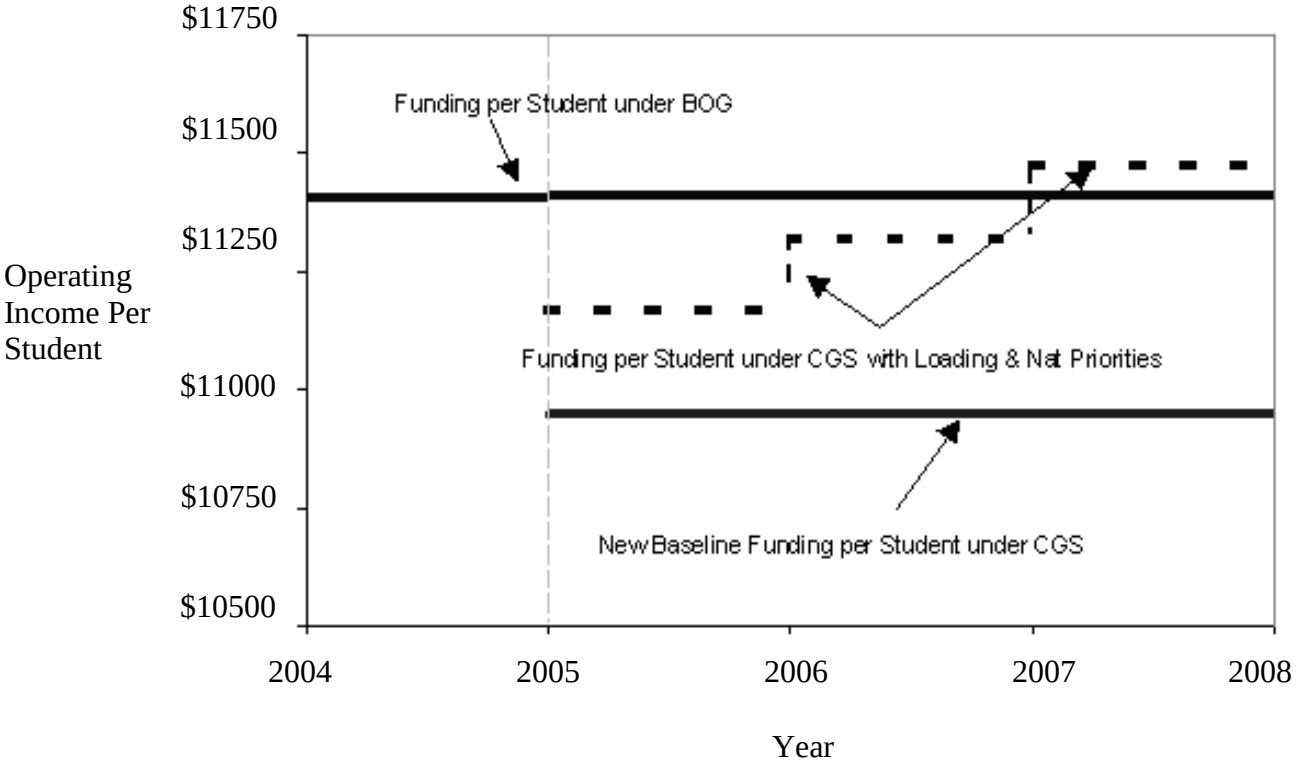
[11] Course costs are equal to the Government contribution plus the student contribution.

Nursing	9511	3847	29

Source: Modified from Commonwealth Government 2003

The Students' Association of Flinders University (SAFU) (2003) argues that if Government funding remained under the previous system, the value of total Base Operating Grants, as estimated by DEST, would be $4305 million for 2005. Referring to Figure 1.1, if this was to fund 377,260 EFTSU, then the funding under the Base Operating Grants system would equal $11,412 per EFTSU. The Students' Association of Flinders University (SAFU) (2003 p.9) state 'the weighted average funding under the CGS arrangements calculates as $10,935 per EFTSU'. This means that the Government is allocating $477 less per student under the Commonwealth Grant Scheme. This is supported by the NTEU (2003a) who argues, if there are 400,000 Commonwealth Supported Places in 2005, then there will be a reduction in funding of approximately $190 million.

Figure 1.1 Funding per EFTSU under Base Operating Grant system compared to Commonwealth Grant Scheme



Source: Modified from NTEU 2003a p. 2

The NTEU (2003a p. 2) states ‘under CGS the operating income per student does not reach the current level of funding under BOG until 2007’. The NTEU (2003a) argues of the $1465 million funding that the Government provides from 2005 to 2007, $584 million or 40 percent is through what they have saved from transferring from the Base Operating Grants system to the Commonwealth Grants System, and therefore suggest there is only an increase in funds of $813 million. The NTEU (2003a) suggests one of the main reasons for the decline in total Government funding of $584 million is the growth of student places in low cost disciplines, such as law and humanities.

This means the introduction of the CGS has not only led to a fall in Government funding per student reducing the Government’s contribution as a proportion of course costs, but also means the level of student contributions as a proportion of course costs varies depending on the discipline. The shift towards increasing the cost of university education to students was addressed by Schreuder (Senate Standing Committee 2004 p. 23) in *Hacking Australia’s Future Report:*

> Within the Commonwealth Grant Scheme, we are concerned about the shift in the burden of funding from the Commonwealth to students…We are not convinced a shift of this magnitude is justified, and while it is impossible to specify a ‘correct’ public: private funding mix, international benchmarks suggest that students in the Australian system are not under-contributing.

The issue of a ‘correct’ public: private funding mix will be considered in Chapters Four and Five of this thesis.

1.6.2.3 Government funding tied to national governance protocols and workplace relations requirements

Government funding has not only been reduced under the Commonwealth Grant Scheme (CGS) but funding, for the first time, will be based on conditions such as complying with national governance protocols and Higher Education Workplace Relations Requirements. Nelson (DEST, 2004b p. 3) states that the Government's contribution will increase from 2.5 percent to 7.5 percent per student place with the allocation of $83 million to universities between 2006 and 2008, if they offer their staff Australian Workplace Agreements (AWAs). This change does not reduce the financial burden on students or their contribution as a proportion of course costs. Figure 1.1 shows the introduction of CGS has led to a fall in Government funding per student place, and any additional funding by the Government from 2005 is the outcome of moving to Government grants based on funding per discipline and not average funding per student, leading to a reduction in additional funding of $584 million under the new scheme.

Of the $1465 million additional funding granted by the Government, $584 million or 40 percent of the additional funding is what the Government has saved from transferring to the Commonwealth Grants Scheme from the Base Operating Grants Scheme. This 40 percent saving is then re-delivered to universities based on unprecedented conditions. Nelson states these funds are 'conditional on institutions providing staff with genuine choice of industrial agreements and adherence to the national governance protocols' (DEST, 2004b p. 3). In order for a university to apply for extra funding they must have written compliance to each of the Higher Education Workplace Relations Requirements (HEWRRs). The five requirements are: choice in agreement making by offering AWAs by 31st August 2006, direct relationships with employees, workplace flexibility, productivity and performance and freedom of association. Minister Andrews (2005a) suggests Australia could be a leader in the global economy for higher education, if universities embraced a more competitive workplace. That is, encourage flexible and efficient workplace relations through establishing AWAs. Andrews (2005a) argues higher education is Australia's sixth largest export worth $6 billion annually but international success is limited with current workplace relations allowing third party influence, the third party influence being that of trade unions.

Andrews (2005 p. 3) states:

> The higher education sector remains heavily influenced by third parties, a factor which constrains a university's ability to offer flexible working arrangements, tailor wages and conditions to attract and retain high quality staff, and mould course delivery to the needs of the changing economic environment.

The introduction of AWAs is further justified by Andrews with the arguments that AWAs will ensure taxpayers' money is used both efficiently and effectively, as compared with the current higher education environment, and high achieving staff can be awarded a higher income through negotiation. The study by Horsley, Martin and Woodburne (2005), however, contradicts the claims by both Nelson (2003a) and Andrews (2005a) that Australia's current higher education system lacks flexibility and is unable to reward high achieving staff by higher incomes. They found that universities use an extensive range of incentives to both attract and recruit staff. These incentives according to Horsley, Martin and Woodburne (2005 p. 27) consist of:

> housing subsidies, research support (staff, travel, facilities, funds) flexible work programs, parental leave, outside earnings, superannuation (university super with a compulsory 18 percent employer contribution in the salary component of the package is regarded as being generous), housing loans, reduced interest, staff development and training opportunities, reduced or no teaching, packaging of benefits.

Horsley, Martin and Woodburne (2005 p. 28) suggest that on average five percent of staff within each university are paid loadings above their standard Enterprise Bargaining Agreements (EBAs) with up to 20 percent of staff in research intensive universities and the Go8 paid loadings on top of their standard EBA. Horsley, Martin and Woodburne (2005 p. 30) state the *Higher Education at the Crossroads Package 2002* argued there was 'limited progress being made toward meeting the workplace flexibility challenge' but 'one conclusion from the interview responses is that human resource practices in the higher education sector exhibit far more flexibility than predicted'.

The consequence of reforming workplace relations is university autonomy. McAlpine states HEWRRs is 'the biggest attack yet on university autonomy and employees' rights' (Trades and Labor Council of WA, 2005 p. 1). The introduction of AWAs is another step towards embracing national competition policy within the higher education sector, since Enterprise Bargaining Agreements (EBAs) were introduced in 1993 (Nelson, 2004b).

The introduction of Enterprise Bargaining Agreements in the higher education sector has resulted in the level of Government funding to decline in real terms, as no adjustments have been made to the mechanisms of indexation to coincide with the changes in salaries. The introduction of AWAs may only promote more adverse outcomes. Firstly, increasing competition in the higher education sector, including reforming workplace relations, cannot take full effect, if the supply of places is limited and university autonomy is undermined. Secondly, workers cannot be rewarded higher salaries, if indexation is not effectively adjusted to correspond to negotiated salaries in the workplace. This is discussed in more detail under indexation in Section 1.6.2.6. Besides reducing university autonomy, another fundamental reason for the NTEU's rejection of AWAs is the possible decline in salaries. Instead of rewarding staff through higher salaries, the NTEU (2005) argues that AWAs will introduce lower salaries to the higher education sector. The NTEU (2005 p. 4) suggests that under an AWA the benchmark would be the award wage set out under the *Higher Education Academic Salaries Award 2002*, which for senior lecturers is $57,000 and general teaching staff (level 6), $38,000. This is approximately $15,000 less then under current enterprise bargaining agreements. The possibility that university staff could be paid lower wages, even below the award wage, is heightened with the clause in the first HEWRR, choice in agreement making. DEST (2005e p. 2) states universities must 'include a clause that expressly allows for AWAs to operate to the exclusion of the certified agreement or prevail over the certified agreement to the extent of any inconsistency'. The importance of this clause is the overriding of the assumption that the conditions of a current enterprise agreement cannot be changed during the agreement's lifetime.

The NTEU (2005 p. 5) states:

> Under the current Act, AWAs cannot override the condition in the underlying agreement during its nominal life. Hence the effect of this requirement would be to enable AWAs to undercut agreement conditions at all times.

No person can be overall worse off under an AWA than under their pre-existing award entitlements, as outlined in the *Workplace Relations Act 1996*. This creates the situation where the minimum salary for staff, including existing staff, is the award wage set out under the *Higher Education Academic Salaries Award 2002*, not the current wages and conditions as negotiated under EBAs. This clause then challenges Nelson's (DEST, 2005e p. 2) argument of introducing AWAs as simply 'providing staff with greater choice and institutions with more flexibility'.

The introduction of HEWRRs by the Government is in spite of previous Senate rejections of linking workplace relations to Government funding under the *Higher Education Support Bill 2003*. The amendment to the *Higher Education Support Bill 2003* made it illegal to tie workplace relations with university funding, the outcome of a 24 hour strike of 40,000 university staff and pressure from both the NTEU and AVCC. The NTEU (2005) argues that for the Government to introduce these changes, they will need to amend the *Higher Education Support Bill 2003*. The NTEU (2005 p. 5) states:

> The existing Act prevents the tying of university funding to workplace relations requirements, the Government has to restrospectively change the law to give effect to the IR requirements.

It is likely that the power of unions to influence workplace relations will be reduced with employee acceptance of AWAs. This is supported by the second and fifth HEWRRs, direct relationship with employees and freedom of association. AWAs are based on workplace negotiations between the employee and employer, excluding union involvement. In addition, freedom of association states that university funding can no longer support the existence of unions. Problems surrounding bargaining power and AWAs are highlighted when Peetz (2005 p. 2) states that:

> average weekly wages for workers covered by AWAs in 2004 were $890.80. That's $110 or 11 percent less than in 2002. This compares to $787.40 for workers under collective agreements. That's $46 or 6.2 percent more than in 2002 for workers on collective agreements.

ABS (2005b) statistics show that the gender wage gap between males and females is broadening under AWAs, with women on average 6.6 percent worse off under an AWA than under an EBA. This is significant given the increasing feminisation of the higher education workforce, with females comprising 52 percent of all university employees in 2003 (ABS, 2005a). Peetz (2005 p. 1) states women under AWAs earn 11 percent less per hour then women under EBAs, worsening the gender gap in earnings between men and women. Peetz (2005 p. 1) states:

> Whereas women on registered collective agreements received 90 percent of the hourly pay of men on such agreements, women on AWAs received only 80 percent of the hourly pay of men on AWAs.

Peetz (2001) suggests evidence of high earnings under an AWA are positively skewed because of the over representation of highly paid senior public servants. Peetz (2001) argues most employees are overall worse off under individual agreements than collective agreements as the 'no disadvantage' test refers to award conditions. Peetz (2001) argues that the March 2001 quarter of the ADAM database shows employee wages increased 3.9 percent under collective agreements, 3.1 percent under non-union agreements and 2.4 percent under AWAs. In Western Australia, where individual contacts have existed since 1990, Kobelke (2005) suggests employees on individual contracts earn on average $65.10 less than employees under collective Federal certified agreements. The possible decline in both university staff's wages and power is further threatened with the third HEWRR, workplace flexibility, which allows for both downsizing of the higher education sector and greater casualisation of the workforce.

The Fourth HEWRR, productivity and performance, suggests workers pay will be productivity based. This is not only challenged by the real possibility of university staff being paid the

award wage with the introduction of AWAs but the NTEU (2005) argues the Government's intention of amending skill classifications will only reduce salaries for staff members and reduce the possibility of high achieving staff being paid higher salaries.

This argument of providing greater choice for employees and creating flexibility is also questioned by the timelines enforced by the Government. Any certified agreement that expires on or after October 1st 2006, such as at the University of New South Wales and ACU National, must have compliance with HEWRRS by 30th November 2005. This has meant universities are now pressed for time to introduce AWAs to staff. Not only are universities pressed for time but there are considerable costs involved with compliance. If the university makes a mistake, they will have their funding withdrawn. The decision will be made by the Minister with no independent review.

> If a HEP succeeds in meeting the HEWRRs in 2005 and receives the increase in CGS funding in 2006 but then cannot, for whatever reason, continue to meet the criteria as at the CGS funding date for 2006, the increase in CGS funding will not be approved for 2007. The same principle will apply with respect to later years. There will be no backdating of the additional funding.
>
> Any statement found to be false and misleading relating to the HEP's compliance with the requirements may result in the requirement to repay the CGS increase, or a reduction of future CGS funding, at the discretion of the Minister for Education, Science and Training (DEST, 2005e p. 2).

Therefore, the NTEU (2005) considers that the reforming of workplace relations are to strengthen Government control and reduce both workers rights and power within the higher education sector, rather then create flexibility and efficiency in the workplace or reward high achieving workers. One questions whether the higher education system will be more equitable when it asks universities to tradeoff their staff's rights and power for Government funding. Universities will lose autonomy in return for public funding, public funding that is lower than previous levels. On the one hand, universities are to act like 'competitive businesses' to

receive Government funding but, on the other hand, they are to forgo autonomy and independence.

1.6.2.4 Learning and Teaching Performance Fund

In addition to Government funding tied to workplace relations, the Government has established a Learning and Teaching Performance Fund for 2006. Nelson (2004b) states that $251 million will be allocated to universities between 2006 and 2008 to encourage excellence in learning and teaching. Stage one of the fund relates to an institution's eligibility for funds and requires universities to have policies and processes aimed at promoting excellence in learning and teaching made publicly available through their website. The five eligibility requirements that need to be publicly available on the university's website are:

- a current and recent institutional learning and teaching plan or strategy;
- evidence of systematic support for professional development in learning and teaching for sessional and full-time academic staff;
- evidence of probation and promotion practices and policies which include effectiveness as a teacher;
- evidence of systematic evaluation of teaching and subjects that informs probation and promotion decisions for academic positions; and
- evidence of student evaluations of subjects (Nelson 2004b).

Nelson (2004b p. 1) states stage two assesses institutional performance in teaching and learning 'using a range of methods, which may include performance indicators such as student progress and graduate employment outcomes' but no exact model has yet been decided by the Government. The AVCC (2004b) supports the Government's aim of encouraging effective teaching practices, except for the criteria for the eligibility of funds in stage one, on the basis that it is a fundamental aspect of all universities' missions and goals. The AVCC (2004b), however, disagrees with assessing excellence in teaching and learning based on a limited set, of quantitative indicators. The AVCC (2004b) suggests using a limited set of quantitative indicators such as employment, attrition, progress, overall satisfaction and good teaching to

measure excellence will not consider the diversity of universities in Australia including students, courses, resources and priorities.

In addition the indicators do not produce a significant degree of discrimination between universities, instead universities are clustered together with minimal difference in their range of scores, making it difficult to determine which universities are the best in excellence for teaching and learning. The NTEU (2004c) suggests these indicators measure the accumulation of knowledge and facts not excellence in teaching and learning. Instead, the assessment of excellence in teaching and learning should be measuring higher order thinking processes such as critical thinking. The AVCC (2004b) argues not only should there be a range of multiple indicators but also a portfolio submitted by each university with evidence showing their claims of improvement in teaching and excellence, together with a peer based panel that assesses the university against a number of benchmarks. The AVCC also suggests funds should be allocated based on the results of each dimension not on overall performance.

Questions also surround whether the Government should be rewarding quality or excellence. Despite stating that there is 'no universally agreed and absolute definition of excellence', the Government has rejected any funding being linked to quality or performance stating 'a performance based model is not appropriate' (NTEU, 2004c p. 4). Instead the Government has stated that the fund will reward 'those institutions that best demonstrate excellence in learning and teaching'. With no agreed definition of excellence the questions remain, what will the fund be measuring and will the indicators be valid?

The NTEU (2004c) argues all universities should be rewarded for improving their quality of teaching and learning based on benchmarks not just a few institutions rewarded for excellence based on their rank. Duckett (2004) suggests that a system of rewarding $54.6 million to the top few universities in 2006 for excellence will be ideal for budget control, but not for universities who have no real control over their ranking. The NTEU (2004c) suggests that the perverse outcome of ranking universities is that institutions will then use their ranking for self promotion and marketing, which destroys any chance of all universities in Australia being recognised for their excellence. This will then reinforce issues of prestige and elitism that will

reinforce the university's ranks. The AVCC (2004b p. 8) states 'the Government should be keen to recognise all universities that meet the set benchmarks as a sign of the strength of Australia's universities'.

There is a lack of support for the Government's approach. King and Moodie (Thompson, 2005) argue that the qualitative indicators suggested by the Government are derived from student surveys such as the Course Experience Questionnaire (CEQ), which contain a degree of bias. The NTEU (2004c) supports King and Moodie by arguing course evaluation surveys are not a legitimate tool for collecting information. In addition, King (Yaman, 2005 p. 22) argues Ballarat University was ranked first for graduate starting salaries in 2004 but the figures were only based on students entering their first full-time position and did not consider students who were already working. King also argues that this rank was based on 15,000 graduates out of a possible 50,000 to 60,000. King suggests that, although these figures are useful for public information, they should not be the sole determinant for contestable funds. While these indicators will create transparency, the NTEU (2004c) disagrees that they will reflect improved quality in teaching and learning within universities.

Nevertheless, universities such as the University of New South Wales (UNSW) have taken action to improve excellence in teaching and learning. Lee, Pro-Vice-Chancellor of UNSW, states that, 'we clearly need to improve our teaching' after the member of the Go8 was ranked second lowest for student satisfaction (Thompson, 2005 p.5). In addition to organising teacher-training programs and mentorships, the UNSW (2005c p. 3) state their '2005 Budget includes a mechanism whereby five percent of faculty monies are tied to the achievement of performance indicators in learning and teaching'.

Irrespective of whether the Learning and Teaching Performance Fund is equitable and fair or whether it will promote excellence in teaching and learning, the introduction of contestable funds will be another source of competition in the higher education sector. The NTEU (2004c) argues that the underlying aim of these contestable funds is to enhance competition between institutions not improve the quality of education for students.

1.6.2.5. Indexation of Government funding

Phillips et al. (2003) suggest that the decline in the proportion of funds per student is intensified by the current indexation of Government funding. Phillips et al. (2003 p. 2) state:

> While Commonwealth funding per actual EFTSU (including over-enrolment) rose slightly between 1996 and 2001, total university revenue per total EFTSU declined by 6.5 percent in real terms between 1995 and 2001. Student load grew faster than income over this time period.

DEST (2005f p. 2) state 'indexation is the process by which Australian Government expenditures are price-adjusted to reflect the forecast social and economic conditions of the year in which the expenditure is expected to occur'. The 2005 review of indexation arrangements in the higher education sector conducted by DEST (2005f) suggests since the 1996 Budget, indexation has been timely, robust and simple, maximising the incentives for programmes to be delivered efficiently and reflecting the minimum cost of delivering policy outputs. Since 1996, the Higher Education Indexing Factor (HEIF), previously named Cost Adjustment Factor (CAF), has been comprised of two components, the Safety Net Adjustment (SNA) and Consumer Price Index (CPI). The Safety Net Adjustment (SNA) represents the salary component and equals 75 percent of total Government indexation, while the Consumer Price Index (CPI) represents the non-salary component at 25 percent. Jackson (2003b p.8) states that these proportions are 'notional' 'because they bear no relation to the actual expenditure of higher education institutions'. The reason for Government funding being indexed to the SNA, as opposed to other salary measures, relates to a fundamental feature of Australia's Government indexation policy, which states 'wage increases should not be funded to cover productivity gains or to the extent that they would diminish the incentive to drive efficient programme delivery' (2005d p. 13).

Nelson (2002a) suggests the responses to the 2002 Crossroads paper *Setting Firm Foundations: Financing Australian Higher Education* revealed an underlying consensus that

current indexation is inadequate, whereby the HEIF and in particular the SNA does not compensate for the full rises in university costs. Nelson (2002a p. 1) declared that:

> The financing of Australian higher education has engendered strong interest in the great majority of submissions to the Review of Higher Education. While there is a wide variety of positions put in relation to the best way forward there is near unanimity on the need for change.

The Go8 (2004 p. 1) claim:

> Without adequate indexation, the capacities of Australia's universities to maintain the quality of their buildings, libraries, laboratories, teaching and research services are at risk, as are their abilities to remain competitive in an increasing international higher education environment.

The AVCC (2004d) suggested that the 1996 indexation system should be modified as the purchasing power of Government grants has declined. The AVCC (2004d p. 6) agrees that the indexing of Government grants cannot be exactly tied to the changes in university costs, given salary rises through Enterprise Bargaining Agreements are decided at the enterprise level. They do point out that salary adjustments under the Safety Net Adjustment are far less than the increases in salaries in the higher education sector. The Go8 (2004) argue the SNA represents the adjustments in the annual rise of the award wage determined by the AIRC and therefore does not accurately reflect the increases in salaries of the higher education sector. These Government indexation mechanisms introduced in 1996 corresponded to the Government's move towards establishing Enterprise Bargaining Agreements in higher education, whereby any increase in salaries higher then the SNA had to be offset by increases in productivity.

According to DEST (2005f), 57.1 percent of institution operation expenses in 2003 were employee benefits. This suggests, with nearly three fifths of operating expenses relating to employee benefits, effective Government funding would need to be aligned to the real changes

in higher education salaries. According to Chapman (2004 p. 4), as a result of the salary component being indexed to the SNA, this means:

> Every year that a university's Enterprise Bargaining Agreement delivers an increase in average remuneration roughly in line with professional or other earnings in the community is also a year that a university experiences an effective cut in real Government support.

Chapman (2004) and the Go8 (2004 p. 4) suggest the Government's reaction contradicts previous claims where the Government had admitted the CAF 'provides only a partial contribution towards the real additional costs faced by universities'. DEST (2003b p. 120) states:

> The Higher Education Cost Adjustment Factor (CAF) is an index reflecting the contribution the Commonwealth makes towards increases in the operating costs of higher education institutions. The CAF does not measure actual price rises but the Commonwealth's contribution towards annual increases in salary and non-salary costs.

While there is an agreement that the non-salary component should be indexed to the CPI, controversy surrounds the salary component being indexed to the SNA. Although Government indexation to the SNA could be changed to either of the following salary component measures, most recommendations have changed overtime with the development of ABS measures. In addition to the SNA and Average Weekly Earnings (AWE) other possible measures of the salary component include the Wage Cost Index (WCI) and the Labour Price Index (LPI).

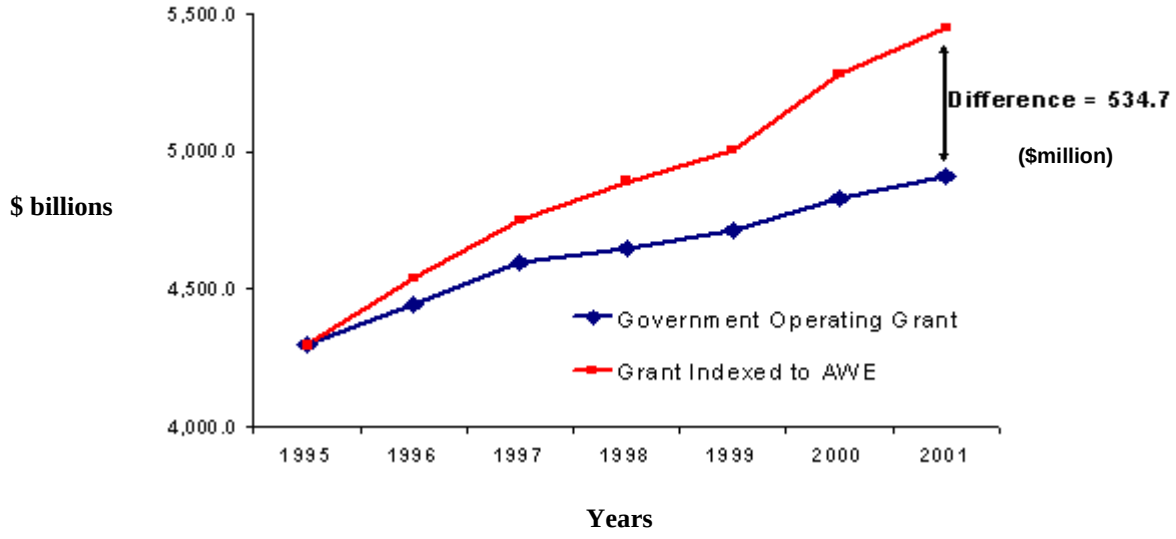
All recommendations previous to the introduction of the Wage Cost Index (WCI) in 1997 suggested the SNA be replaced by Average Weekly Earnings (AWE), as the SNA measures the changes in minimum wages in Australia and is not a realistic measure of salaries in the higher education sector. Burke and Phillips (2001) recommend the salary component be

indexed to the AWE. Referring to Figure 1.2 Burke and Phillips (2001 p. 2) suggest not only is there a difference each year in the size of Government grants, if funding had been indexed to AWE as compared to the SNA, but the gap increases over time. Burke and Phillips estimate the difference between the two funding mechanisms to be $535 million in 2001 and $1.76 billion since 1996. This suggests real indexation funding to universities has not only decreased but is decreasing at an increasing rate.

The Senate Standing Committee (2003 p. 25) states:

> The notional salary component of the indexation for universities between 1995 and 2001 increased at less than half of the rate of economy-wide measures such as the Average Weekly Earnings (AWE).

Figure 1.2 University Base Grants: Actual funding compared to an Average Weekly Earnings index



Source: Modified from Burke and Phillips 2001 p. 2

DEST (2005f) argue that the AWE is not an effective measure for indexing the salary component, as salary increases result from improvements in productivity and efficiency. DEST (2005f p. 5) state:

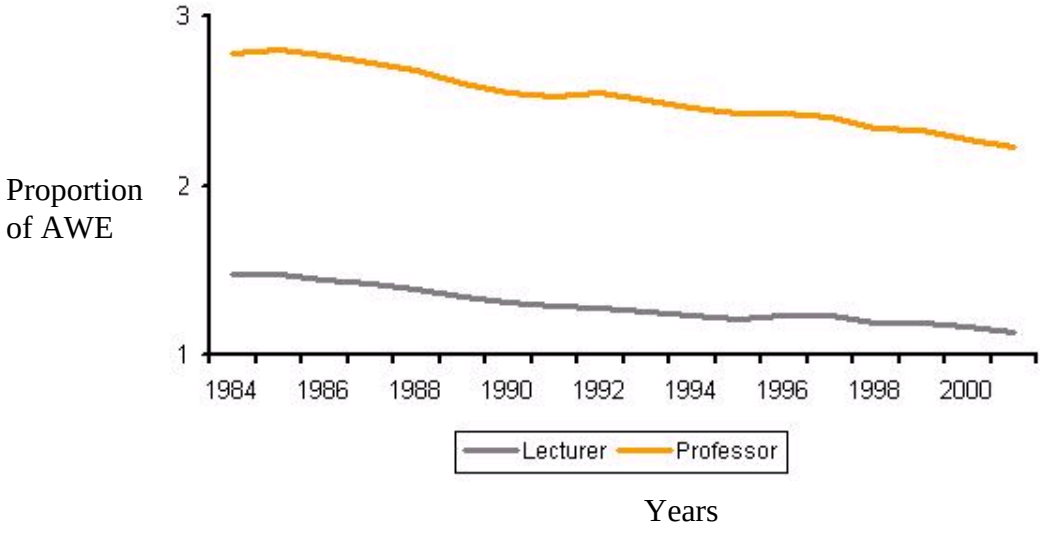
> In terms of the growth in wage costs, the sector has increased its wage costs from around $4.7 billion to $6.5 billion, an increase of 28 percent between 1996 and 2003. The growth in wage costs, therefore, appears to be relatively well contained as it is broadly comparable with the growth in the SNA (a component of the HEIF) over this time period.[12]

It could also be argued that universities can only pay staff what they can afford. So limited funding would limit salary increases to staff. Conversely the Go8 (2004) suggest the SNA, measuring adjustments in the award wage, cannot reflect the real rise in salaries made through negotiation. Even though the AWE may reflect increases in productivity, the Go8 (2004 p. 6) state that the percentage change in the SNA between 1997 and 2002 was eight percent, whereas the percentage change in AWE was 25 percent, suggesting the latter measure would more likely reflect the real increases in salaries over time. If according to DEST wage costs increased 28 percent between 1996 and 2003, then the AWE is a more adequate mechanism for indexing salary costs.

The lack of adequate indexation has according to Maiden (2005b p. 1) meant 'university salaries have fallen over the past 25 years, making professors $35,000 a year worse off than their counterparts in the late 1970s'. Likewise Figure 1.3 shows academic salaries as a proportion of average weekly earnings have been declining since 1984 (Chapman, 2002).

Figure 1.3 Academic salaries as a proportion of Average Weekly Earnings

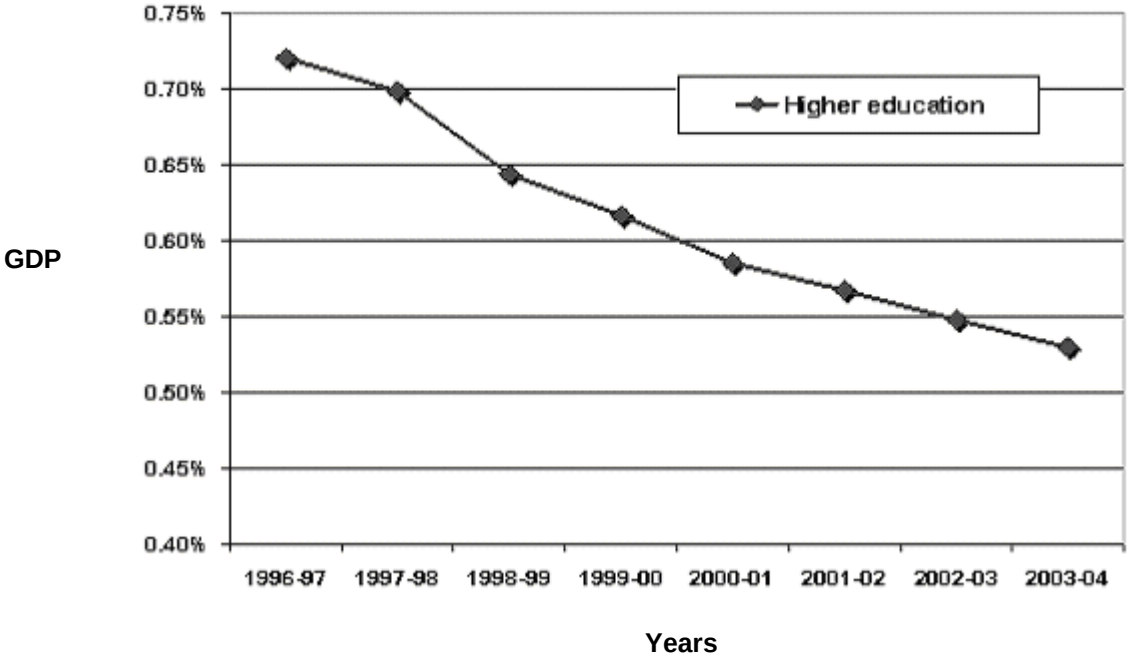
[12] The value of 28 percent is questionable as the change is $1.8 billion from an original amount of $4.7 billion which is an actual increase of 38 percent.



Source: Chapman 2002 p. 7

The Senate Standing Committee (2003) also suggests operating grants should be indexed to AWE given Government revenue increases more than average weekly earnings. The Senate argues if operating grants are not indexed to AWE, then education as a proportion of GDP will fall overtime. Referring to Figure 1.4, Larkins (2003 p. 5) suggests from 1996-97 to 2003-04 the proportion of GDP spent on higher education has decreased from 0.72 percent to 0.52 percent. Larkins (2003 p. 5) estimates that a decrease of 0.1 percentage points of GDP in expenditure is equal to $790 million in 2003 price terms.

Figure 1.4 The proportion of GDP spent on higher education by the Government



Source: Larkins 2003 p. 5

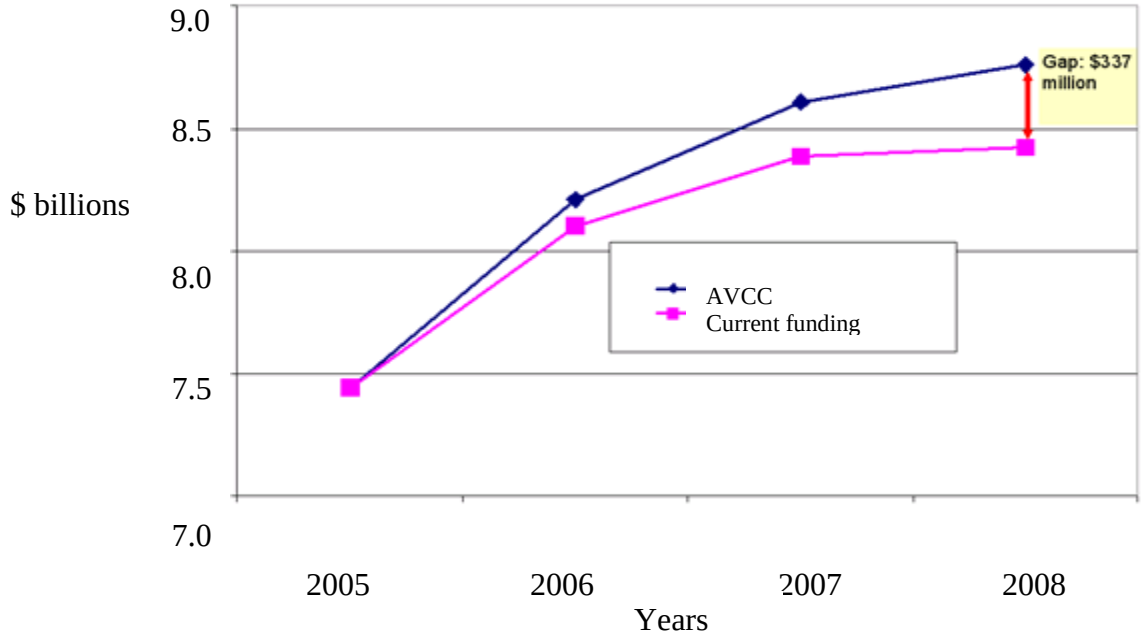
The Productivity Commission's (PC) *2002 Research Report* commissioned by the Government, (2003 p. 29) also revealed expenditure on tertiary education as a proportion of GDP fell between 1995 and 1999. Except for the United Kingdom, the expenditure as a proportion of GDP for all other countries either remained the same or increased. A caveat of this measure is the inclusion of direct funding by students and private sectors but the Productivity Commission (2002 p. 34) states 'the proportion of Government payments for tertiary education fell from 1.5 percent of GDP in 1995 to 1.2 percent of GDP in 1999'.
This is supported by Larkins (2003 p. 6) who states:

> Australia has had the largest percentage decrease in public investment in universities over five years of any OECD country. A decrease of 11 percent compared with the OECD average of a 21 percent increase.

The AVCC (2004d) and Go8 (2004) until recently suggested the salary component be indexed to the Wage Cost Index (Education). The WCI (Education) measures the changes in wage and salary costs for a basket of jobs. The AVCC (2004d) argues the WCI (Education) shows the increase in education salaries, net of productivity gains, and would therefore indicate the real

change in costs for universities complying with Australia's indexation policy. The AVCC (2004d p. 7) states 'universities would still be required to be efficient, with indexation still being less than increases in average weekly earnings'. The Democrats (2005) claimed that if for 2005 Government funding was indexed to the Consumer Price Index (CPI) and Wage Cost Index (WCI) (Education) instead of the SNA, operating grants would have increased by one percent delivering $148 million extra revenue for universities.

Figure 1.5 The difference in funding using the LPI as opposed to SNA approach



Source: Modified from AVCC 2005b p. 1

Since September 2004, the ABS has published a new statistic, the Labour Price Index (LPI). The ABS (2005c pp. 1-2) state the Labour Price Index (Education) unlike the Wage Cost Index (Education) includes non-wage costs such as 'annual and public holiday leave, employer funded superannuation, payroll tax and workers compensation'. Referring to Figure 1.5, the AVCC (2004d p. 7) estimates that the adoption of the LPI would have increased Government funding $337 million between 2005 and 2008.

The AVCC (2004d) suggests the WCI and LPI were requested by the Government in order to replace the SNA, a funding mechanism that was only supposed to be temporary. The 1995 Commonwealth Government Budget (1995 p. 18) stated 'the wage measure in the new indexation arrangement will be reviewed once the ABS has developed a new Labour Cost Index to replace the outdated award wage indexes'. Despite this, the Coalition Government rejected any adjustments to the indexation mechanisms as DEST (2005f p. 12) claims that:

> the ABS' Labour Price Index measure for the education sector incorporates some productivity gains as it is designed to measure changes in price of labour services from market pressure and is unaffected by changes in the quality and quantity of work performed.

This decision not to change current indexation arrangements forces universities to pass indexation shortfalls on to students, with Despoja (2005) suggesting most universities have increased their fees the maximum 25 percent because of no other reason other than inadequate indexation. The Government, however, did introduce price flexibility and full fee paying places to domestic students, as the two mechanisms for universities to derive revenue.

1.6.3 Higher Education Equity Programme

Despite the shift in the cost of indexation shortfalls to students, Nelson (2004b p. 34) has indicated that greater funding for the Higher Education Equity Programme (HEEP) from 2005 is 'to ensure that there are no barriers to access to higher education for any groups in Australia'. The Government has decided to allocate $4.5 million to HEEP per annum from 2005 according to a performance based formula replacing block grants. DEST (2004c) indicates to be eligible for funding, universities will have to offer specialised support for equity groups, implement an outreach program and provide university scholarships under an institutional equity scholarship program to complement the Commonwealth Learning Scholarships Programme. Nelson (2004b p. 34) states 'while in recent years the participation of some disadvantaged groups in higher education has increased, this has not been the case for all'. This was the result of the report, *Analysis of Equity Groups in Higher Education*

1991 to 2002, by the Centre for the Study of Higher Education (CSHE) that showed the participation of some equity groups had not improved, for example, low income students. DEST (2004c p. 34) states:

> While there has been a small increase in the participation of mature aged (over 25 years) low SES students in higher education, overall the proportion of low SES students (of all ages) entering higher education has not increased since 1991. Their participation rate has remained around 15 percent throughout the past decade. They are particularly under-represented in award courses and in courses leading to professional qualifications.

DEST (2006a) claim in the *2005-06 Annual Report* that the participation of students from low SES has not varied greatly between 2001 and 2005. However, the report's findings show that the number of students from low SES declined from 102,598 in 2001 to 102,394 in 2005 and the proportion of students of low SES declined 0.6 percentage points to 14.5 percent in 2005. The report also shows that the number of students receiving youth allowance had fallen from 458,053 in 2003-04 to 435,661 in 2005-06.

This is despite previous claims that increases in the cost of higher education did not deter low income students. Nelson (2004c p. 3) stated:

> There's been an enormous amount of research done on the impact of HECS on participation by students in Australian universities. As a result of the introduction of HECS, and these same arguments were run in 1989 when the Labor Government introduced HECS, we have doubled the proportion of Australian people who have a university education, we've almost doubled the size of the university sector and the proportion, and indeed the number of low income people going to university, has substantially increased over the last 14 years.

The Government considers that the increase in funds provided to HEEP, and in particular the performance based model used for distributing HEEP funds to institutions, will reduce any barriers to entry for disadvantaged students as funds will be solely based on the universities

equity performance. Previously under HEEP, each university received a core grant of $80,000 with the remaining funds under the scheme distributed based on a performance model, however, now all funds will be aligned to performance and no block grants allocated. In addition to replacing block grants with a performance based model the Government has also changed the formula for distributing funds. The previous performance based component of HEEP funds as allocated to universities based on success and retention rates of disadvantaged groups, with students weighted for each disadvantaged group, such as students from low Socio Economic Status (SES) (40 percent), rural and isolated areas (30 percent), disabilities (15 percent), non English speaking backgrounds (NESB) (7.5 percent) and women in engineering and architecture (7.5 percent). The 2005 changes to the higher education support program have resulted in the $10,823,000 being allocated to universities in 2005 based on a similar performance formula that includes retention and success rates but excludes all disadvantaged groups other than low socio-economic students and students from rural and isolated areas.

The formula for distributing funds to higher education providers per annum as stated by DEST (2005d p.3) is:

Grant = (A/C) * E + (B/D) * E

A is the number of students from low socio-economic areas enrolled in the university multiplied by student retention and success ratios for this group

B is the number of students from low socio-economic areas that are from rural and isolated areas enrolled in the university multiplied by student retention and success ratios for this group.

C is the number of students from low socio-economic areas enrolled in all universities multiplied by student retention and success ratios for this group.

D is the number of students from low socio-economic areas that are from rural and isolated areas enrolled in all universities multiplied by student retention and success ratios for this group.

E is 50 percent of total funding allocated under the Higher Education Equity Support Program.

The above formula shows only two disadvantaged groups are taken into consideration when allocating HEEP funding to institutions. From 2005, disability groups and indigenous students are considered under separate schemes other than HEEP, but this means women studying in non-traditional areas and students from non English speaking backgrounds are no longer considered equity groups for basing the allocation of funds. The AVCC (2004c) supports the study of the Centre for the Study of Higher Education (CSHE) (2004), that considers that, even though, overall women are no longer a disadvantaged group, with the proportion of women participating in higher education greater than men at, 56.7 percent, women in engineering and information technology should remain a targeted equity group. Despite the Centre for the Study of Higher Education (2004) recommendation to the Government for women in engineering and information technology to remain a targeted equity group, they are not considered under the allocation of HEEP funding.

Unlike the Centre for the Study of Higher Education (CSHE), the AVCC (2004c) disagreed that students from NESB should no longer be a targeted equity group. The AVCC (2004c) argues the movement to exclude students from NESB is unfair. Even though this equity group is broad and covers a range of students, including some who are not disadvantaged there are several students who are disadvantaged, who will miss out. Although CSHE suggested that students from non English speaking backgrounds (NESB) should no longer be a targeted equity group this was based on the existing definition of the equity group. CSHE (2004 p. 35) stated, if the variables: country of birth, language spoken at home and year of arrival in Australia from 2001 Census, are used to measure the proportion of students from non English speaking backgrounds, as a percentage of Australia's population their share would equal 4.1 percent. This would mean the 3.8 percent of NESB participating in university is 'below their expected share of education enrolments in recent years (by 0.3 percentage points)'.

Table 1.9 shows the changes to the distribution of HEEP funding in 2005 has resulted in greater funding for universities that have a higher number of students of low socio-economic status and students from rural and isolated areas, such as USQ and University of Tasmania. The removal of block grants and the allocation of funds based on the modified 2005 performance based model have meant USQ now receives $747,445 in 2005 up from $149,000

in 2004 and Australian National University receives $45,629 a lower amount than the previous model's minimum block grant of $80,000.

Table 1.9 HEEP funding to institutions for 2005 compared to 2004

Institution	2005 funding	2004 funding
University of Southern Queensland	$747,445	$149,000
University of Tasmania	$639,671	$135,000
University of Queensland	$619,186	$179,000
Queensland University of Technology	$530,057	$172,000
Monash University	$396,611	$178,000
University of Melbourne	$211,544	$166,000
Victoria University	$194,659	$140,000
University of Adelaide	$174,229	$121,000
University of Sydney	$163,687	$157,000
University of WA	$158,772	$125,000
University of New South Wales	$104,666	$159,000
Swinburne University of Technology	$84,309	$112,000
Australian National University	$45,629	$111,000

Source: Modified from Martin 2005 p. 13

Of the 13 universities in Table 1.9, USQ had the sixth lowest funding in 2004 and the University of Tasmania the fourth lowest funding in 2004. In 2005, USQ has the highest amount of HEEP funding and the University of Tasmania the second highest. From 2005 universities such as USQ and University of Tasmania will be rewarded for a higher number of disadvantaged students and for the first time greater HEEP funding, than all Go8 universities including those previously rewarded higher funding for lower numbers of disadvantaged students, such as Sydney University, University of Melbourne and Monash University.

The funding model considers retention and success rates of students when calculating the amount of funding for each institution. CSHE (2004 p. 5) states the success rate 'measures the proportion of units passed within a year' of total units enrolled and the retention rate measures the 'proportion of students who actually re-enrol in a subsequent year, of the numbers who had not completed a course and so were expected to re-enrol'. However, student numbers are not simply multiplied by the retention and success rates for each disadvantaged group, but rather are multiplied by the retention and success ratios for each group. The ratios differ to the rates as DEST (2005h p. 2) state the indicator is then expressed as a 'rate divided by the reference

value for that indicator'. DEST (2005h p. 2) state 'this is a better measure of equity because it makes a comparison between the equity group and a suitable benchmark'.

Table 1.10 Success and retention ratios of disadvantaged students

	Students of low SES retention ratio	Students of low SES success ratio	Rural students retention ratio	Rural students success ratio	Isolated students retention ratio	Isolated students success ratio
University of Southern Queensland	1.020	0.98	1.132	1.07	1.018	1.01
University of Melbourne	1.005	0.98	0.997	1.00	0.879	1.00
Monash University	0.990	0.96	0.953	1.00	0.892	0.97
University of Western Australia	0.994	1.00	0.967	1.01	0.944	0.96
All universities	0.980	0.97	0.973	0.99	0.875	0.91

Source: Modified from DEST 2005h

Despite this, an evaluation of the retention and success ratios for each of the universities for 2003, in Table 1.10, shows that USQ has the best performance out of all universities for both the retention and success of students from rural and isolated areas and the best ratio for the retention of students of low socio-economic status. The UWA is the only university to have a slightly better success ratio for students of low socio-economic status.

Retention and success rates are factors which to a certain extent are outside the university's control. With funding based on the number of students multiplied by the success and retention ratios for that particular group, this could mean some universities will focus on targeting students from these two equity groups, as opposed to all equity groups such as students of NESB. These universities may aim to improve their success and retention rates by reducing standards, for example by passing a greater number of students from disadvantaged backgrounds.

The allocation of HEEP funding solely based on students of low socio-economic status and students from rural and isolated areas also means women in engineering and technology and men in nursing, education and society and culture (found by CSHE (2004) to be specific disadvantaged groups in higher education) are also not taken into account in the distribution of HEEP funding, providing no incentive for universities to target these additional equity groups.

1.6.4 Commonwealth Learning Scholarships Programme

The new programme also includes the addition of Commonwealth Learning Scholarships. Nelson argues in addition to the changes to HEEP, the allocation of $327 million for 40,000 new scholarships over the next five years under the Commonwealth Learning Scholarships Programme will ensure no disadvantaged student faces barriers to entry.

Nelson (2004b p. 3) states that:

> While in recent years the participation of some disadvantaged groups in higher education has increased, this has not been the case for all groups. Additional financial support, culturally appropriate and responsive policy, clear directives on equity programmes and performance-based rewards are needed to ensure that there are no barriers to access to higher education for any groups in Australia.

In order to reduce these barriers to entry for students of low socio-economic status and from rural and isolated areas the Government in 2004 allocated 3000 Commonwealth Accommodation Scholarships (CAS) and 2500 Commonwealth Educational Costs Scholarships (CECS). Although this would reduce the barriers to entry for some disadvantaged students, it would not remove the barriers to entry for all disadvantaged students, with DEST (2005g) suggesting there are approximately 2500 Indigenous students, 26,000 students of low socio-economic status and 10,000 students from rural and isolated areas enrolled in university each year. Even though the Government increased the number of scholarships to 3518 CAS and 5029 CECS in 2005, this is still not enough to end the barriers to access to education.

According to DEST (2003c), there were 45,302 rural students, 3746 isolated students, 3788 indigenous students and 37,256 students of low socio-economic status students enrolled in 2003. This then means there is a one in seven chance of an eligible student receiving a CECS and a one in fourteen chance of an eligible student receiving a CAS. Even if it is assumed that the number of students of low socio-economic status and from rural and isolated areas remains the same between 2003 and 2008, the higher number of scholarships that the Government has offered for 2007 (3553 CAS and 5105 CECS) and 2008 (3574 CAS and 5075 CECS) will not effectively change the likelihood of an eligible student receiving a scholarship.

In addition to the insufficient number of CAS and CECS, there is also the inequitable distribution of these scholarships to universities. The inequitable distribution of scholarships between universities is a result of the formula for distributing Commonwealth Learning Scholarships that considers not only the number of disadvantaged students enrolled in each institution but also the demographics of the population surrounding each institution.

The Government (DEST, 2005g p. 4) state:

> To base a formula entirely on domestic student population would be to influence student's choice in favour of larger providers, regardless of their performance in attracting disadvantage students. HEPs with a high proportion of low SES students, most likely due to the demographics of their catchment areas, would receive more scholarships than HEPs with few low SES students.

Even though Monash University and Sydney University have a lower proportion of students of low socio-economic status and students from rural and isolated areas, when compared to USQ and the University of Tasmania, they both receive a greater number of CAS and CECS scholarships. Of the universities in Table 1.9, the USQ has the highest proportion of disadvantaged students, yet receives the least number of both CECS and CAS. The reason for the number of scholarships not correlating to the proportion of disadvantaged students within each university is the effect of basing the distribution of scholarships both on the absolute number of students within each university and the local demographics of the population.

Instead of the characteristics of the institution's local area being a detriment to the number of scholarships it receives, this should be a reason supporting the allocation of a greater number of scholarships, as surely this would suggest that there are more students facing barriers to entry within that area. The Government suggests the method of allocating funds based solely on the number of students within each institution will only favour larger providers, as they will receive more funding for having a greater number of disadvantaged students, such as Monash University.

Table 1.11 shows that the current method of allocating scholarships does not avoid the problem of larger universities benefiting from a greater number of scholarships, as Monash University receives the greatest number of scholarships, despite having a below average proportion of disadvantaged students. Even though overall regional universities tend to have a lower absolute number of students enrolled from disadvantaged backgrounds than the more established universities, the proportion of disadvantaged students as a percentage of their student population is much higher. The Government taking into consideration the demographics of the local population, in addition to the absolute number of disadvantaged students in each institution, only worsens the smaller regional universities share of the number of scholarships allocated each year. The method of allocating scholarships was supposed to be according to the proportion of students within each institution and their ability at improving equity in participation.

Nelson (2004b p. 1) states:

> Commonwealth Learning Scholarships will be distributed to institutions on the basis of their proportion of full-time low SES students, taking into account their ability to increase the number of low SES students attending their institutions.

This is not supported by DEST. The allocation of scholarships would not be according to the proportion of disadvantaged students in each institution, with DEST (2005g p. 3) arguing that:

if allocations were to be based entirely on the share of CECS-eligible students, then HEPs with a high proportion of low SES students, most likely due to the demographics of their catchment areas, would receive more scholarships than HEPs with fewer low SES students.

Table 1.11 Distribution of Commonwealth Accommodation Scholarships (CAS) and Commonwealth Educational Costs Scholarships (CECS) to institutions in 2005

	CAS	CECS
Sydney University	138	179
University of Melbourne	112	149
USQ	71	139
University of Tasmania	129	170
Monash University	143	198

Source: modified from DEST 2005g

The current method of distributing scholarships means an eligible student has less chance of receiving a scholarship, if there are a greater number of low income students living in their area. That is, you have less chance of receiving a scholarship, if you come from a poorer or relatively lower socio-economic area, than a low income student who resides in a wealthier postcode. The outcome of the 2005 changes results in the Government financially rewarding a small proportion of disadvantaged students. This does not promote a more equitable higher education system and does not 'ensure that there are no barriers to access to higher education for any groups in Australia'. In addition, for a student to be eligible for a Commonwealth Learning Scholarship they must already be enrolled in a university. This suggests both the barriers to entry remain for the majority of students, who did not receive a scholarship, and the barriers to entry remain, that discourage students from enrolling into university in the first place. As for the few eligible students who received a scholarship they had to be already enrolled in the university, so there will still be a number of students choosing not to apply for university because of the lack of guaranteed financial support. The Government, therefore, has not effectively put in place measures to improve the overall access to university for low income students but rather increased the barriers to entry for low income students, with the majority of disadvantaged students enrolled in university from 2005 facing up to 25 percent higher HECS fees and a lower chance of gaining a HECS-HELP place, given universities are allowed to offer up to 35 percent of their places to full fee paying students.

Other aspects of the Commonwealth Learning Scholarships Programme that have not changed, consequently not improving the welfare of low income students and students from rural and isolated areas, include the value, length and university discretion of scholarships. There has been no increase in the value of scholarships since 2004, except for indexation, despite the Government allowing university fees to increase up to 25 percent. In 2005, the value of the scholarships including indexation was $4084 per annum for CAS and $2042 per annum for CECS. That is students receive just $78.54 per week to assist with their accommodation expenses and $39.27 to assist with education costs.

This is despite the fact that the University of Melbourne (2003) estimated the cost of living in Melbourne for a student in 2005 was much higher, ranging between $152.77 per week to $492.50 per week depending on whether the student resides at home or lives at a residential college on or near the campus. The University of Melbourne (2003) suggests the cheapest alternative for a student living away from home is shared accommodation ranging between $15,818 per annum and $16,632 per annum depending on the location and whether the student pays $200 or $240 per fortnight in rent. In 2005 the maximum youth allowance payment for a student living away from home was $8489 per annum, with the possibility of an additional $2548 per annum for rental assistance, if the rent was greater than $217.67 per fortnight and the student was the sole occupant. If a student chooses the cheapest alternative of living away accommodation, that being shared accommodation, the maximum payment for rental assistance was $1698.58 per annum, assuming rent was more than $174.11 per fortnight. If a student receives a CAS at the value of $4084 to assist with their living away expenses and receives both the maximum youth allowance payment and maximum rental assistance for shared accommodation at $10,187.58 per annum or $9475.62 per annum (after tax) for living away from home, the student's total income still falls short of the total cost of living away from home by $2255.38. This assumes the student's total cost of living for shared accommodation is $15,818. If the student wanted to live closer to the University of Melbourne, the total cost of living in shared accommodation would be $16,632 per annum, leaving the student with outstanding expenses of $3069.38. If a student was fortunate and received a CECS to the value of $2042, in addition to a CAS and their income support, this would still not cover the cost of a student living away from home in shared accommodation.

A shortcoming of these estimates is the student is living away from home in Melbourne. Even if the student's total cost of living was $16,632 per annum, this assumes rent was only $240 per fortnight and the cost of public transport was just six dollars per week. The University of Sydney (2005) estimates rent for a student to study in Sydney is at a minimum of $276 per fortnight and public transport is approximately $22.00 per week. This means that, assuming all other expenses are the same for a student living away from home in Sydney, as it would be for them living in Melbourne, the total cost for a student living away from home in Sydney is $18,400 per annum.

So if a student in Sydney receives a CAS and both the maximum youth allowance payment and rental assistance for shared accommodation, their total income will fall short of their total cost of living by $4837.38 per annum. This suggests that even if the student was fortunate enough to receive both a CECS and a CAS, they would still have outstanding expenses of $2795.38 per annum. These calculations suggest a student receiving both scholarships and income support would still not have sufficient financial support to cover the total cost of living in Sydney or Melbourne and would either have to borrow money or work to meet yearly expenses. Furthermore, these yearly estimations do not include a student's internet or computer costs and assume books, photocopying and stationary total $600 per annum, and the student catches public transport instead of owning a car.

A significant limitation of these calculations is the assumption that students will receive both the maximum payment for youth allowance and the maximum rental assistance. Only a minority of students receive the maximum youth allowance payment, as with the age of independence at 25 years, youth allowance payments are based on the student's parents' income. For a student to receive the maximum youth allowance payment their parent's income cannot be greater than $28,850 (2005) (except there are allowances for additional children) before it affects the level of youth allowance payments students receive. This means in order for a student to receive the maximum level of youth allowance only one parent can earn the award wage income, otherwise one dollar is reduced from their youth allowance payment for every four dollars that the parent's income is above the threshold. It is unfair to have an age of

independence at 25 years when Luteria and Bourne's study (2000) shows 52 percent of students under the age of 25 years, living at home claim their parents do not give them any financial support. Moreover, for students who are 25 years or older receiving Austudy, they are ineligible for rent assistance. The anomaly here is, if you are under 25 years you can receive rent assistance, if living away from home, as your benefits fall under youth allowance. If you are 25 years or older you cannot receive rent assistance, as your benefits fall under Austudy.

The maximum time duration of scholarships has remained unchanged, discouraging disadvantaged students from undertaking degrees that are longer than four years. The restriction of CAS and CECS to four years means students are less likely to choose law, medicine, dentistry, or combined degrees including education and honours. This then reinforces an unequal access to different disciplines.

The effectiveness of the Commonwealth Learning Scholarship Programme is based on the assumption that scholarships, when under the university's discretion, will go to those students in greatest financial need. However, each university has their own selection and additional eligibility criteria to help determine which students will receive a scholarship. This means students with similar financial hardship have different chances of receiving a scholarship, depending on the university's selection process and additional eligibility criteria. For example, although most universities will allow students to receive a CAS and CECS concurrently, Charles Sturt University (2005a p. 2) states 'a student can only receive either a CECS or a CAS, not both'. Likewise the University of Ballarat (2005) will allow students to apply for both scholarships but will only award students with either a CECS or CAS. This means a multi-disadvantaged student of low socio-economic status and from a rural and isolated background will be only financial supported for one disadvantage, despite having greater financial hardship. The University of Western Australia (2005) differs from several universities in that it includes academic merit as part of the selection process, while Murdoch University (2005) considers when ranking students, their personal circumstances and responsibility for others and living arrangements, in addition to financial circumstances.

Arguably, the one fundamental change to the Commonwealth Learning Scholarships Programme that has reduced the financial burden of higher education for some low income students is the exemption of Commonwealth Learning Scholarships from personal income tests. Prior to 2005, Commonwealth Learning Scholarships were considered a source of income under a student's personal income test for youth allowance and Austudy, which consequently affected their overall financial situation. This may make it possible for some low income students to gain larger youth allowance or Austudy payments than previously.

1.7 Conclusion

The introduction of the Higher Education Contribution Scheme (HECS) in 1989 shifted part of the cost of higher education from the Commonwealth Government to the students. The liberalisation of higher education in Australia and the movement towards a user pays higher education system was accelerated by the Coalition Government's 1996-97 budgetary changes where the establishment of a three tier HECS system consequently increased the cost of higher education for students by approximately 40 percent. The 2005 changes in HECS changed the nature and extent of the income contingent scheme with the introduction of the Higher Education Loan Programme (HELP) by broadening it to include domestic full fee paying students. However, offering a FEE-HELP loan to the limit of $50,000 would mean several students would need financial resources up-front to complete their full fee paying courses, defeating the nature of an income contingent scheme. The introduction of HELP has also restricted student access to a HECS-HELP place. The establishment of Student Learning Entitlements has limited student access to a HECS-liable place to seven years, while the increase in the percentage of full fee paying students from 25 percent to 35 percent has been accompanied by a reduction in the number of HECS-HELP places offered. The introduction of institutional price autonomy has meant most students since 2005 have paid 25 percent higher HECS fees. The increases in the contribution by students towards the cost of higher education since 1989 coincide with not only the fall in the level of Government funding but also the decline in the value of Government funding through indexation shortfalls.

The Wran Committee recommended HECS, an income contingent system, as the surest approach to raising a greater contribution from students towards the cost of higher education and for funding greater access and equity. The following Chapter will assess the impact of changes in HECS on the participation of students from different socio-economic backgrounds and challenges the claims by the Wran Committee that HECS will fund more places for students while ensuring equity to access. The following Chapter will also look at the quality of university education and question the efficiency and resource allocation of the market for higher education.

Chapter 2: An evaluation of the overall effects of the higher education policy change

This Chapter examines the impact of changes in HECS on the higher education sector. It will consider the impact of changes in HECS on students, including both the quantity and quality of higher education and the efficiency of higher education reforms. In this Chapter, implications of a higher education market characterised by asymmetric information and the effect of HECS on the participation of students from different socio-economic backgrounds will also be discussed.

2.1 The impact of changes in HECS on student participation

Aungles et al. (2002) consider the most effective method of measuring the impact of HECS on demand for higher education is the level of applications for places in universities. Andrews (1997) states that the approach of using levels of applications differs from previous studies, which focused on student enrolments, such as, Lewis and Vella (1985) and Chapman (1997). The enrolment estimations are 'not adjusted for those students who have unduly restrictive course preferences, those who may reject an offer or those who may have applied in two or more states and are, therefore, subject to double discounting' (Andrews, 1997 p. 6). The study of enrolments does not consider all individuals who had the intention of pursuing higher education and, unlike the study of applications, does not assess the impact of changes in the cost of education on influencing students' behaviour. According to Andrews (1997), the number of applications that did not receive a place during the period between the middle of the 1980s and the middle of the 1990s is equal to 23 to 40 percent of all applicants. Andrews (1997) concluded that the introduction of HECS in 1989 had only a small negative effect on

the level of demand of school leavers but no effect on mature age applicants. Andrews derived this conclusion by interpreting the decrease of 20,000 applications equal to 14 percent of applications as a 'small effect'.

The 1996-97 budgetary changes according to Andrews (1997) had mostly affected mature age applications with a fall in applications by 10,000, equal to seven percent. The two major shortcomings of Andrews's (1997) study are addressed by Aungles et al. (2002 p. 9). Firstly, the impact of the 1996 changes was based solely on the applications of the year the changes were introduced, with Andrews (1997) acknowledging it is 'too early to know whether this may be a permanent effect or a rescheduling of higher education plans'. Secondly, Aungles et al. (2002 p. 9) state that Andrews's observation of applications through admission centres makes it 'difficult to disentangle the impact of change to HECS with changes in the pattern of applications to universities'.

Unlike Andrews (1997), Aungles et al. (2002) found 'no evidence' that the introduction of HECS in 1989 affected the level of school leaver applications, and consequently, the demand for higher education. Aungles et al. regression results for school leaver applications, however, showed that the 1996 changes did impact upon school leaver applications, totaling 9000 fewer applications per year from 1997 onwards. Aungles et al. also found that when HECS was introduced in 1989 it did not deter mature age interest but the 1996 changes lowered the quantity of demand equivalent to 17,000 applications.

The contrasting results from the two studies are a consequence of two underlying factors. Firstly, Andrews (1997) calculated the rate of applications, whereas Aungles et al. (2002) measured the level of school leaver applications and secondly, Aungles et al. (2002) unlike Andrews (1997) used a longer time frame to assess the impact of the 1996-97 budgetary changes.

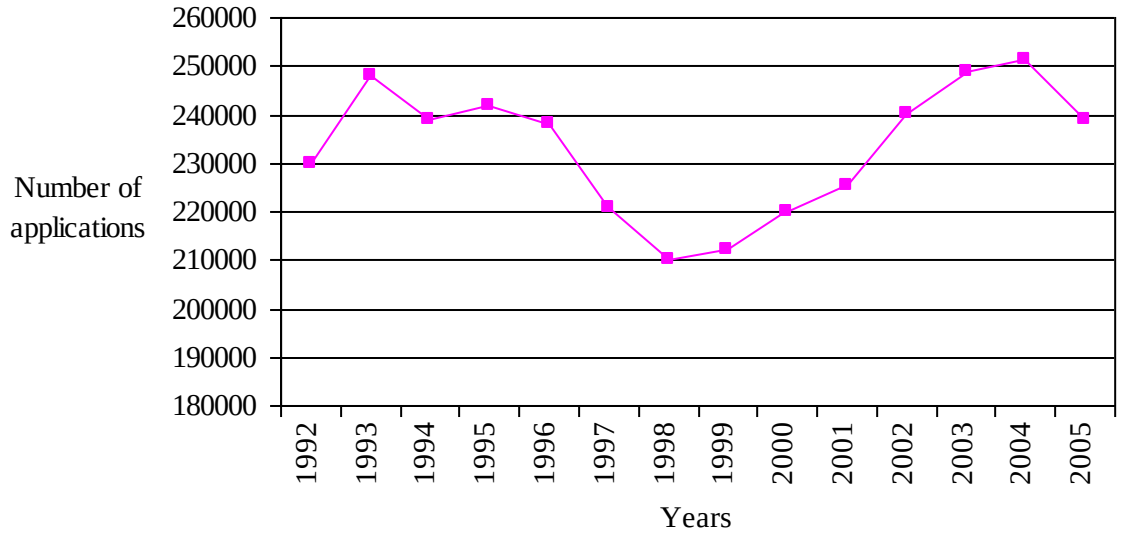
The cost of higher education impacting upon the demand for human capital is complex. Despite the disagreement over whether the introduction of HECS in 1989 affected the demand for higher education, both the NTEU (2000) and DEST (2001b) support Aungles et al. (2002)

findings that the level of applications for university places has declined since the 1996-97 budgetary changes in HECS.

According to DEST (2001b p. 291), the demand for higher education has fallen with applications declining between 1995 and 1998, the fall in applications equaling 14 percent (Figure 2.1). DEST (2001b) argues that the reason for the decline in applications prior to 1998 was not the cost of higher education but rather the rising opportunity cost of higher education through changes in labour market conditions. Kemp (2000 p. 1) states 'claims that Higher Education Contribution Scheme (HECS) charges are discouraging applications by students to universities are inaccurate and not borne out by the facts'.

This argument, that the falling number of applications is a consequence of an improved labour market, implies there is a positive relationship between the level of applications and the unemployment rate (measure of labour market conditions). This argument is questionable, as the falling number of applications between 1993 and 1996 does coincide with a falling unemployment rate from 10.7 percent to 8.1 percent. When the unemployment rate declined from 8.0 percent to 6.6 percent between 1998 and 2000, the number of applications increased from 207,605 to 214,232 (ABS, 2003, AVCC, 2003b p. 2).

Figure 2.1 University applications 1992 to 2005



Source: Modified from DEST 2001b and AVCC 2005a

It should also be noted that the introduction of an additional 25 percent fee in most universities in 2005 led to a substantial drop in university applications (Figure 2.1). The fall in the level of applications through increases in the cost of higher education is further supported by Phillips et al. (2003) and Kniest (2005). Kniest (2005) suggests academics are arguing that the findings by DEST (2004d) on the level of enrolments contradict reports that suggest high levels of unmet student demand for undergraduate places still exists. DEST (2004d) suggests that in 2004 there were 1190 fewer students enrolled in universities than in 2003 and 24,000 fewer students commencing university than there were in 2000. For example, Doherty and Thompson (2005 p. 7) state:

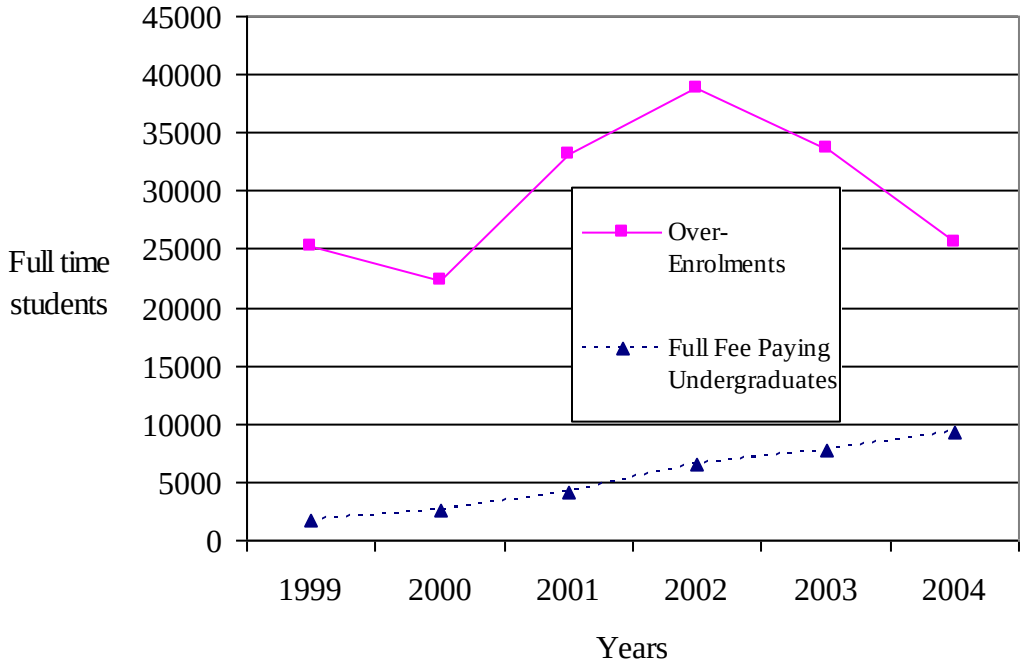
> The number of Australian students starting courses fell by almost 9000 between 2002 and 2004. In NSW, the fall was 6.5 percent and all but two public universities were affected by the decline in domestic demand.

Phillips et al. (2003 p. 8) argue 'the general pattern of leveling or decline in participation rates does not reflect reduced demand from students, but rather constraints on the number of places available'. This is supported by Kniest (2005) who states that the number of undergraduate

commencements is declining but the declining number of enrolments does not reflect student demand but rather the supply of places.

Kniest suggests the appropriate measure of the quantity of demand is the number of applications and not the number of enrolments. Kniest suggests the number of undergraduate enrolments has declined but the number of applications is still high, a result of the restrictions on over-enrolments, and fewer HECS-liable places. This is also supported by the increasing number of students enrolled in full fee paying positions (Figure 2.2).

Figure 2.2 The level of enrolments for domestic and full fee paying undergraduate students



Source: Modified from Kniest 2005 p. 22

Although the level of unmet demand is still high, Kniest (2005) agrees that there was a decrease in the number of applications in 2005, as a result of the increase in the level of HECS fees by 25 percent. Kniest (2005) suggests 12,000 fewer students applied in 2005 then in 2004.

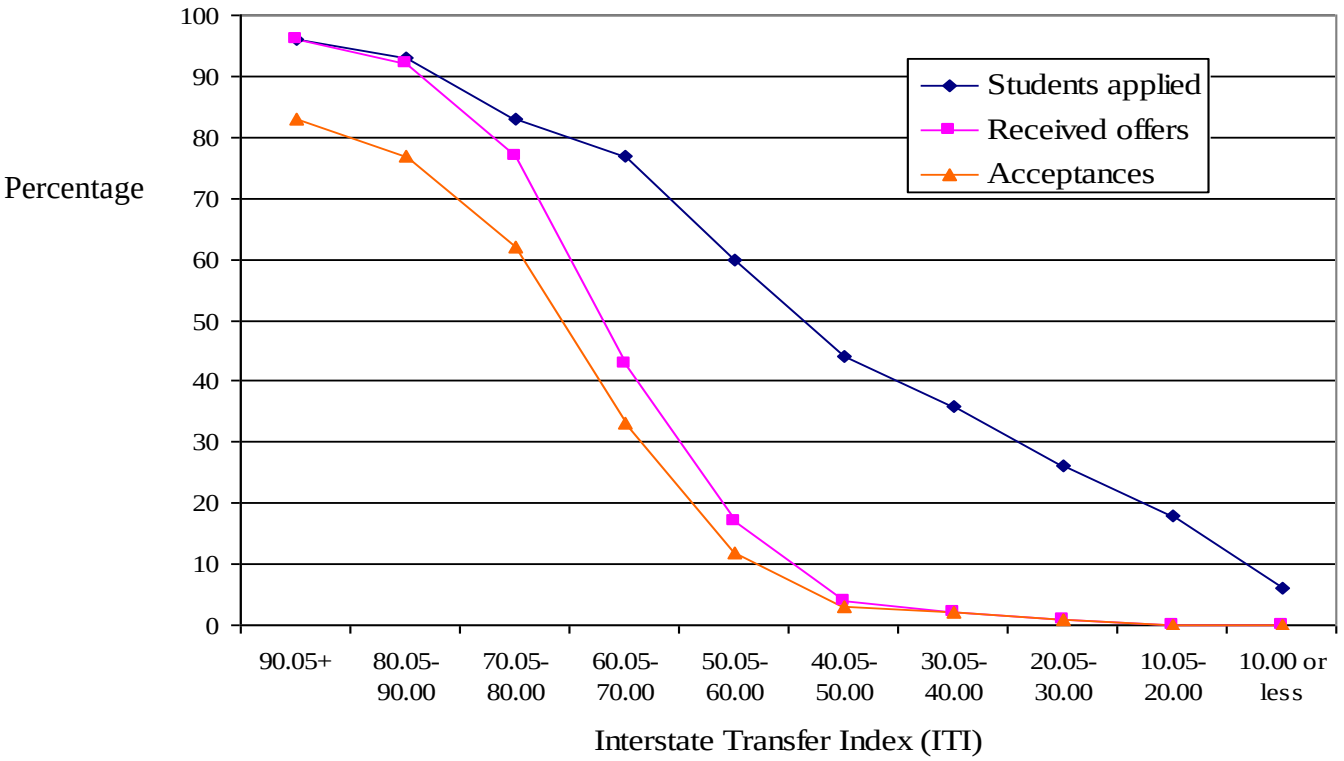
Figure 2.1 shows the number of university applications increased each year from 2001 to 2004 but decreases by 12,123 applications for 2005.

Kniest (2005) suggests the level of unmet demand is significant even with the falling number of applications. Nelson (2004b), however, suggests that the fall in unmet demand is because of the additional places offered by the Government not the falling level of applications. Conversely, Jansen (2004) states that the fall in applications cannot be a response to greater supply, if the level of applications is already in excess of supply. In addition, if supply is perfectly inelastic (a quota), the fall in applications is a response to the increasing financial burden placed on students to study at university, due to the increased HECS charges.

Not only were there 9877 fewer students applying to university in 2007 than in 2004 but a significant proportion of home state year 12 students with high Interstate Transfer Indexes (ITI)[13] did not accept the offer they received (Figure 2.4). The AVCC (2006b, 2007) states that in 2004, 96 percent of home state year 12 students with an ITI of 90.05+ applied for a place at university and even though 96 percent of these students received an offer, 83 percent accepted their offer (Figure 2.3).

Figure 2.3 The percentage of home state year 12 students who applied, received and accepted a university offer in 2004

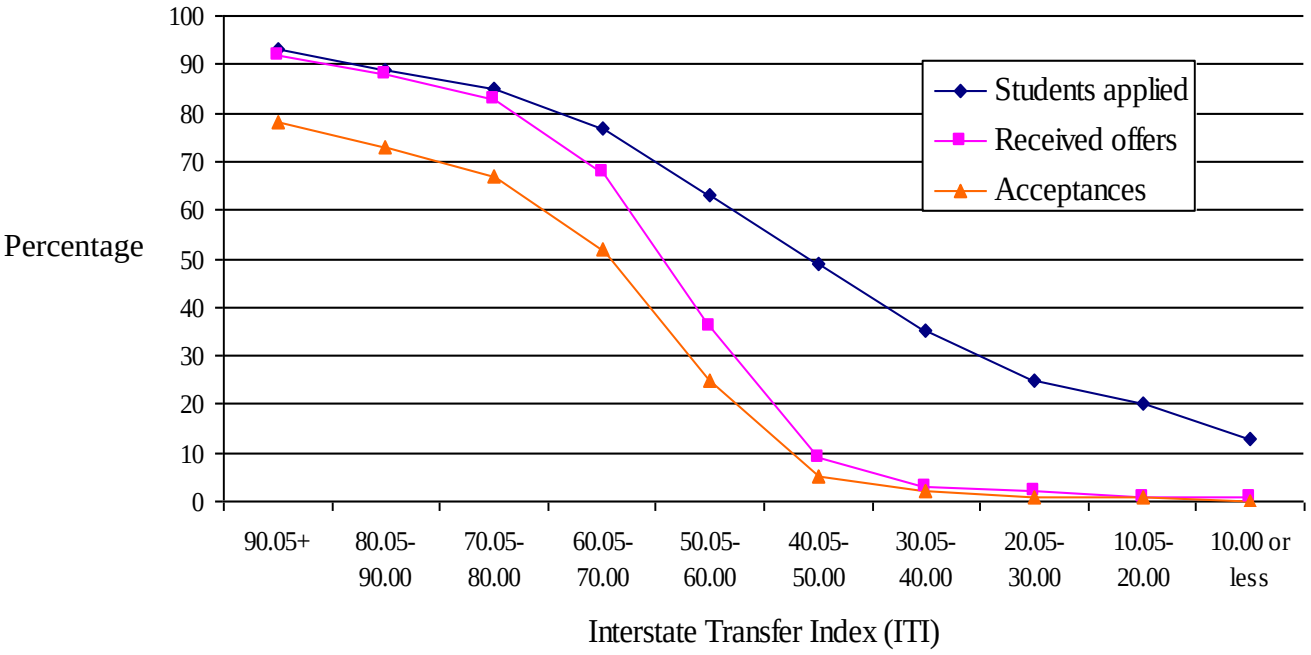
[13] The AVCC (2005e) states the Interstate Transfer Index (ITI) presents the State Tertiary Entrance Ranks in a comparable fashion, allowing analysis across States



Source: Modified from AVCC 2006b

Whereas in 2007, 93 percent of home state year 12 students with an ITI of 90.05+ applied for a place at university in 2007, yet even though 92 percent of these students received an offer, only 78 percent accepted their offer. This suggests that the increased HECS in 2005 not only reduced the quantity of demand but also the quality of those who accepted places. A higher percentage of the brighter students turned down the opportunity to go to university. Meanwhile, the proportion of home state year 12 students with an ITI of between 50.05 and 60.00 increased. In 2004, 60 percent of home state year 12 students with an ITI of between 50.05 and 60.00 applied for a place at university. Of these students, 17 percent received an offer, and 12 percent accepted their offer. In 2007, 63 percent of home state year 12 students with an ITI of between 50.05 and 60.00 applied for a place at university. Of these students, 36 percent received an offer, and 25 percent accepted their offer. In addition, the proportion of home state year 12 students with an ITI less that 50 receiving and accepting an offer has also increased as shown in Figures 2.3 and 2.4. This shows a decline in the quality of students studying at university after the 25 percent HECS increase in 2005.

Figure 2.4 The percentage of home state year 12 students who applied, received and accepted a university offer in 2007



Source: Modified from AVCC 2007

The link between increases in HECS and a decline in the number of students participating in university is supported by the rising number of students choosing the cheaper post-school alternative, TAFE. In 1993 there were 1,117,000 students participating in TAFE, whereas in 2003 there were 1,683,000 students participating in TAFE (ABS, 2005a). Macklin suggests an underlying reason for the 16.2 percent increase in TAFE applications in South Australia for 2005 is the 6.8 percent decrease in student applications for university (Maiden, 2004b p. 6). Macklin argues even though the largest increase in the demand for TAFE was in South Australia, for most states the demand for TAFE has increased and this is because of the 25 percent higher HECS fees most students will be charged at university from 2005 (Maiden, 2004b p. 6). Besides the increasing number of students choosing to study at TAFE, instead of university after year 12, Contractor (2005 p. 9) states 70 percent of the 1520 students who left the University of Western Sydney (UWS) in 2004 had 'permanently withdrawn' from the

university, with 30 percent choosing to study at TAFE instead. Contractor found nine percent of the students, who left UWS, cited financial difficulties and 30 percent said the course did not meet their expectations.

The financial benefits of students studying at TAFE were also acknowledged by Nelson (2002b). Nelson (2002b p. 1) states students:

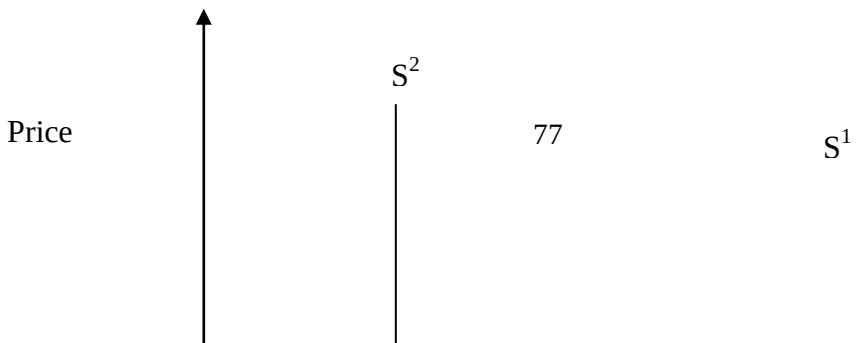
> go to TAFE for one or two years, they pay about $500 to do the TAFE course and then they automatically transfer to university and get a university degree for half the price of a student enrolled in university in the first place.

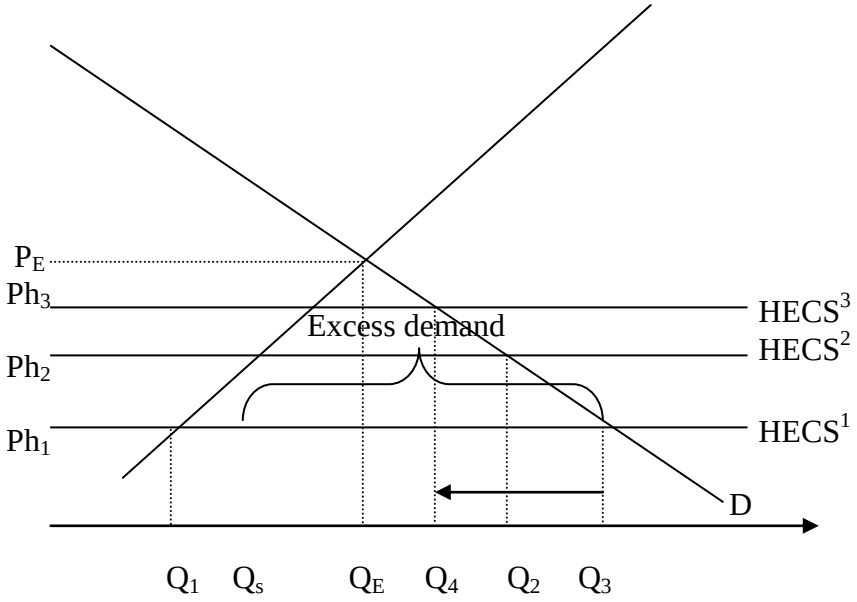
This is supported by Ham (2004), who argues students are not necessarily worse off, if they first study at TAFE and then transfer to university, than students who study at university straight after leaving school. Ham suggests for students, who are unsure of what they want to study, that TAFE is a cheaper option and given an advanced diploma at TAFE is considered by the University of Technology Sydney, University of Wollongong, University of New England and Charles Sturt University, as the equivalent to first-year undergraduate courses, students are financially better off. Ham states (2004 p.1) in 2003, 14 percent of UTS students were from TAFE. This is also reflected by Moodie (2005 p. 102), who states only 43 percent of students enrolled in Australia's universities are admitted based on year 12 results.

2.1.1 An economic model of higher education

The impact of HECS on the market for higher education can be illustrated using the following demand and supply model (Figure 2.5).

Figure 2.5 Demand and supply for higher education





Source: Modified from Wright 2005

In a free market, the equilibrium price (P_E) and output (Q_E) are determined by the demand and supply for higher education. However, the Government sets a quota on the number of university places represented by a perfectly inelastic supply curve (S_2), therefore, demand (D) represents the number of applicants and supply (S_2) represents the number of enrolments. The introduction of HECS in 1989 resulted in the establishment of a price ceiling ($HECS^1$) set below the market price. Despite the Wran Committee's (1988 p. 79) claims, that the introduction of HECS would 'finance growth and enhance greater access to education', the price ceiling ($HECS_1$) creates excess demand equal to (Q_3-Q_s), resulting in this quantity of eligible applicants not receiving a place at university. The 1996-97 budgetary changes increased the price of higher education from $HECS^1$ to $HECS^2$. The model suggests that this would cause a decrease in the quantity demanded for higher education from Q_3 to Q_2. However, the increase in the price of higher education did not increase the number of university places, as a perfectly inelastic supply curve, the quota Q_s, unlike a normal supply curve is unresponsive to price changes. This would suggest any further increases in the level of HECS would not result in a greater number of Commonwealth Supported Places (CSP) but

rather a greater number of eligible applicants not receiving a place at university. The supply would only increase if the Government decided to fund more places, thus shifting the inelastic supply curve. Since 2005, universities have been allowed to charge fees up to 25 percent higher than the previous HECS level ($HECS^2$). The model shows that with the level of HECS increasing to $HECS^3$ the quantity demanded of higher education decreases further from Q_2 to Q_4. The decrease in the quantity demanded for higher education or fall in the level of applications since HECS was first introduced is now equal to Q_3-Q_4. The model also suggests that further increases in HECS, such as the removal of the 25 percent price cap on HECS, could mean students will be paying the full market price for higher education P_E but will receive less than the market equilibrium number of university places Q_E because of the quota.

The model demonstrates that, firstly, a time series study of enrolments will not show the impact of changes in HECS on the demand for higher education as supply is constrained. Secondly, an increase in HECS, such as the 1996-97 budgetary changes followed by the 2005 changes in HECS, results in a decrease in the quantity of higher education demanded or a fall in the number of applications, ceteris paribus. Thirdly, this model suggests that FEE-HELP positions would reduce the shortage of university places and increase the number of university graduates. However, any increase in the supply of university places will lower the quality of university graduates. Moreover, if the extra places provided by the Government are FEE-HELP positions then the standard of graduates would be even lower than if the Government provided extra Commonwealth Supported Places. This is explained in greater detail in the next section.

2.1.2 The quality of higher education

Not only are both higher HECS fees and a greater number of FEE-HELP places at university creating a more inequitable higher education system, academics such as Milbourne (2004) are also questioning the quality of Australia's higher education system. Milbourne (2004) argues many full fee paying places offered by universities have entrance scores five points lower than HECS-HELP places. Milbourne (2004 p. 4) argues that if a Law degree has a University Admission Index (UAI) of 97 for HECS-HELP students and a UAI of 92 for full fee paying students, then students are able to get access to university on lower merit as long as they can

afford to pay the full fees of the course. Milbourne (2004) argues that this is promoting an inequitable system that overlooks student merit. For example, a student who scores a UAI of 96.8, on merit should be admitted before a student who scores a UAI of 92, but the student is overlooked because of their inability to pay full fees. Table 2.1 shows the differences in cut-off scores for HECS-HELP and full fee paying places and the annual cost for students who obtain a full fee paying place.

Table 2.1 UAI (New South Wales) and ENTER (Victoria) cut-off scores for HECS-HELP and FEE-HELP students

University	Undergraduate course	UAI/ENTER HECS-HELP cut-off 2005	UAI/ENTER full fee cut-off 2005	Difference (%)	Annual fee for full fee (domestic) ($)
ACU-National	B. Ed (Primary)	85.15	80.15	5.00	$8600
	B. Teach/ B. Arts (Sec-Humanities)	83.10	78.10	5.00	$8600
	B. Arts/ B. Business	83.20	78.20	5.00	$10,000
Sydney University	B. Combined Law	99.60	96.15	3.45	$18,250-$19,950
	B. Eng (Aero) (Space)	99.40	94.40	5.00	$20,160
	B. Veterinary Science	98.45	93.45	5.00	$30,720
	B. Psychology	96.20	91.00	5.20	$20,160
Newcastle University	B. Economics	83.20	78.20	5.00	$12,070

Source: Modified from UAC Guide 2006 (2005) and VTAC Guide 2006 (2005)

Table 2.1 UAI (New South Wales) and ENTER (Victoria) cut-off scores for HECS-HELP and FEE-HELP students (contd.)

University	Undergraduate course	UAI/ENTER HECS-HELP cut-off 2005	UAI/ENTER full fee cut-off 2005	Difference (%)	Annual fee for full fee (domestic) ($)
	B. Teach/ B. Arts (Callaghan campus)	81.10	75.00	6.10	$12,340

University of New South Wales	B. Arts (Callaghan campus)	79.00	70.00	9.00	$12,760
Monash University	B. Arts/ B. Law (Clayton campus)	99.00	94.10	4.90	$18,850
	B. Accounting (Caulfield campus)	83.25	78.20	5.05	$16,480
University of Melbourne	B. Biomedical Science	95.70	90.05	5.65	$22,300
	B. Architecture	95.35	88.35	7.00	$19,150
	B. Arts/ B. Science	96.10	84.20	11.90	$14,700-$22,300

Source: Modified from UAC Guide 2006 (2005) and VTAC Guide 2006 (2005)

As shown in Table 2.1, the university cut-off scores for full fee paying places are often five percentage points or more lower than HECS-HELP places, with a full fee paying place in B. Arts/B. Science degree at the University of Melbourne 11.90 points lower than a HECS-HELP place. The cap of $50,000 placed on FEE-HELP loans means the majority of students applying for university apply for a HECS-HELP place. However, if the student can afford for example, $22,300 per year to study Biomedical Science at the University of Melbourne, they can gain access to a university place with an entrance score of 90.05, whereas a HECS-HELP student would need a score of 95.70 or more. This means a student who scores for example, 95.50, showing stronger academic ability than a student who scores 90.05 is overlooked because of the their inability to pay. Table 2.1 also shows that the differences in cut-off scores between HECS-HELP and full fee paying places are just as large for degrees of high student demand. For example, to study Combined Law at the University of New South Wales students need a score of 99.15, and to study Engineering (Aeronautical Space) at Sydney University students are required to have a score of 99.40, yet for both of these courses students who can afford to pay for a full fee paying place can enter with a score up to five points lower than HECS-HELP students. Likewise, a student, who has an entrance score five percentage points lower than the HECS-HELP, cut-off can gain a position in Veterinary Science at Sydney University, if they

are able to pay $30,720 per year over five years or a total of $153,600 for the course. The issue of students being able to enter university on their ability to pay, not merit, is worsened by the *Higher Education Support Act 2003* permitting universities from 2005 to offer up to 35 percent of their university places as domestic full fee paying places. This increase in the percentage of domestic full fee paying positions from 25 percent of each cohort to 35 percent of each cohort implies that there will be a greater proportion of students and consequently graduates who are of lower academic ability than previously. This is supported by the findings of both McInnis and Hartley (2002) and Applegate and Daly (2005) that show a student's average mark per subject or grade point average at university is positively related to the student's UAI.

There are further implications on the quality of Australia's higher education with university's policies restricting the percentage of students that can fail within any course. For example, according to the *ACU-National Handbook* (2005) for undergraduate units with 30 or more students, no more than 15 percent of the students can be awarded a pass conceded or fail grade. This means despite the standard of students within the unit, a minimum of 85 percent of students will pass. This becomes a greater concern with a lowering of the standard of entry to courses.

A further concern was raised by Abelson (2005) who measured the standards of economics students across 21 Australian Universities. Of the 21 Economics Departments surveyed, 11 Economic Departments felt that 30 percent or more of their first year economics students had standards that were poor or very poor. A further five Economics Departments believed between 20 and 29 percent of their students had standards that were poor or very poor. Abelson found 13 Economics Departments, or 62 percent of all respondents surveyed, considered the standards of students over the last 10 years had declined. Abelson (2005 p. 6) states, besides increasing student to staff ratios, the factors causing declining student standards are:

> Low entry standards of international and local students and low student work hours. Many survey responses highlighted declining level of student application as a major concern and an important determinant of standards.

Jopson and Burke (2005b) also raised concern about the quality of Australia's higher education being affected by lower entry standards for full fee paying students. Jopson and Burke (2005b) state that universities are dependent on 220,000 international students or the equivalent of one in every five students to financially survive. Jopson and Burke (2005b p. 1) state for some courses:

> Entry requirements have been lowered, courses have been made easier and marking has been softened to help overseas students cope with their English language problems.

Jopson and Burke (2005c p. 1) state the Australian Universities Quality Agency (AUQA) between 2002 and 2005 found 10 universities with off shore campuses had flawed audits. For example, the University of Southern Queensland in 2002 had to reimburse students in China for an unsatisfactory course. They also found that in 2002 the University of Ballarat had no established orientation program for staff, insufficient library facilities and misleading information about their Masters of Business Administration degree. In March 2003 AUQA found the University of Adelaide had no reviews in place for reviewing the academic performance of international students and in 2004 the University of New England could not guarantee the quality of its international programs. In addition, Jopson and Burke (2005c p.1) state that in 2005 AUQA had found that '11 active international partners and 1250 students raised concerns about financial viability and compliance with academic policies' at Deakin University.

In addition to these cases, where the quality of higher education has come second to the international revenue universities have received, the Independent Commission Against Corruption (ICAC) ruled corrupt conduct by the University of Newcastle. ICAC found both the former Head of the Graduate School of Business, Dr Ryder, and former Deputy, Dr

Rugimbana, ignored lecturer Firns complaint of plagiarism by 15 postgraduate business students. Instead of carrying out an investigation, Ryder and Rugimbana had ordered the assignments to be remarked by Dr Zeffane, whereby Dr Zeffane had passed all 15 students. ICAC (2005 p.1) claimed that the employees of the University of Newcastle had:

> engaged in corrupt conduct by breaching their duty to the University in having the assignments in question remarked contrary to University policy and without any proper investigation as to the truth of the plagiarism allegations.

Jopson and Burke (2005a) state that in 2004 the University of Newcastle's revenue from its 15 offshore operations equaled $4.5 million. It's most profitable faculty was the Faculty of Business and Law in Hong Kong and Malaysia generating a profit of $800,000. The University of Newcastle's plagiarism scandal known as the 'Malaysian affair' occurred within the Faculty of Business in Malaysia. Jopson and Burke (2005a p. 6) state it is 'still to be determined how much of Newcastle's role in the Malaysian affair was influenced by its desire to protect its international reputation'. However, ICAC (2005 p. 1) concluded the employees of the University of Newcastle were:

> motivated by a desire to avoid any potential adverse consequences that the allegations may have had for the offshore program, which as a result entailed the undermining of academic standards.

This raises serious concerns about the impact higher education reforms and market driven education is having on the quality of higher education in Australia.

2.2 The efficiency of higher education reform

Further questions surround the argument that the introduction of price flexibility will lead to both an improved allocation of resources and greater revenue for universities. Even though cost-effectiveness and flexibility are two of Nelson's (2002a) key principles for reform, there is no certainty under institutional autonomy that universities will distribute funding to their most productive departments. Despite Beer and Chapman's (2004 p.15) support for price flexibility, they state that the allocation of resources will improve 'so long as most of the additional revenue is delivered directly to the university departments'. There is considerable evidence that this may not be the case. Finney, Leslie and Stojanovich (2002 p.2) suggest the high fees paid by law students studying at Monash university had been used to support the operation of other faculties. They state this is because of the 'low maintenance nature of the law degree'.

Likewise, there is no certainty that universities will generate extra revenue from institutional pricing. Nelson (2004c) argued that under a 'one-size fits all' approach there was no incentive for universities to improve performance but under new reforms universities would be encouraged to charge prices that reflect the value of their courses. Firstly, universities have received mounting pressure to increase fees due to indexation shortfalls. Instead of universities charging competitive prices, the product of the 2003 higher education reform has been a near-uniform rise in fees of 25 percent to counteract the reduction in the proportion of public funding. Norton (2004 p. 15) states the 'artificial constraint on investment eased slightly' but while the Government allocates the number of student places for each university, universities cannot receive the full benefits of competition, as demonstrated in Figure 2.4. If the Government stipulates a quota for the number of student places for each university, then universities are unable to compete for more revenue, conflicting with the benefits of competition and theory of competitive prices. Universities are encouraged to act like 'competitive institutions', as under a free market, but this is not possible with supply constrained by the Government. Norton (2004) suggests penalising universities for exceeding their quota of students will limit student choice and encourage higher prices. Under the 2003 legislation, if universities enrol more than five percent above their quota of students, the Government takes the extra revenue. Despoja (2004c) suggests that the five percent limit on

over enrolling students has meant that one third of applicants in South Australia have missed out on a first round offer.

Most university submissions to the 2002 review of higher education rejected any increase in the price of education for students and instead advocated an increase in public funding. The Group of Eight[14] (Go8) (2002 p. 1) 'called for an overhaul of university financing', suggesting price flexibility and a greater control over revenue for universities. The Go8 supported the Government by suggesting that price flexibility would provide higher quality teaching and extend student access to university.

Professor Hay[15] (Go8, 2002 p. 1) stated:

> The Go8 universities are privileged to teach the great majority of the most able university students in Australia. This privilege brings with it an obligation to provide the highest quality teaching and learning opportunities and facilities.

2.2.1 The prestige of universities in a market characterised by asymmetric information

The Go8 supports Nelson's (2002a p. 37) claims that further deregulation of Australia's higher education system will lead to 'increased flexibility, promote greater responsiveness and encourage innovation and diversification'.[16] Norton (2004), however, argues one of the perils of price flexibility with price caps is the establishment of a 'price-prestige link', whereby prices are more likely to be attached to status and prestige than quality teaching and learning. Norton (2004 p. 1) states 'in the absence of real information, students and parents will fall

[14] Group of Eight (Go8) consists of the University of Queensland, University of Western Australia, University of Sydney, University of New South Wales, Australian National University, Monash University, University of Melbourne and University of Adelaide.

[15] Professor Hay was the former Chair of Group of Eight (Go8).

[16] The Go8's support for the deregulation of higher education systems is seen by the Go8's support for the introduction of fees in Germany. Germany has abolished free education by introducing student fees for higher education starting September 2005. The Go8 (2005 p. 1) states 'the lack of fees in Germany has traditionally made it a popular destination for foreign students'.

back on the market rule-of-thumb that more expensive goods and services are better than cheaper alternatives'.

Neoclassical economic theory assumes consumers make rational decisions and perfect information exists within the market. However, the market for higher education is characterised by asymmetric information, which leads to irrational decision making by consumers. Murray and Dollery (2004 p. 21) considers asymmetric information as the situation where 'information concerning the nature of the good or service being transacted is unevenly distributed between buyers and sellers. If either party is significantly better informed, sub-optimal outcomes will result'. James (1999 p. 7) argues that in the case of higher education, universities have the information that students want such as the quality of their degrees but students are 'not in a position to judge quality until they have experienced it'. James (1999 p. 7) suggests students therefore choose a 'course in an act of faith', hoping the prestige of universities indicates the quality of their degrees. However, prestige and quality are not synonymous. According to Wilkes and Krebs (1991 pp. 1230-1268) prestige is defined as the 'high status or reputation achieved through success, influence or wealth', whereas quality is defined as 'a degree or standard of excellence'. Busby (2000 p. 10), in turn, defines quality as 'the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs'. Busby states quality is not to be mistaken for 'degree of excellence' or 'fitness for use', as this would meet only part of the definition. In the case of higher education, the Department of Education, Science and Training (DEST) *Student Outcome Indicators of Australian higher education institutions for 2003* show that the prestige of universities does not necessarily correlate with the quality of degree, with some of the regional universities out performing their prestigious counterparts (this will be discussed in Section 2.2.2). Clarke (1998) suggests this lack of information that is available for students means students face problems when choosing between degrees, in particular, new degrees that have no market reputation. Clarke argues price flexibility and the move towards a market driven higher education system will only result in more adverse outcomes. The free market fee for higher education will not reflect the quality of the course, rather, student expectations of what they hope the degree will offer. Clarke also argues asymmetric information in a market

driven higher education system would also worsen the supply of quality programs. Clarke (1998 p. 4) states:

> This intrinsic uncertainty disadvantages quality suppliers given the impossibility of selling quality programs at their value-quality suppliers can never fully communicate their program's worth since dud suppliers will not admit their programs are duds. Given an inability to recover investment, some quality suppliers will therefore exit the market increasing the chance that observed programs are duds.

Clarke (1998 p. 4) argues that the growing presence of poor quality ('dud') programs will cause the price of programs to decline. This will result in high quality programs leaving the market for higher education. Clarke argues equilibrium will only be restored when poor quality programs have driven out most, if not all quality, programs. Clarke's argument against the introduction of price flexibility is based on Akerlof's (1970) *Lemons Principle*[17].

According to James (1999), the introduction of price flexibility in a market characterised by asymmetric information will mean universities will make more of an effort to market their prestige. James (1999 p. 7) states:

> Broadly speaking, our preliminary analyses of the data show that not all students are in a good position to judge the appropriateness of programs for them or to judge the quality of courses overall. A large number of prospective students base their decisions on quite limited, subjective information - the survey respondents' comments in the thinking behind their decisions removes any illusions that it is a logical, informed process… This is a situation in which institutions can trade on prestige and not quality, at least in the short run.

[17] Akelof, G. A. (1970) 'The Market for lemons: Quality uncertainty and the market mechanism' developed an alternative explanation why used cars are much cheaper than new cars. The 'lemons principle' refers to the presence of 'lemons' in the used car market reducing the value of cars in the used car market for all sellers including those sellers whose cars are not lemons.

This irrational decision making by students, when choosing which university to attend and which course to study, was addressed by the West Committee (1998) in the *Learning for Life. Review of Higher Education Finance and Policy*. The West Committee (1998) argued that there needs to be:

> incentives to encourage students to choose their studies carefully, while encouraging providers to compete vigorously in terms of the nature, price and quality of their offerings.

The West Committee (1998), in acknowledging students were subject to a lack of information, recommended a student centered funding model, otherwise known as a voucher system, for higher education. Clarke (1998) suggests the West Committee's reasoning behind recommending a voucher system is that students will have incentives not to demand low quality courses. However, Clarke (1998 p. 7) argues consumers are unable to select which programs are of less quality, 'asymmetric information biases supply toward degraded programs'. Akerlof's (1970) *Lemons Principle* suggests asymmetric information is a factor influencing the supply of poor quality courses not the consumer's ability to demand only quality courses. This would suggest that a free market will not equip students to demand quality courses but rather provide incentives for universities to offer poor quality courses. Frank (2006) supports this by arguing that if firms are unable to effectively communicate to consumers the quality of their product, they will not be able to charge a price high enough to cover added costs. Frank suggests there is no reward for institutions for producing higher quality products, if asymmetric information characterises the market. Instead, it would be more profitable for prestige universities to offer low quality courses.

Clarke (1998) argues, if anything, there are incentives for students to demand 'dumbed down programs', especially if employers want general rather than specialist skills, and if employers who are ill-informed of the program's quality, prefer degrees from prestigious universities. The West Committee (1998) made similar claims:

> Many employers do not look for discipline related knowledge when selecting graduates, and in fact value the generic attributes that are part and parcel of generalist courses like the arts and sciences.

Marginson states that the treatment of economics is an example of this trend. In a number of universities economics is no longer a compulsory unit of business. This has resulted in the number of students enrolled in economics to be approximately half the number that it was five years ago, with students picking other 'fashionable areas' such as marketing and management (Fullerton, 2005). Fullerton suggests that the 'dumbing down' of courses has already taking place with some universities becoming degree factories. This would suggest that the effects of price flexibility and the move towards a market driven higher education system is already driving out high quality programs. Since the 2005 changes in HECS, universities with prestige have been able to take advantage of both price flexibility and asymmetric information. Finney, Leslie and Stojanovich (2002) suggest the movement towards market driven higher education will create a two tier system, comprising high status universities, primarily the well established universities, and low status universities, mainly rural and suburban institutions. The benchmark for high status universities is not the quality of education but rather the prestige of the faculty. Finney, Leslie and Stojanovich (2002 p. 4) argue that if the quality of education is measured by the prestige of universities, universities will use 'window dressing' to compete for funding rather than real improvements to the degree structure.

2.2.2 The quality of higher education among Australia's universities and universities marketing 'prestige'

Thompson (2005) questions the quality of education produced by the highly prestigious Go8 universities. For example the level of student satisfaction with teaching in 2002 and 2003 was lowest for the University of Adelaide and University of New South Wales, two of the Go8, out of a total of 37 universities. This is supported by the Department of Education, Science and Training (DEST) *Student Outcome Indicators of Australian higher education institutions for*

2003.[18] The Course Experience Questionnaire (CEQ) despite its limitations, as discussed in Section 1.6.2.4, is the only available nationally Government recognised measurement of student outcomes. The CEQ of good teaching 2003 results[19] showed that the University of New South Wales and the University of Adelaide had the poorest teaching at 72 percent and 74 percent respectively, compared to an average of 81 percent (Table 2.2). The universities with the highest level of good teaching were the University of Ballarat, Murdoch University and the University of the Sunshine Coast at 89 percent. The CEQ for overall satisfaction for 2003 results showed the level of overall student satisfaction was the highest for the University of New England at 95 percent, while the University of Adelaide, Charles Darwin University and University of Western Sydney all had the lowest level of overall satisfaction at 86 percent, four percent below the average. Only three universities of the Go8 (the University of Melbourne, the University of Western Australia, and the Australian National University) had a level of overall student satisfaction greater than the average of 90 percent. For these three universities, the level of overall student satisfaction equaled 91 percent. So 'prestige' did not translate into good teaching. If students were fully informed and aware of the quality of teaching in all universities, then there may not be as much demand for places in universities with lower quality teaching.

Table 2.2 The levels of good teaching and overall student satisfaction for higher education institutions for 2003

University	Level of good teaching (%)	Level of overall student satisfaction (%)
University of Ballarat	89	92
Murdoch University	89	93
University of Sunshine Coast	89	94
University of New England	88	95
University of Queensland[a]	84	90
University of Western Australia[a]	82	91
University of Melbourne[a]	81	91
University of Western Sydney	81	86
Charles Darwin University	80	86
Sydney University [a]	80	90
Australia National University[a]	79	91
Monash University[a]	77	90
University of Adelaide[a]	74	86
University of New South Wales[a]	72	89

[18] These will be in 2006 the criteria for Government funding under the competitive Learning and Teaching Performance Fund.

[19] All results are according to the broad agreement crude percentage and not the broad agreement adjusted Percentage. This is because the broad adjusted percentage may not be as reliable due to large standard errors.

National average	81	90

[a] These are Go8 universities.

Source: Modified from DEST 2003d

Table 2.3 shows the university ranks and scores for each of the 38 universities for 2005. As seen in Table 2.3, only three of the Go8 universities were ranked in the top eight of all universities, with the University of New South Wales and University of Adelaide ranked 32nd and 36th respectively.

Table 2.3 University rank and score according to the criteria for teaching performance

University	State or Territory	Score	Rank
Wollongong University	New South Wales	34.24	1
Australian Maritime College	Tasmania	30.79	2
University of Melbourne[a]	Victoria	29.93	3
Swinburne University of Technology	Victoria	29.33	4
University of Queensland[a]	Queensland	28.73	5
Australian National University[a]	Australian Capital Territory	26.95	6
University of New England	New South Wales	25.56	7
University of Canberra	Australian Capital Territory	24.25	8
University of Ballarat	Victoria	24.08	9
University of Sydney [a]	New South Wales	23.93	10
Murdoch University	Western Australia	23.49	11
University of Western Australia[a]	Western Australia	23.42	12
Australian Catholic University	Multi-state	22.73	13
Monash University[a]	Victoria	22.16	14
Macquarie University	New South Wales	19.96	15
La Trobe University	Victoria	19.83	16
Charles Sturt University	New South Wales	19.44	17
University of Technology, Sydney	New South Wales	18.72	18
Victoria University	Victoria	18.65	19
University of the Sunshine Coast	Queensland	18.44	20
Deakin University	Victoria	18.35	21
Griffith University	Queensland	18.25	22
Edith Cowan University	Western Australia	17.91	23
Curtin University of Technology	Western Australia	17.45	24
University of Newcastle	New South Wales	16.31	25
Flinders University	South Australia	16.02	26
University of Southern Queensland	Queensland	15.39	27
Southern Cross University	New South Wales	14.83	28
RMIT	Victoria	14.49	29
James Cook University	Queensland	14.17	30
Queensland University of Technology	Queensland	13.67	31
University of New South Wales[a]	New South Wales	13.56	32
University of Western Sydney	New South Wales	12.85	33
University of Tasmania	Tasmania	12.00	34
Central Queensland University	Queensland	11.49	35
University of Adelaide[a]	South Australia	10.54	36
University of South Australia	South Australia	10.11	37
Charles Darwin University	Northern Territory	9.05	38

[a] These are Go8 universities

Source: Modified from Illing, 2005d

The criteria that were used by the Department of Education, Science and Training for ranking Australia's universities for teaching performance is shown in Table 2.4.

Table 2.4 DEST criteria for measuring teaching performance

Criteria	Weighting
CEQ (Course experience questionnaire) generic skills	17.91%
CEQ good teaching	18.50%
CEQ overall satisfaction	18.90%
Students in full-time employment after they graduate	11.48%
Those that go on to full-time study	10.29%
Drop-out or attrition rates	10.65%
Student progress or pass rates	12.26%

Source: Modified from Illing 2005d

A reflection of the benefit of the prestige that a university has is shown by the percentage of graduates in full-time work, as seen in Table 2.5. For all the Go8 universities, the percentage of students in full-time work is above the average except for the University of Adelaide, which equaled the average of 77 percent. Moreover, for all of the Go8, the graduate starting salary is above the average graduate starting salary of $36,993. This is significant given 22 universities out of a total of 37 universities have below average graduate starting salaries.

Table 2.5 Full-time employment rate and average graduate starting salary for higher education institutions for 2003

University	Full-time employment rate (%)	Average graduate starting salary ($)
Sydney University	83	$38,163
University of New South Wales	81	$40,608
Monash University	80	$38,382
University of Melbourne	84	$39,944
University of Queensland	85	$39,944
University of Western Australia	81	$41,070
Australian National University	81	$38,166
University of Adelaide	77	$38,640
National average	77	$36,993

Source: Modified from DEST 2003d

However, a caveat of using these two statistics is different universities offer different courses, whereby different courses lead to different occupations, that have different employment and salary rates. Moreover, the various states and territories have both different levels of average

income and cost of living. This could explain why of the seven universities to experience above average graduate starting salaries, that are not in the Go8, all are in New South Wales. Even though the average graduate starting salary would be positively skewed in New South Wales, because of the higher average weekly income when compared to other states, of the Go8, the University of Western Australia experienced the highest average graduate starting salary of $40,070, while the University of Sydney had the lowest average graduate starting salary at $38,163. Furthermore, the marketing of 'prestige' by 'sandstone' universities to future students often refers to the employment conditions of graduates, as opposed to student satisfaction or the quality of teaching, despite students often assuming that prestige means quality.

Finney, Leslie and Stojanivch's (2002) arguments of 'window dressing' and the link between university prices, prestigious and employment are reflected by the marketing of the 'sandstone' universities. The Australian National University (ANU) is the only university of the Go8 that did not increase fees for 2005, but similar to the other members of the Go8, deliberately markets the prestige of the university. The Australian National University, according to Norton (2004 p. 1), in a 2003 newspaper advertisement told prospective students that, if they went to ANU, they would have a 'prestige degree', that would give them an 'unfair advantage' in starting a career. Likewise, Chancellor McWha (2005 p. 1), of the University of Adelaide welcomes prospective students by stating 'you are joining one of Australia's most respected and prestigious universities, and also an institution that prides itself on the quality education it provides its students'. The University of New South Wales (UNSW) (2005a) also uses 'prestige' as a reason why students should pay full fees to study law. This time, it is justified by high employment rates and reinforces Clarke's (1998) argument of the importance of prestige to employers, more so than the quality of the degree. The University of New South Wales (2005a p. 3) states:

> A UNSW law degree has, in our view, the greatest prestige of any legal qualification in Australia. Employment rates for our students support this view and national student surveys demonstrate a very high satisfaction rate with the programs offered.

The University of New South Wales (2005b) also claim that their students enjoy their law studies more than students at other universities, backing this claim by suggesting the overall satisfaction ratings by the Graduate Careers Council of Australia's national survey support this. Yet, the Graduate Careers Council of Australia's *2004 Graduate Destination Survey* ranked Bond University first for 'overall satisfaction of Australian law graduate with course quality' and second for the 'proportion of Australian Law graduates in full-time employment'. The marketing of prestige instead of quality of education by 'sandstone' universities is misleading, especially for international students paying high prices to study courses in Australia. Despite claims of prestige and high employment, the UNSW (2005b p. 1) state:

> International students who are hoping to gain work experience in a law firm during their studies should be aware that the opportunity to do this is limited. Law firms generally restrict employment, including placement in their summer clerkship programs, to permanent residents or citizens of Australia.

According to James (2002), Australia's higher education system is a 'heavily reputable market' where reputation plays a powerful role in the market for higher education. Students consider the reputation of universities in their decision making. James (2002 pp. 3-4) states 'with a highly intangible product and with 'hard' information about courses and universities difficult to come by, the community relies to a degree on reputation passed on by word-of-mouth'. In addition James, Baldwin and McInnis (1999) point out:

> While a high proportion of 57 percent of respondents state that the reputation of the course is a strong influence, only 36 percent believe they have a reasonable or good knowledge of that reputation. Forty four percent of respondents indicate that the quality of teaching in the course is a strong influence, but only 25 percent claim to know much about it.

James (2002) argues the prestige and reputation of a university, although complex for students, is reflected in the entry scores of a university. James (2002 p. 3) states 'entry scores

are self-fulfilling, they support a self-maintaining hierarchy', where under panic decision making conditions students apply to universities with higher entry scores.
This is supported by Marginson (2005b) who argues a prestigious university with indifferent teaching will always be chosen by students over a newly established university with better teaching. Marginson (2005b p. 13) states:

> Status is determined by tradition (which advantages older universities), by selectivity (the scores required for entry) and by research, performance and scholarly reputation - none of which may be connected with teaching quality.

2.2.3 A self maintaining two tier system

The development of a two tier system with a self-maintaining hierarchy of institutions will further hinder student choice and the demand for less prestigious universities. If 'sandstone' universities are marketing the value of their degrees, then this will attach value to both past and current degrees. This could result in a greater number of students applying to the more prestigious universities, but given the limited number of student places offered by these universities, this will mean an even greater number of students will miss out. This raises the entry scores for the more prestigious universities, reinforcing James's (2002) argument of self-maintaining institutions. This then challenges the motive behind the 2003 higher education reforms of expanding student access to university education and supports the argument of Kemmis et al. (2003) argument that a positional good cannot operate on classical market principles (discussed in Section 1.6.1.1.2).

Schwartz (2000) states 'by giving each institution an enrolment limit, the Government protects the less popular universities', as students will apply to less prestigious universities in the second and third round offers. Although the demand for regional and suburban universities might be a consequence of the limitations set on student places for city universities, this does not necessarily result in the protection of less prestigious universities. Unlike 'sandstone' universities, who market the prestigious nature of their universities, regional and suburban universities cannot market a competitive price. With supply constrained, regional and

suburban universities are unable to increase revenue by offering competitive prices. Under new legislation, universities can only earn more revenue by increasing fees or having full fee paying students but given universities in regional and suburban areas respond to local needs and support a higher proportion of low income students, compared to the more prestigious universities, they are more constrained in raising their prices. Over 40 percent of students at Central Queensland University are from a low socio-economic area and over 70 percent are from rural areas. The average across all universities in Australia is 14.8 percent and 17.6 percent, respectively. Of the Go8 universities, six universities had less than the average percentage of low income students and seven universities had less then the average percentage of rural students. The University of Sydney, the University of New South Wales and the Australian National University all had percentages of students from low socio-economic areas less than seven percent, less than half the average percentage for low income students. The Australian National University's proportion of students from a low socio-economic area equals 3.7 percent, less than a tenth of the percentage of low income students at Central Queensland University. Alcorn and Rood (2004 p. 1) state the Age analysis of Department of Education data over 15 years shows that the 'two tier university system is already entrenched and is steadily worsening', where students from lower income areas are 'channeled to less elite institutions and clustered in less prestigious courses'. Alcorn and Rood (2004 p. 1) suggest that in 1991 students from high socio-economic areas (top 25 percent of Australia's population) equaled 50 percent of Go8's student population. Instead of the changes to HECS between 1991 and 2002 improving equity to access, the percentage of students from high socio-economic areas increased to 54 percent of the Go8's population in 2002.

Both Central Queensland University and Charles Sturt University (CSU) did not raise their HECS fees in 2005, due to concerns of student access and equity. However, both universities increased their fees from 2006. Central Queensland University increased their fees by 15 percent in 2006 and Charles Sturt University increased fees by the full 25 percent due to financial constraints. Professor Goulter of Charles Sturt University (2005 p. 1) states:

> There are significant financial challenges facing CSU in the next few years and to meet those challenges and enable the University to go forward in an intensely competitive sector, we need to increase our revenue base.

Yaman (2005b p. 4) suggests despite universities' lack of willingness to raise fees the University of Western Sydney (UWS) was the 31st university to increase HECS fees when it raised fees by the maximum 25 percent in 2006. This is in spite of Professor Reid, Vice Chancellor at the University of Western Sydney, (Yaman 2005b p. 4) stating in 2004 that 'we are very aware of the detrimental effect an increased debt burden could have on students and their families in western Sydney'. Yaman (2005b) suggests UWS's decision to increase fees by the maximum 25 percent, although 'regrettable', is to help reduce their nine million dollar budget deficit. Yaman (2005c p. 4) states that the movement by UWS to increase fees reinforces the 'corruption of the concept of partially deregulated HECS'. This situation where most universities in 2006 will be charging fees 25 percent higher than previous HECS levels contradicts Nelson's (2003a) claims of a higher education system characterised by variable prices.

2.2.4 The effects of increases in HECS on the participation of students from different socio-economic backgrounds

Equally important, as the impact of HECS upon the demand for higher education, is its impact on socio-economic disadvantaged students. Mullarvey, Chief of the Australian Vice-Chancellors' Committee (AVCC) highlighted, 'the AVCC has never considered the HECS impact based on postcodes' (Bissett and Roa, 2004 p. 5). HECS, an income contingent charge, was designed to minimise potential negative effects on the participation of disadvantaged students, yet according to DEST (2001b p. 186), university students from low socio-economic backgrounds were still highly under represented, at 16 percent of the student body while representing 25 percent of the population.

There is some disagreement among academics that HECS does not deter the participation of disadvantaged students in higher education. Aungles et al. (2002) state that the share of low

socio-economic status students (SES) was unchanged but the share of males of low SES in HECS band three courses has declined 38 percent since the 1996-97 budgetary changes.

Chapman and Ryan (2003 p. 14) supported by the AVCC maintain 'HECS did not result in decreases in the participation of prospective students from relatively poor families, although the absolute increases were higher for relatively advantaged students, especially in the middle of the wealth distribution'. Chapman and Ryan's review of literature for the AVCC, reassures that HECS has had no discernible effects upon students access to higher education stating 'the relatively disadvantaged in Australia were less likely to attend university even when there were no student fees'. This supports the earlier study by Robertson, Sloan and Bardsley (1990) that low SES students are not debt averse.

Andrews's (1999) study calculating changes in the proportions of low SES students concluded that the share of low SES students was unchanged despite the 1996-97 budgetary changes. The combined analysis of attitudes to debt reinforced the hypothesis that student participation in higher education was determined by students' values and attitudes rather than income.

However, as Jackson (2003a p. 12) suggests, Andrews's examination of literature before 1998 does not accurately assess any implication of the 1996-97 budgetary changes in HECS on student access to higher education. Furthermore, Andrews stated (1999 p. 25) 'HECS does not appear to have substantially affected the level of applications or enrolments of students in general, although, little can be said concerning students from low SES backgrounds'.

Contrasting to this dominant view, that HECS does not deter the participation of students of low SES, is James's (2002) study surveying 7000 year 10 to 12 students across Western Australia, Victoria and New South Wales. In contrast to Andrews's (1999) study of values and attitudes, James (2002 Ch. 5) found appreciable social stratification in the values and attitudes of students towards higher education, concluding that the socio-economic background of students was a decisive factor influencing student participation in higher education. The main findings of James's (2002 pp. 33-34) study were that, 39 percent of low SES students believed that the costs of university may stop them from attending university compared to 23 percent of

high SES students, while 41 percent of low SES students stated their family could not support them at university, with 36 percent stating they would have to support themselves. The main limitation of both James's and Andrews's studies is the use of surveys to assess the impact of 1996-97 budgetary changes in HECS upon the participation of students of low SES, as attitudes are not synonymous with student behaviour. The limitation of using surveys was overcome by Wright (2005) who carried out a repeated cross-section of ABS Census data for the Sydney region from 1996 and 2001 to determine the relationship between changes in relative income and the proportion of students in the 46 Statistical Local Areas (SLAs).

Wright (2005 p. 55) found that the participation of students from all socio-economic areas increased between 1996 and 2001, but the increase in student participation was the result of a greater number of university places offered by the Government and 'not a reflection of higher student demand for university education'. Wright's model showed that the increase in the participation of students from higher socio-economic areas (a relative income of 1.25) between 1996 and 2001 was nearly three times the increase in the participation of students from lower socio-economic areas with a relative income of 0.75. Instead of the changes in HECS promoting greater access to university for students from lower socio-economic areas, Wright (2005) argues that the changes in HECS resulted in a lower opportunity for students from lower socio-economic areas to participate in higher education. Wright (2005 p. 56) states that the 1996-97 budgetary increases in HECS 'has consequently led to greater inequality and the under representation of students from lower socio-economic areas to increase'.

In addition to the study by Wright (2005), Contractor and Noonan (2003b) also suggest the *National Report on Australia's Higher Education Sector 2001*, a report delayed more than fifteen months, which Carr states was 'suppressed by the Government', showed that the proportion of university students from disadvantaged backgrounds had declined sharply since HECS fees were increased in 1996. Both Contractor and Noonan (2003b) and Kingston (2003) suggest the original National Report was not only suppressed by the Government but the section on equity to access was edited by Dr Shergold[20] to remove any negative

[20] Dr Shergold was head of the Department of Prime Minister and Cabinet.

consequences on the participation of students from low income areas. Contractor and Noonan (2003a p. 3) state:

> Current and former departmental officials said Dr Shergold claimed inclusion of the sections would jeopardise the Federal Government's position that no one would be worse off if it were to introduce new fees under proposed changes to university entry. The deleted material included figures showing that applications for university entry had fallen since the Government raised fees in 1997, particularly from poorer and older students.

Furthermore, a study by Borg (2006) comparing university and TAFE students in New South Wales showed that TAFE provided equal access to post-school education based on socio-economics groups in 2001. University students from low socio-economic areas, however, were severely disadvantaged. This suggests that students from low socio-economic backgrounds are not opposed to post-school education but rather are deterred from the higher cost of university education. The Borg study did show, however, that when TAFE fees were increased in 2004, there was a considerable decline in TAFE enrolments.

2.2.5 The impact of tax concessions

In addition to the impact of increases in HECS worsening the opportunity for students from low socio-economic areas to participate in university, is the regressive nature of the FEE-HELP scheme. The more a full fee paying student earns, while studying at university, potentially the greater the tax relief they can receive. In an email on 5th September 2005, R. Mitchell from the Department of Education, Science and Training revealed that full fee paying students who are earning an income while studying at university are entitled to tax deductions, if they meet the self education expenses criteria with the exception of the 20 percent loan fee. If the student meets the self education expenses criteria, the higher the income the student earns while studying, the greater the proportion of their fees paid by the Government. For example, an individual working in the business sector earning $75,000, who pays their fees up-front, can

claim a tax deduction equal to 47 cents in every dollar spent on higher education. Chapman (2001) argued free higher education was a system of middle class welfare, however, one could also argue that the current higher education system is a system of upper class welfare. Students from low socio-economic backgrounds are less likely to benefit from these tax deductions as they are most likely to be dependant on their parents' income and less likely to pay the full fees that universities charge. Most low income students, who receive Government assistance such as, Youth Allowance, have a low level of personal income or no personal income at all, as their entitlements are affected by the Government assistance they receive. As a result most low income students pay either no tax or the lowest rate of personal income tax. In addition, students who pay the lowest rate of personal income tax at 17 cents in every dollar, are less likely to be able to claim any tax deductions on their higher education expenses, as most would have enrolled in a course where the FEE-HELP loan limit of $50,000 covers the entire cost of the course. Even these students would be unable to receive any tax deductions, as they have deferred their cost of study. This could mean that in some circumstances the Government is contributing a higher percentage towards the cost of study for wealthier, less able students enrolled in a FEE-HELP place, than to poorer more able students who have achieved a HECS-HELP place at university. Furthermore, the size of the Government contribution on behalf of a FEE-HELP student will vary depending on the course and university the student attends, as the *Higher Education Support Act 2003* only sets the minimum rate universities can charge for FEE-HELP places and sets no maximum fee. The only restriction for universities is that the charges for a FEE-HELP place cannot be lower than the fees Commonwealth supported students pay.

Table 2.6 shows the different level of contributions made by students studying a Bachelor of Business degree at ACU-National. A HECS student who pays their HECS fees up-front pays $4383 per year whereas a student who defers their HECS payments pays $5479 per year. Meanwhile, a student enrolled in a full fee paying place for a Bachelor of Business degree at ACU-National would normally pay $10,000 for the year. However, if the student is working, they can claim up to 47 percent of their fee as a tax deduction for self education expenses and actually only contribute $5300 per year. This means that a full fee paying student, who is able to claim a 47 percent tax deduction, pays $179 less per year for their degree than a HECS

student who defers their HECS payments. The Government's contribution towards a Commonwealth supported student studying a Bachelor of Business degree at ACU-National is $2371. The Government pays an additional $1096 for a student who is able to pay their HECS payment up-front. In the case of a student, who is able to pay full fees and claim a 47 percent tax deduction, the Government contributes $4700 towards the cost of a business degree. The Government pays a greater contribution towards the cost of a business studies degree for a student who pays full fees and claims a 47 percent tax deduction than for all HECS students. The Government contributes $1233 more per year for the full fee paying student who claims tax deductions, than for a student who pays their HECS payment up-front, and $2329 more per year than a HECS student who defers their HECS payments. This shows that higher income working students can benefit from the system and that it is largely regressive in nature. It also shows that it favours less able fee paying students earning an income.

Table 2.6 The different contributions made by students for a Bachelor of Business degree at ACU-National

Bachelor of Business degree	Student contribution per annum [a] ($)	Total Government contribution ($)
A student who pays full fees and claims a 47 percent tax deduction at ACU-National	$5300	$4700
A student who pays HECS up-front at ACU-National	$4383	$3467
A student who defers the HECS payments at ACU-National	$5479	$2371
A student who pays full fees at ACU-National can not claim a deduction	$10,000	$0

[a] These levels of student contributions are based on 2005 fees and 2004-05 income tax rates.
Source: Modified from UAC 2005 and ACU-National 2005

2.3 The real change in the number of Commonwealth Supported Places (CSP)

It could be argued that of the 34,000 additional Commonwealth Supported Places (CSP) offered by 2008, there is no real increase in the number of places offered to medicine, nursing and teaching but rather the reshuffling of places from marginally funded students to the national priorities. It could also be argued that there will be no real reduction in the number of students missing out on a university place. In addition to the unequal distribution of CSP

between states and territories and between institutions, there is arguably a loss of CSP for the higher education system as a whole. Of the 34,000 additional CSP places, 6700 places are allocated for population growth and 24,883 are converted marginally funded places, with the remaining 2417 CSP places allocated to national priorities and medicine. Kniest (2004) suggests that in 2003 there were 33,600 over-enrolled places, yet the Government is converting only 24,883 marginally funded places into CSP by 2008. This would mean not only a shortfall of 8717 marginalised funded places, that are not converted to fully funded places, but an even greater number of HECS-liable places lost. Instead of providing an additional 34,000 places, there has been a reduction in the number of HECS places, with its exact size depending on the level of unmet demand and student population growth. This is supported by Phillips et al. (2003 p. 1) who state, 'the net change resulting solely from *Backing Australia's Future* is a reduction in HECS-liable places of 1175 EFTSU in 2008 compared with 2002'.

According to the NTEU (2004d), the impact of a reduction in HECS-liable places is heightened by the growing level of unmet demand. The NTEU (2004d p. 1) states:

> 63,000 applicants were not offered university places for courses for which they applied and met the eligibility criteria. This represents 27.7 percent of all applicants. In other words, almost one third of all applicants were unsuccessful in applying for their preferred course of study.

Despite the Government's claim of providing additional university places for 2005, Rood (2005b) suggests 19,295 Victorian students missed out a first round offer and that there was still a high degree of unmet student demand. In 2004, the number of eligible students, according to the AVCC (2004a p. 2) who did not receive an offer, equaled 63,329 applications, 0.3 percent higher than 2003. Maiden (2004a p.1) suggests that in 2004, 30 percent of students did not receive a position in South Australia and Western Australia and the level of unmet demand in Queensland equaled 9000 students or one in five applicants. The level of unmet demand in Queensland in 2004 was nearly the equivalent of the total number of converted marginally funded places for the nation for 2005.

Phillips et al. (2003) suggest that there is a vicious cycle with the Government basing their future allocation of Commonwealth Supported Places (CSP) on participation rates. The level of participation rates is determined by supply not demand, therefore a decline in the level of participation rates is a response to constrained supply, not falling demand. As a result these falling participation rates lead to the Government providing fewer additional HECS-liable places in the future. This in turn consequently constrains supply and leads to a further decline in participation rates.

Nevertheless, Nelson suggests the level of unmet demand of 63,329, as estimated by the AVCC, is overestimated due to double counting and the inclusion of ineligible students (NTEU, 2004b). Nelson suggests that when the AVCC subtracted ineligible students and double counting, the level of unmet demand was more realistic, with unmet demand between 19,200 and 24,300. The NTEU (2004b) argues that by Nelson using the second estimation of the level of unmet demand, to suggest that 34,000 addition places will be sufficient, is in itself double counting and incorrect. The NTEU (2004b) suggests both of the AVCC's statistics are useful indicators, when showing the lack of student places offered in university, but it's a façade to suggest the latter estimated level of unmet demand will be covered by the 34,000 additional places set by the Government. The NTEU (2004b) argues that those students who missed out on a position at university in 2004 did not include students who were marginally enrolled, therefore, by suggesting, the 34,000 places, which includes the conversion of marginally funded places, will reduce the level of unmet demand, is in itself double counting.

Despite the level of unmet student demand for university places, Nelson (2004a) further justifies the number of fully funded places at 34,000 by suggesting there should be 'reasonable' supply to balance demand. Nelson (2004a) suggests that given 70,000 students drop out of their course and do not return to university, and only one in 10 students missed out on a university place, when ineligible students and double counting are excluded, 34,000 places represent a reasonable supply of additional student places. Despoja (2004a p. 1) does not accept Nelson's solution for reducing unmet demand by relying upon students to drop out of university. She considers that 'it was important to note that four out of 10 university entrants would drop out of their university courses' is not a remedy for reducing unmet

demand but rather shows the difficulties facing students. However, Norton (2005 p. 11) supports Nelson by stating:

> Academically weak students often struggle at university. Although Year 12 scores do not set academic destiny—people who do poorly at school sometimes do well at university, and vice versa—on average the lower your school marks, the higher the chance you won't finish. For some, rejection saves them from an expensive mistake. What looked bad news at the time is for the best in the long run.

In reality though, the students, who are less academically able and fail to get the university entrance mark, can pay full fees and get into university that way. The opportunity for university then becomes based on income not ability. Norton's statement also supports the view that lower UAI entry marks will lower the standard of university output.

2.4 Changes to the level of student contributions as a proportion of course costs

In recent years the contribution by students towards the cost of university has increased while the proportion of Government funding towards higher education has declined. This has been exacerbated by both the introduction of price flexibility and the movement towards the Commonwealth Grant Scheme in 2005. The NTEU (2003c) suggests that in 2005 the average contribution by students towards their cost of study is 50 percent, with law students paying close to 100 percent of their course costs and business and economics students paying 86 percent of their course costs. The NTEU (2003c) estimates are derived after considering Karmel's (1999) calculations of the level of student contributions as a proportion of the cost for each discipline for 1997. Karmel's (1999) calculations indicate, after the introduction of different HECS bands, students on average contributed 40 percent towards the cost of their education. Karmel estimated the contributions of law students equaled 80 percent of their course costs and the contributions of economics and business students equaled 69 percent of their course costs.

Despite these estimates, Nelson (2005b p. 2) states 'under these proposals [2005 changes], students will contribute through an income contingent loan, on average approximately 27 percent of course costs'. Nelson (2004b) suggests students in 2005 will contribute 26.8 percent towards the cost of education, an increase of 0.7 percent from 26.1 percent in 2001. Nelson (2004b p. 2) states these estimates are 'calculated by determining the actual value of student contributions through HECS-HELP, as a percentage of the total funding for educational costs provided by the Commonwealth to higher education institutions'. The NTEU (2003c) suggests total HECS payments ($1,734,000) divided by operating grants ($4,369,240) shows the level of student contributions in 2001 was 40 percent not 26.1 percent. The difference between the two estimations is the first calculation by DEST excludes the discounts students receive and the non-repayments of HECS. A limitation of this estimation is the assumption that discounts to students only benefits the students receiving the discount. The theory of discounting indicates Government's revenue will increase, if students repay their debt earlier.

Table 1.8 shows student contributions as a percentage of course costs range from 29 percent for nursing to 85 percent for law. Although the calculations in Table 1.8 for the disciplines, law and economics and business are not as high as the NTEU (2003c) estimates, they show the level of student contributions have increased since Karmel's (1999) 1997 estimates. Despite the Government's claim that HECS bands are based on the future income of graduates and course costs, students studying dentistry and medicine only contribute 35 percent towards the cost of their courses while students studying education, a national priority, contribute approximately half of their course costs. The validity of the claim that HECS bands are based a student's future income and course costs will be tested in Chapter Three. Law and economics students pay the highest proportion of their course costs, even though they are relatively lost cost disciplines for universities to run. Despite students paying more to study at university, universities are receiving less Government funding per student. The NTEU (2003c p. 14) estimates universities received '$1173 less per student in 2001 than they did in 1996'. This is despite Nelson stating 'as far as the funding per student is concerned, I certainly don't accept that it's gone down' (Fullerton, 2005 p. 2).

2. 5 Challenges to competition within higher education

It is important to consider whether the introduction of contestable funds and the reforming of higher education will result in greater efficiency, flexibility and improved resource allocation. Under a competitive system institutions are to allocate their resources to those departments that are most efficient and the viability of certain disciplines would ultimately depend on their cost-effectiveness. Nelson (2002a p. 11) has indicated that universities are to maximise their use of resources and become like competitive businesses under National Governance Protocols and states that:

> Given the level of public investment in higher education it is reasonable for the public and the Government to expect that higher education institutions will make cost-effective use of the resources provided to them.

A further adverse outcome of the higher education system is the existence of courses not based on their value to society but merely based on their cost effectiveness to institutions. On the one hand, the aim of reforming higher education was to enhance student choice and diversity, on the other, Nelson (2002a p. 126) argues universities:

> persist with unviable subjects with miniscule enrolments and indeed continue to proliferate such courses. A reduction in resources devoted to small enrolment offerings, including through collaborative arrangements, may release additional resources to service the areas of growing student demand.

2.5.1 Internal cross subsidisation

The Government's model of efficient resource allocation and greater transparency is undermined by cross subsidisation. Anecdotal evidence demonstrates widespread cross subsidisation of units. Funds are distributed to universities based on the Equivalent Full-Time Student Unit (EFTSU) formula of the Government and then allocated by universities to faculties to meet the needs of the units, such as wages and operating expenses. There is,

however, a growing tendency that low cost disciplines, such as law and economics and commerce that attract relatively high HECS fees, end up cross subsidising more costly disciplines. This is supported by the Australian Law Students Association (ALSA) (2003) who argue the band three fees of law students have been used to cross subsidise teaching in other disciplines, yet the quality of education and services for law students have not improved. Instead full year courses have been reduced to semester long courses, law schools have been merged into other departments and many services have ceased, such as research and learning centres to specifically study law. This goes against the theory of improved resource allocation where resources are allocated to those courses which are most cost-effective. In addition to law, Wroe (2005 p. 7) suggests teaching and education courses are seen by universities as 'cash cows', that is, courses that provide the necessary funds to subsidise medicine and engineering, rather than simply providing students with greater choice.

The *University of Melbourne's 2005 Budget* reports that total income was forecasted to be $361,001 million, including $149,801 million from Commonwealth Grants Scheme and $91,244 from HECS. Of the $361,001 million, only $183,367 million or 51 percent is allocated to the university's faculties. Of the additional $5,339 million dollars received from charging the maximum 25 percent higher student fees (HECS-HELP), only $3,737 million or 70 percent is given to the university's faculties (University of Melbourne, 2005 pp. 29-31). This supports anecdotal evidence that suggests often as high as 50 percent of non-Government income supports the costs of administration. The University of the Sunshine Coast's, Professor Thomas (2005 p. 1) states the recent reforms of higher education have:

> increased the administrative costs of universities, and reporting and auditing (academic and financial) requirements demand more administrative staff, thus diverting funds from academic pursuits.

The third of the five principles in the University of Melbourne's University Funding Model (UFM) (University of Melbourne, 2005 p. 16) states 'sufficient funds should be retained to provide permanent or temporary cross subsidisation to maintain programs regarded as desirable'. For example, Asian studies within the Faculty of Arts receives a 'bonus' 0.3

EFTSU to the total student load. The UFM allocates funding to individual faculties based on the following criteria; research training, institutional grant scheme, research infrastructure block grant and coursework. Arguably, the most variable component of the criteria is coursework funding. Coursework funding is comprised of 25 percent of funds being allocated at a flat rate per EFTSU while 75 percent of funds are allocated on a pro-rata basis that includes relative costs. Besides the Melbourne Business School, the Faculty of Economics and Commerce is the only faculty out of 11 to have a coursework weight of one while Veterinary Science has a course work weight of four.

Table 2.7 Coursework weights for each faculty

Faculty	Coursework weight	DEST weight
Faculty of Architecture, Business and Planning	1.6	1.6
Faculty of Arts	1.5 – 1.8 (depending on discipline)	1.0-1.6
Faculty of Economics and Commerce	1.0	1.0
Faculty of Education	1.8	1.4
Faculty of Engineering	2.2	2.2
Faculty of Law	1.5	1.0
Faculty of Medicine, Dentistry and Health Sciences	1.5 – 3.7 (depending on discipline)	1.6-2.7
Faculty of Science	2.2	2.2
Faculty of Veterinary Science	4.0	2.7
Melbourne Business School	1.0	1.0

Source: Modified from University of Melbourne 2005 p. 20

The UFM criteria, in particular the course weight funding for each faculty, has resulted in the allocation of funds varying between faculties and not necessarily corresponding to the HECS fees students pay and the Government's funding formulas. Table 2.7 shows the coursework weight for Veterinary Science of 4.0 results in $4,311,065 being allocated to the faculty (Table 2.8) while a coursework weight of 1.0 (Table 2.7) provides the Economics and Commerce Faculty $9,791,546 (Table 2.8). One possible explanation for the differences in the allocation of funds is the number of students. Total teaching EFTSL (excluding all full fee paying students) for Veterinary Science is 201 and for Economics is 1830. This means the funding per

teaching EFTSL is approximately $21,448 for Veterinary Science and $5351 per Economics and Commerce student. In Table 2.8 the funding allocated to the Science Faculty is $31,401,080 and with a total teaching EFTSL of 2680 this equals $11,716 per student and for the Faculty of Medicine, Dentistry and Health Science $52,863,306 has been allocated for a total of 2975 teaching EFTSL equaling $17,769 per student.

Table 2.8 Funding to faculties under the UFM funding model for 2005

Faculty	UFM funding allocation 2005 ($)	Number of EFTSU including undergraduate and postgraduate	Funding per student (EFTSU) ($)
Faculty of Architecture, Business and Planning	4,358,961	650	6706
Faculty of Arts	28,749,138	3858	7452
Faculty of Economics and Commerce	9,791,546	1830	5351
Faculty of Education	16,352,755	2100	7787
Faculty of Engineering	18,594,585	1540	12,074
Faculty of Land and Food Resources	11,219,665	775	14,477
Faculty of Law	5,835,273	875	6669
Faculty of Medicine, Dentistry and Health Sciences	52,863,306	2975	17,769
Faculty of Music	2,626,426	336	7817
Faculty of Science	31,401,080	2680	11,717
Faculty of Veterinary Science	4,311,065	201	21,448

Source: Modified from University of Melbourne Budget 2005 p. 32

Although there are differences in the relative cost of each course, each faculty ends up receiving a different proportion of their total revenue than is allocated by Government funding and HECS income. The level of HECS that students pay and the model of Government funding now based on disciplines rather than average student cost are supposed to reflect the relative cost of the course. Yet the funds allocated to each economics and commerce student at

the University of Melbourne is $5351, $1498 less than the HECS fees students pay at $6849. This means economics and commerce students not only receive $1498 less funding per student than they are paying but they are not receiving any of the Government's funding to the faculty at $2371. A total of $3869 or 42 percent of both Government funding and HECS income is not allocated to the Economics and Commerce Faculty. This unfair outcome for economics and commerce students should mean students should pay a lower amount of HECS equal to the funding they receive per person minus the Governments contribution. It also indicates price flexibility does not deliver efficient outcomes or value for money. Even though the Faculties of Veterinary Science, Science and Medicine, Dentistry and Health Science receive less than their allocated total revenue from Government funding and HECS income, unlike the Faculty of Economics and Commerce, funding is at least greater than the HECS fees students pay. For example, science students pay $6849, the same as economics and commerce students but the Faculty of Science receives $11,716 per student. However, veterinary science, medical and dentistry students pay $8018, yet the faculties receive $21,448 and $17,769 respectively per student. The funding per person shows each faculty receives a different proportion of Government funding and HECS income. For example, of the $22,756 allocated to Veterinary Science, the faculty receives 94 percent of their designated income, whereas the Faculty of Economics and Commerce receive only 58 percent of their designated income. Another approach to demonstrating the level of cross subsidisation is to minus the Government contribution from the faculty's allocation of funding to determine the proportion of HECS students pay that is actually allocated to the relevant department. The funding for each economics and commerce student is $5351, if the Government's contribution is $2371 then of the $6849 students pay, $3869 is allocated to the department and $2980 or 44 percent of the HECS that students pay is allocated outside the department to areas such as administration. Whereas of the $21,448 allocated to each veterinary student, $14,738 is contributed from Government funding and $6710 is revenue from HECS, with $1308 or only 16 percent being allocated to other expenses.

To complement this cross subsidisation of HECS fees is the cross subsidisation of funds from full fee paying domestic and international students. Deventer, Dean of the Faculty of

Engineering at the University of Melbourne, (2004 p. 1) highlights the importance of international full fee paying students by stating:

> With 28 percent of our undergraduate and postgraduate student body being from overseas, it is noteworthy that these students contribute 50 percent of our funding for teaching, which results in substantial cross subsidisation. Unless Government funding is indexed properly, the percentage of the budget derived from overseas student fees will rise even further.

Table 2.9 shows 43 percent of total full fee paying funds in 2005 were allocated away from faculties to support other expenses. There are also different proportions for each discipline, ranging from 73 percent for Medicine, Dentistry and Health Sciences to 42 percent for Music. The University of Melbourne allocates 73 percent of full fee paying revenue to the Faculty of Medicine, Dentistry and Health Sciences complementing the existing funds of $17,769 per student. Yet the university allocates 59 percent of full fee paying revenue to the Faculty of Economics and Commerce, the most valuable full fee paying discipline, to complement funding of $5351 per student. If the Economics and Commerce Faculty was allocated 100 percent of the full fee target revenue, funding per full fee paying student would be $18,114, given that there is a target of 3075 teaching EFTSL, but the faculty receives only $10,959 or 59 of full fee paying revenue per student. Although no faculty receives 100 percent of full fee paying revenue, the Faculty of Medicine, Dentistry and Health Science receives $12,436 per student, approximately 73 percent of full fee paying revenue. Overall, the revenue received from the Government, HECS and full fee paying students for the disciplines within the Faculty of Economics and Commerce have become valuable sources of income for the University of Melbourne to be redistributed to other faculties and other operating expenses.

Table 2.9 The allocation of full fee paying income to faculties for 2005

Faculty	2005 Fee target (full fee paying students) ($)	2005 Faculty allocation ($)	Proportion or fee target (%)
Architecture, Building and Planning	13,570,000	6,650,000	49
Arts	23,672,000	15,200,000	64

Economics and Commerce	56,699,000	33,700,000	59
Education	7,628,000	4,400,000	58
Engineering	33,619,000	14,300,000	43
Land and Food Resources	4,723,000	2,100,000	44
Law	22,212,000	12,500,000	56
Medicine, Dentistry and Health Sciences	36,464,000	26,800,000	73
Music	2,376,000	1,000,000	42
Science	27,274,000	12,850,000	47
Veterinary Science	5,587,000	3,500,000	63
Other	1,396,000	0	0
Total	235,220,000	133,000,000	57

Source: Modified from University of Melbourne 2005 p. 50

Similarly, James Cook University (2002 pp. 5-7) suggests that the money from courses such as Marine Biology, Tropical Biology and Earth Sciences, that attract international fee paying students, cross subsidise HECS places in these courses and without cross subsidisation would not be offered. This would suggest diversity is not being preserved by competition but rather by what disciplines universities choose to cross subsidise. This contradicts the Government's claim of a higher education model with an efficient allocation of resources to disciplines that are market driven. An efficient market based higher education system should not result in students paying more for their education than the true cost of the courses. Nelson not only admits to the presence of internal cross subsidisation within universities but also the role it plays for long term success of several disciplines. Nelson (2002a p. 17) states:

> Clear policies need to be developed for balancing the rewards for staff involved in entrepreneurial activities and cross subsidising other areas in order to sustain the broader mission and reputation of the institution.

Moreover, Nelson (2002a, preface) states:

> In considering reform, consideration must be given to the critical importance of humanities, social sciences, languages, fine arts, literature and philosophy. These

> areas do not find it easy to source non-Government funding though they play a key role in moulding our values, beliefs, the way we relate to one and other and see our place in the world.

2.5.2 Mergers and Government intervention

The theory underlying the changes to Government funding that of enhancing competition to improve diversity and efficiency is not only challenged by the presence of cross subsidisation but also the cooperation agreement between Sydney University and the Australian National University signed in February 2005. Professor Brown, Vice Chancellor of the University of Sydney (2005 p. 1) states:

> This is a radical venture which envisages joint planning in long term research initiatives, cross-credit of courses even joint badging of degrees in due time and shared marketing presentations overseas.

Brown (2005) suggests that the agreement is a response to both ANU and Sydney University securing their own destinies and to the poor investment into higher education. Brown also argues that the outcome of the Backing Australia's Future Reform package has not been establishing differentiation between institutions and promoting universities based on their 'status' and 'prestige' rather the equalisation of universities with the aim of all 37 universities to have equal success and emulate Harvard University.

Despite the Government's aims of encouraging greater diversity within the higher education sector and for universities to act like 'competitive institutions', according to Illing (2005a), Nelson welcomed the merger between three of the five universities of Western Australia, Curtin University of Technology, Edith Cowan University and Murdoch University to create a 'mega uni' of 70,000 students. Nelson's support for mergers is on the premise that they will create economies of scale, economies of scope, better productivity and efficiency. Nelson argues that there needs to be structural reform within the higher education sector with universities being encouraged to share courses, rationalise offerings and consider the prospect

of merging (Illing, 2005b). Despite Nelson's claims that the Government is not forcing universities to merge, Macklin argues the Government's higher education policies are creating no other choice for universities (Illing, 2005a). Macklin states more universities will merge given the financial situation they are in, for example, 'half of the universities in New South Wales are in a deficit' (Illing, 2005a). The claims by Nelson and Macklin would suggest that the there are currently too many institutions within the market for higher education for all universities to remain viable. However, if the Government's higher education policies are aimed at amalgamating universities in order to create greater productivity and efficiency and avoid budget deficits, then questions surround why the Government has made the private university, Notre Dame University, a national priority. Of the five national priority outcomes, three refer to Notre Dame University. Section 30-20 of the *Higher Education Support Act 2003* states the national priorities as:

a) increasing the number of persons undertaking teaching and nursing courses of study;
b) supporting a number of persons undertaking teaching courses at Avondale College;
c) supporting a number of persons undertaking teaching and information and communications technology courses of study at the University of Notre Dame Australia;
d) supporting a number of persons undertaking medical courses at the University of Notre Dame Australia; and
e) supporting a number of Indigenous students undertaking courses of study at the University of Notre Dame Australia.

By favouring Notre Dame University the Government is effectively undermining its own aim of enhancing competition. On the one hand, the Government has encouraged Australian public universities to merge in order to remain viable and operate efficiently, on the other hand, the Government has subsidised and protected private universities consequently encouraging inefficiency. Perhaps, the underlying reason for the Government welcoming mergers and protecting private institutions is to have a greater number of private universities within Australia's higher education system, therefore a greater number of students paying full fees. Subsidising private universities is a contradiction to enhancing competition and diversity and according to neoclassical economic theory creates a social deadweight loss, which

represents an inefficient allocation of resources. In addition to funding private universities the Government also allocates extra funding to regional universities. So while some public universities are expected to compete on an even playing field others receive regional loading for protection. According to Nelson (2004b), $146 million in additional funding will be allocated to regional universities. This additional funding will be distributed to universities according to loading criteria in the form of five bands. Table 2.10 shows that the regional loadings range from 1.5 percent to 30 percent depending on the loading criteria. The loading criteria, however, is highly discriminatory with only 5 campuses receiving a 30 percent loading with only one university campus receiving 1.5 percent, while 49 university campuses receive either five percent or seven percent regional loading. This is because the criterion for band one and band five is restricted to a specific location, whereas bands two, three and four are related to size and distance from the nearest mainland city. Table 2.10 suggests the allocation of extra funding is not only a contradiction of the Government's aim of increasing competition but also raises suggestions that the Government has embraced a political not economic ideological agenda.

Table 2.10 Loading criteria and corresponding levels of regional loading

Band	Loading criteria	Number of campuses[21]	Regional loading
1	Northern Territory	5	30.0%
2	Distant and small	23	7.5%
3	Proximate and small or distant and large	26	5.0%
4	Proximate and large	20	2.5%
5	Wollongong	1	1.5%

Source: Modified from Nelson 2004b

Moreover, the claims by Nelson that further deregulation of Australia's higher education system such as structural reform will make universities more productive is challenged by the study by Worthington and Lee (AVCC, 2005d). Worthington and Lee found the annual productivity growth of universities was high, averaging 3.3 percent between 1998 and 2003. Worthington and Lee argued that the productivity of universities 'compares favourably with other industries in Australia and universities overseas' (AVCC, 2005d p. 1). The study also

[21] The number of campuses is according to DEST's *Higher Education Statistics 2002*.

challenges why universities, in particular, smaller newly established universities should be encouraged to merge, when it was found that newly established universities were more productive than older well established universities. Central Queensland University had the highest productivity growth rate at 13 percent. Worthington and Lee (AVCC, 2005d p. 1) argue:

> This is because they are generally in a better position to quickly exploit some of the primary sources of productivity gains, including efficiency improvements, scale and scope economies, innovation and integration in production processes and improvements in the quality of inputs.

2.6 Indexation

In addition to the inequitable outcome of increasing the financial burden on students, the Go8 (2004) suggests there is an unfair treatment between universities and schools with indexation. Burke and White (2003 p. 1) state 'between 1997 and 2002 grants to universities increased by less than 10 percent compared to more than a 30 percent rise over the same period in the index used to adjust recurrent Commonwealth funding for schools'. The index for schools, the Average Government School Recurrent Cost (AGSRC), equals the per capita expenditure of educating a student at school, which is on average greater than average weekly earnings (AWE) (Table 2.11). The Go8 (2004) suggest the Government should at least index funding to the Wage Cost Index (WCI) which is less than both the AWE and school index.

Table 2.11 A comparison of the different indexation measures

Index	1998	1999	2000	2001	2002	2003	Average
School index	4.6%	5.5%	7.4%	4.9%	5.2%	5.6%	5.5%
AWE	4.2%	2.9%	4.9%	5.2%	5.2%	5.5%	4.7%
WCI (education)	3.6%	3.1%	3.2%	4.4%	3.8%	3.8%	3.6%
Existing	1.5%	1.4%	1.4%	1.9%	1.9%	1.9%	1.7%

index

Source: Modified from Burke and White 2003 p. 15

The adverse outcomes of inadequate indexation are outlined by Burke (2005) and Wroe and Guerrera (2005). Wroe and Guerrera (2005) suggest Victoria University would have decided to increase fees for 2006 by 15 percent instead of the full 25 percent had the Government announced in April 2005 changes to indexation that embraced the Labour Price Index (LPI). Burke (2005 p. 7) states that, if the University of Newcastle's Senate Report recommendations are adopted:

> From next year the university will no longer offer bachelor degrees in human nutrition, herbal therapies, food technology, science (phototonics), science (building), social science (recreation and tourism) and fine arts at the Central Coast campus.

Furthermore, Saunders, the Vice-Chancellor of the University of Newcastle, suggested that by 2007 degrees in business, economics, commerce, finance and management would be reduced to two and to avoid an annual deficit of more than $23 million, 450 jobs would be cut (Burke, 2005 p. 7). Kniest and Mullins (2005) suggest the University of Newcastle aims to change their four percent budget deficit to a five percent budget surplus through cutting 450 jobs or 20 percent of their staff.

If the Government had agreed to adjust the indexation mechanism from the Safety Net Adjustment (SNA) to the LPI in 2005, the Government would not have been required to act upon the changes until 2008. The absence of reviewing indexation arrangements before 2008 may result in further adverse outcomes especially with the Government's move to align higher education funding to workplace relations. If university staff accept AWAs and are paid a higher salary than both the award wage benchmark and current arrangements under EBAs, then this will further reduce the purchasing power of Government funds. The Government's rejection of changes to indexation arrangements from the SNA to the LPI leads to a greater reduction in Government funding in real terms. This is supported by Chapman (2002) and Burke and Phillips (2001) who suggest inevitable increases in income greater than the SNA

through pay rises will not benefit everyone, as the shortfall is met by laying off staff and consequently increasing the student to staff ratio to maintain efficiency.

The current indexation arrangements by the Government challenge whether the current higher education system will be characterised by sustainability, diversity and equity to access. The Government is on one hand encouraging market forces to determine pricing, yet on the other hand wants to reduce institutional autonomy. The outcome of the Government's rejection of changes to indexation arrangements is the universal movement by universities to charge the ceiling price, 25 percent higher HECS fees. This is a contradiction to the Government's aim of institutional price autonomy bringing variable prices. Consequently, with the ceiling price determined by the Minister, the sustainability of the higher education system moves further away from the control of higher education providers towards the Government. This, conflicts with the aims of improved diversity and equity to access, as the viability of universities and disciplines becomes reliant on student income and the student's ability to pay.

Universities are likely to merge not only through a lack of Government funding but also the failure of the Government to change the indexation mechanisms in 2005. This means the salary increases that are greater than Safety Net Adjustment, have created larger student-staff ratios. The AVCC (2004d pp. 3-4) states the student to staff ratio between 1996 and 2003 has increased from 15.6 to 20.8 whereby 'continued increases in the ratio of staff to students will create the risk of reduced effectiveness of university learning and teaching'. Rood (2004 p. 3) states 'seven universities showed student-to-staff ratio rises of over 50 percent over the past eight years'. In addition to the higher student to staff ratios, Milbourne (2002 p. 2) suggests the lack of adequate indexation of Government grants has also created fewer contact hours, increased ancillary fees and increased casualisation of staff. Nelson (2004b) suggests that these are the very reasons for developing the Higher Education Loan Programme (HELP) and introducing institutional price autonomy so that universities have financial incentives to become more efficient. The AVCC (2004d) however, suggests that the ability to attract non-Government funding is dependent on the services that universities provide, such as quality teaching, which in turn are dependent on the adequate indexation of Government grants.

In agreement with the AVCC (2004d) and Go8 (2004), DEST (2005f) suggest staff numbers have increased only slightly, while the total number of full-time students has increased by 33 percent. DEST (2005f), however, argue this increase is not a result of more Commonwealth supported students but rather fee paying places occupied by international students, that have provided additional revenue to universities. However on the 12th July 2005, the AVCC (2005c) announced for the first time in 10 years that the student teacher ratio had decreased. The AVCC suggests the ratio had decreased through some growth in teaching staff numbers coinciding with a modest growth in student numbers.

Irrespective of the changes to the student to staff ratios, DEST (2005f) conclude that the majority of institutions are performing strongly, with 77 percent of institutions operating in a surplus. The April 2005 Government response to the *Review of Higher Education* revealed no adjustments to High Education Indexation Factor (HEIF) would take place 'as there is not a strong case for change given the strong financial health of the sector' (Nelson, 2005c p. 1). Questions surround how it can be concluded that the higher education sector is of strong financial health given that 23 percent of universities are either in deficit or in balance. O'Keefe (2005 p. 35) claims the University of New South Wales recorded a $9.9 million loss in 2004 and UTS a $12.2 million loss in 2004, when previously these universities recorded outstanding surpluses. This shows that the financial state of the university sector is subject to volatility and financial uncertainty.

2.7 Other Considerations: The location and history of universities and national priorities

Two additional concerns with introducing price competition surround location and history. Beer and Chapman (2004 p. 15) state 'the fact that universities do not pay rent means that the playing field is not level'. Beer and Chapman argue well established universities located in cities will have a commercial advantage over regional and less established universities, as they have a greater pool of potential students than regional and less established universities but do not have to compensate for their location as they do not pay rent and unlike newly established

universities have a reputation built on Government subsidies over the years. Even though these issues of rent and reputation are the reasons for Beer and Chapman's support for establishing a price cap on price flexibility, one could argue that these are two reasons why institutional price autonomy should not be introduced into higher education.

In addition to the concerns surrounding student choice and the value of degrees with the introduction of price flexibility, Allison (2005) suggests students should also be aware that HECS fees for teaching and nursing are not entirely exempt from any increase. Despite Nelson (2003a) stating 'the [higher education reform] package ensures those training as teachers and nurses (14 percent of students) will pay not a cent more in HECS'. Allison (2005 p.1) argues only units classified as nursing and teaching units are exempt from HECS fee increases, and not the electives that are required to complete a degree, such as maths or science for a teacher or health and science units for a nurse. With fees based not on the type of course but rather the cost of each unit, teaching and nursing students have been affected by the increase in HECS fees. According to Allison (2005 p. 1) the Government has admitted the exemption of national priorities from HECS-HELP does not alleviate the true cost for teacher and nursing students but this is because the 'Government does not know the exact combination of units of study that a student will undertake in a basic nursing [or teaching] degree'.

2.8 Conclusion

Increases in HECS have resulted in a decrease in the quantity of higher education demanded, as measured by the level of applications. Although the impact of the 1996-97 budgetary changes upon the participation of disadvantaged students is conflicting, several of these studies contain results that are derived from qualitative research embracing the use of surveys and some refer to the level of university enrolments. Phillips et al. (2003) and Kniest (2005) state the level of enrolments reflect the supply of university places and not student demand for higher education. This is supported by Wright's (2005) economic model of demand and supply that shows the impact of changes in HECS upon the demand for higher education. The model shows that the supply of university places is unresponsive to increases in the level of

HECS, while the quantity of higher education demanded falls with increases in HECS. The impact of increases in HECS resulting in a fall in the demand for higher education is supported by the falling level of applications for university in 1997 and 2005 and rising level of applications for TAFE. In addition to the fall in demand for higher education, is the impact of increased fees on the participation of students from different socio-economic backgrounds. Wright (2005) found that the increase in students participating in university from higher socio-economic areas (a relative income of 1.25) between 1996 and 2001 was nearly three times the increase in participation of students from lower socio-economic areas with a relative income of 0.75. The 1996-97 budgetary changes in HECS had discouraged students from lower socio-economic areas participating in university. These findings suggest that the 25 percent increases in HECS will lead to greater inequality and the under representation of students from lower socio-economic areas to increase.

In addition to the regressive nature of Australia's higher education system, is the impact of increases in both the level of HECS and full fee paying positions on the quality of higher education. Milbourne (2004) argues universities accepting lower university entrance scores for full fee paying students compared to HECS students, creates a higher education system not based on student merit but rather the student's ability to pay. As a result, students who can afford to pay full fees gain access into university over more eligible students, who cannot afford to pay full fees. This inequitable system is worsened by the provision in the *Higher Education Support Act 2003* that has allowed universities from 2005 to increase the number of full fee paying places from 25 percent to 35 percent of all domestic places and the abolition of the limit in 2007. The implications of this provision are highlighted by the findings of both Applegate and Daly (2005) and McInnis and Hartley (2002) that show that there is a positive relationship between a student's grade point average at university and their university entrance score. This suggests a greater number of students are both entering and graduating from university of a lower standard. Figure 2.3 and figure 2.4 shows that between 2003 and 2007 the proportion of students entering university with a lower ITI increased. This is supported by the study by Abelson (2005), who concluded that, overall the academic standard of economics students has fallen and suggested this was a result of rising student to staff ratios and lower entry requirements for domestic and international full fee paying students. This is also

supported by university policies that restrict the number of students that can fail within a unit. This means, irrespective of the standard of students, the policy will ensure a given percentage of students will pass each year. As the standard of entry declines, this ensures a lower standard of graduates.

The situation, where universities are putting private income before the quality of education, is more evident with the enrolment of international students. The 'Malaysian affair' and the 10 university breaches found by Australian Universities Quality Agency (AQUA) suggest that universities are protecting future international income, even if this means lowering university standards. These cases suggest that the Government's refusal in 2005 to change the mechanisms for indexation of Commonwealth Grants will only increase the pressure on universities to prioritise private income over the quality of higher education. The Government's rejection of changes in the mechanisms of indexation have also created added pressure for universities to cross subsidise income between their departments. Not only is it unfair that some HECS students are paying 85 percent of their course costs to study law while others pay only 35 percent of their course costs to study medicine, but the cross subsidisation of funds will also mean that those HECS students studying lower cost disciplines will help fund the cost of other courses. This suggests that some students are not receiving full value for their money. Despite students paying higher HECS fees, universities were receiving $1173 less per student in 2001 than they received in 1996 and overall there were 2017 fewer HECS places in 2005 than there were in 2003.

A higher education system characterised by asymmetric information also means students are paying for prestige but not necessarily quality. Akerlof's (1970) *Lemons Principle* suggests contestable funds awarded to institutions for excellence, in a market characterised by asymmetric information, will lead to an increase in poor quality programs, as universities with high quality programs are unable to communicate their programs worth. In addition to fewer HECS places, lower entry scores for full fee paying students and asymmetric information is the opportunity for both HECS students, who pay their HECS fees up-front and full fee paying students, to claim tax deductions for self education expenses. This means the Government is contributing a greater percentage to the cost of study for some students, who can pay their

HECS fees up-front and for students who can afford to pay full fees, than for students who do not have the financial means to pay either their HECS fees up-front or pay full fees. This also means that the Government may be contributing a greater percentage towards the cost of study to less able full fee paying students, than to more able HECS students. The unequal opportunity to higher education is worsened by the opportunity for full fee paying students to convert to a Commonwealth Support Place after two semesters, if their grade point average is at a credit average or above. This means a student who just misses out on a HECS place because of their entrance score, but cannot afford to pay full fees misses out on an opportunity to go to university. While a student with a lower entrance score than the student who just misses out on a HECS place, who can afford to pay full fees, has not only the option of going to university but after one year of study has the opportunity to enrol as a HECS funded student. This regressive system means a more able student misses out on a place at university because of their inability to pay.

The following Chapter will discuss the Human Capital Model and the decision making involved when deciding to pursue or not pursue higher education. Chapter Three will also consider the conflicting views of Human Capital Theory and the various Australian studies that have measured the Private Rate of Return (PRR) to higher education.

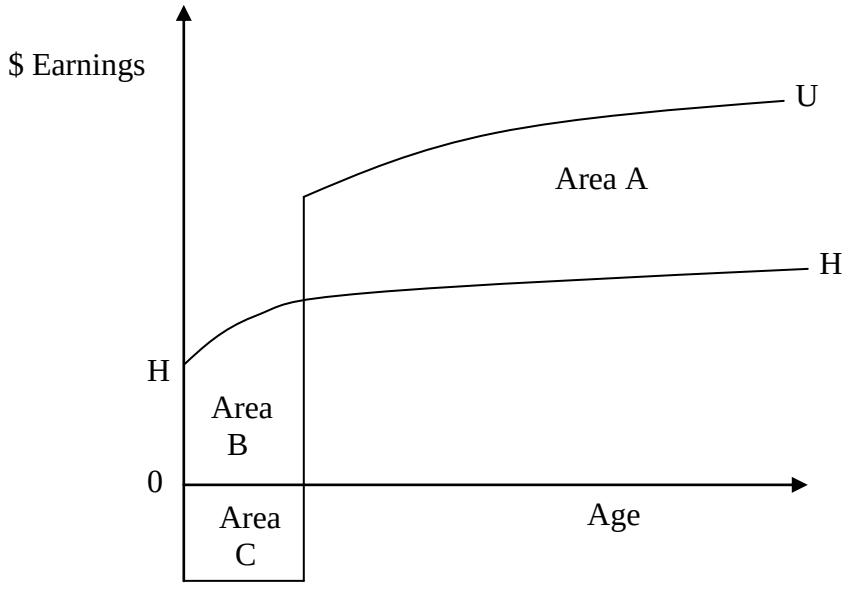
Chapter 3: The Private Rate of Return to higher education

In order to measure if it is worthwhile to invest in a university education, it is important to understand the decision making involved in deciding to go to university. A student's decision to pursue or not pursue higher education is considered in economics as a form of investment in human capital and this decision will affect their income earning potential. This Chapter looks at the costs and benefits associated with studying at university, otherwise known as the Human Capital Model. The optimal level of human capital and the factors affecting a student's decision to invest in higher education are discussed using the Human Capital Model and the Private Rate of Return to higher education. The conflicting views of Human Capital Theory will be discussed, including the arguments surrounding the cause and effect relationship between education and earnings. This Chapter will also provide an overview of the existing Australian literature on the Private Rate of Return to higher education in accordance with the development of higher education policy.

3.1 Human Capital Theory applied to rates of return on education

According to Norris (2000) and McConnell, Brue and Macpherson (2003) investment in human capital by a student is based on the premise that costs borne immediately are worthwhile because of the return received later. The costs incurred include both explicit and implicit costs (opportunity cost) that is, not only HECS and the cost of living (Area C) but also the loss of income forgone while studying (Area B) (Figure 3.1). The return for higher education is the earnings differential, the higher income received for greater skills and knowledge (Area A).

Figure 3.1 Human Capital Model



Source: Adapted from McConnell, Brue and Macpherson 2003 p. 87

The model also assumes that the earnings differential widens with age, as income rises more rapidly for the university graduate, shown by the steeper slope of the earnings profile labelled 'UU' as opposed to the year 12 graduate 'HH'.

Although, Kaufman (2000), Ehrenberg (2003) and McConnell, Brue and Macpherson (2003) all state that the peak of the earnings profile is greater for the individual with higher education, Norris (2000) further argues that the human capital model illustrates the peak of the university graduates' earnings to be later in age, between 45-54 years compared to 35-44 years for the earnings profiles of all other groups. The Australian Bureau of Statistics (1998) data (Table 3.1) shows, that in Australia, education is compensated for by a larger income. The difference in income does increase with age, for example, between 25-34 years the earnings differential is 23.3 percent, and between 55-64 years the earnings differential is 37.9 percent. Those individuals with post-school qualifications have incomes peaking at $913.00 between 45-54 years, compared to $678.00 for those without.

Table 3.1 Level of educational attainment and average weekly earnings, 1997

	Age					
	15-24 years	25-34 years	35-44 years	45-54 years	55-64 years	
Level of educational attainment						Total
With post-school qualifications $	526.00	752.00	867.00	913.00	822.00	794.00
Without post-school qualifications $	434.00	610.00	660.00	678.00	596.00	595.00
All persons $	475.00	699.00	792.00	816.00	720.00	711.00
% difference	21.2	23.3	31.4	34.7	37.9	33.4

Source: Australian Bureau Statistics 1998

The differences in results is a consequence of the source of statistics, with Norris (2000) using the *Census of Population and Housing, 1991* to calculate life time income profiles of full-time

male employees. The model also assumes that investment into human capital is viable when the earnings differential (Area A) is greater than the total cost (Area B + Area C).

The return on the investment into human capital is complex with the costs and benefits of higher education occurring at different points of time. According to Ehrenberg (2003), in order to calculate the rates of return on education, future receipts need to be discounted, as an equal amount of benefits in the future is worth less than in the present, ceteris paribus. This is a consequence of present consumption preferred to future consumption and the real rate of interest, the return on money invested.

The benefit discounted to present value according to Norris (2000) is equal to;

$$\$P/(1 + i)^n$$

$P represents present value, n equals number of years and i presents the interest rate, if the interest rate is 8 percent (0.08) and income is $5000, then

$PV = 5000/(1+0.08)^n$

in one years time (n=1) the present value is equal to $4629.63 and in two years time (n=2) equal to $4286.69.

Norris (2000) explains, if the total opportunity cost of a degree is $90,000 and the earnings differential is $240,000 over the working life, then investment is initially beneficial with $150,000 difference. An investment is profitable when the Net Present Value (NPV) is greater than zero. That is when the Present Value of benefits (PV_B) is greater than the Present Value of costs (PV_C). That is, $NPV= PV_B – PV_C >0$

According to the Productivity Commission (1997), a limitation of this approach is that it requires information about each person's time preference or discount rate. Each individual would have their own discount rate, the point where investing in higher education is profitable. The Productivity Commission (1997 p. 90) argues this would 'result in an infinite number of possible returns to higher education'.

According to Chia (1990), it is possible to determine the internal rate of return, the minimum rate of return that an individual would need to earn to consider higher education a profitable investment. This is where the discount rate sets the Net Present Value to zero. (NPV= $PV_B - PV_C = 0$). The internal rate of return is referred to as the Private Rate of Return to higher education.

Borland (2002 p. 2) measures this by:

$$PV_C = \sum_{t=1}^{n} C_t/(1+r)^t \qquad (3.1)$$

$$PV_B = \sum_{t=n+1}^{m} B_t/(1+r)^t$$

Then:

$PV_B - PV_C = 0$ and solve for r.

Where:

C_t = opportunity costs for university degree in year t;

B_t = benefit of university degree in year t;

n = length of education;

m – n = years in workforce; and

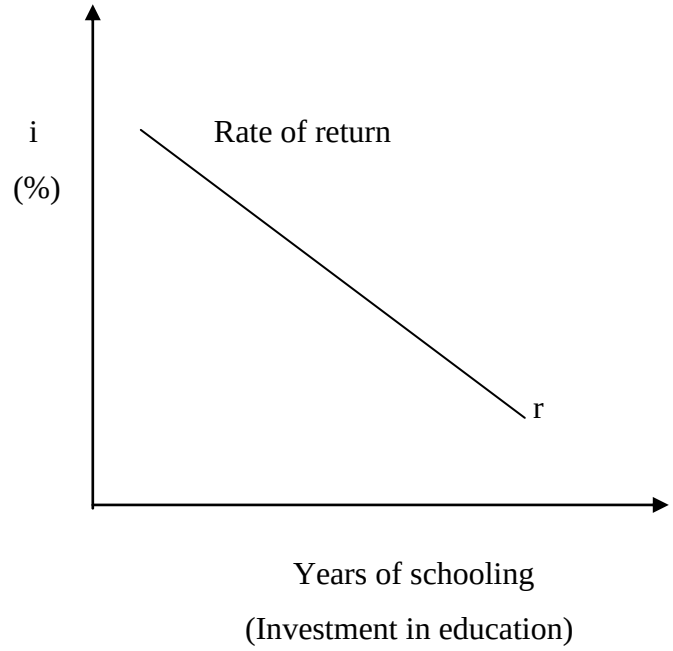
r = rate of return.

Investment is worthwhile when the Private Rate of Return 'r' is greater than the rate of interest 'i', where the rate of return is greater than the return on money whether it is borrowed money or money that could have been invested. Individuals will invest in human capital up to the point where r=i[22].

[22] For a detailed analysis refer to Norris (2000) pp. 64-69.

The optimum level of human capital is derived from the demand and supply for education, also referred to by Ehrenberg (2003) as marginal benefit and marginal cost, respectively. The demand curve for human capital is downward sloping as the marginal rate of return on education falls with greater investment (Figure 3.2).

Figure 3.2 Demand for education



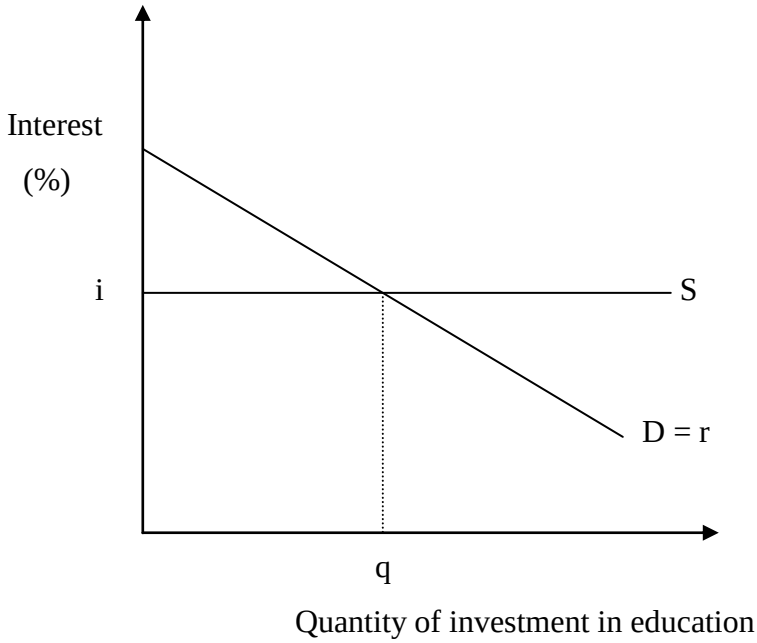
Source: Modified from McConnell, Brue and Macpherson 2003 p. 104

The decreasing rate of return is a consequence of the 'law of diminishing returns' where according to McConnell, Brue and Macpherson (2003 p. 104) the 'incremental earnings from an additional year of schooling will diminish' coinciding with the rising costs and falling benefits. McConnell, Brue and Macpherson (2003) argue, the most important factor influencing rising costs and falling benefits is time, as the greater amount of time spent on investing in education leaves fewer years of receiving higher income.

McConnell, Brue and Macpherson (2003) state the demand for education is also the rate of return on education, as individuals invest up to the point where r = i (decision rule). The

interest rate is the marginal cost of funds and assuming the interest rate is constant, supply is perfectly elastic (Figure 3.3). Therefore, the equilibrium point where demand intersects supply is equal to r = i, the optimum level of human capital.

Figure 3.3 Demand and supply for human capital



Source: Adapted from McConnell, Brue and Macpherson 2003 p. 105

Ehrenberg (2003) argues that the interest rate being perfectly elastic is unrealistic. According to Ehrenberg (2003), an increase in marginal cost (supply), such as an increase in the cost of education, will shift the marginal cost curve up and decrease the quantity of human capital acquired. However, a decrease in the cost of education through an increase in Government subsidisation will shift the marginal cost curve down (Figure 3.4 (a)), increasing the profitability of education for the individual but not necessarily for society. Likewise, if the benefits of education increase, such as, when there is a recession leading to rising unemployment of individuals without post-school qualifications, then the marginal benefits

(demand) for human capital will increase and shift the marginal benefits curve to the right (Figure 3.4 (b)).

Figure 3.4 (a) Decrease in the cost of education

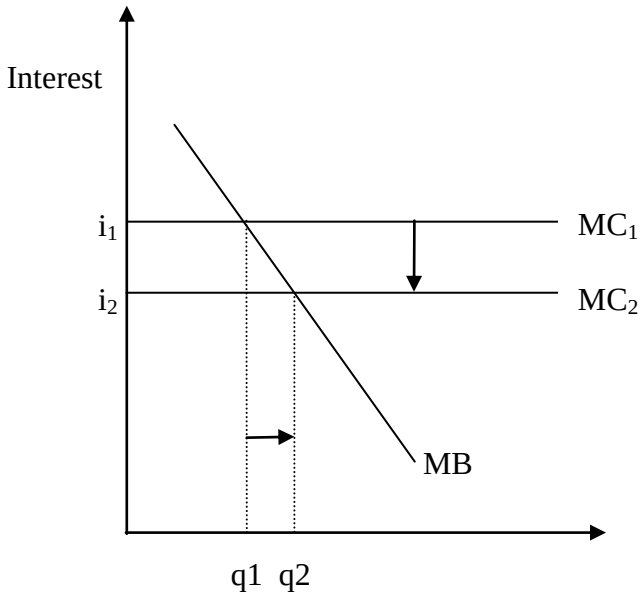
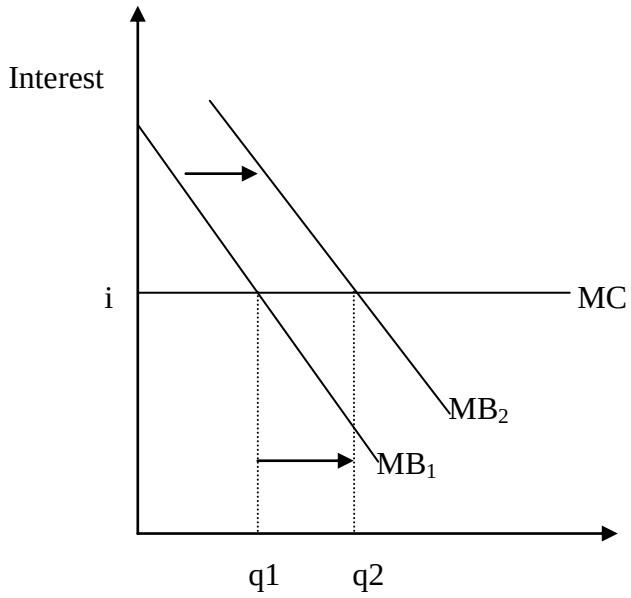


Figure 3.4 (b) Increase in the benefits of education



Source: Ehrenberg 2003 p. 269

3.2 Conflicting views of Human Capital Theory

A major criticism of the liberalisation of higher education is the underestimated value of human capital by limiting it to the Private Rate of Return. According to McConnell, Brue and Macpherson (2003 p. 102) most economists believe there are social benefits or positive externalities from an individual acquiring higher education. Norris (2000) states that the Social Rate of Return differs from the Private Rate of Return as costs include the opportunity cost to

society or loss of output, while an individual continues further study (measured by pre-tax earnings), and direct costs such as operating expenses. The benefits received by society are measured by the pre-tax earnings differential, that is, the increase in marginal productivity derived from higher education.

A significant shortcoming of this calculation is that the social benefits received by society are limited to improved marginal productivity. Other social benefits that could be included are lower unemployment for individuals with post-school qualifications[23] and higher taxation revenue due to higher relative income, together with a decrease in Government expenditure on transfer payments.

Several critics including the University of Technology, Sydney (UTS) (2002) argue that if the social benefits outweigh the social costs of higher education, irrespective of the Private Rate of Return, then the Government should increase Government expenditure on higher education as a percentage of Gross Domestic Product (GDP). UTS (2002) stated that if the gross earnings differential between a male university graduate and male non-university graduate is $622,000 then given the marginal tax rate is 48.5 the Government receives $300,000 in taxation revenue, more than a tenfold return on the Government's investment. However, an important caveat of this calculation is the absence of discounting rates of returns. A fuller discussion of the Social Rate of Return will be carried out in Chapter Five.

Further criticism surrounding Human Capital Theory and private investment are derived from the limitations of market forces. One of the significant factors influencing the demand for human capital and arguably the largest criticism, alongside individual ability is the 'screening hypothesis'.

3.2.1 The 'screening hypothesis'

[23] The unemployment rate for all persons with a bachelor degree or above is 3.0 percent compared to 6.6 percent for all persons who have completed year 12 (ABS, 2005a cat no. 4102.0).

The ‘screening hypothesis’ questions the relationship between a worker’s level of education and their levels of productivity and earnings. The Human Capital Model assumes that workers with higher levels of education receive higher incomes because they are more productive. The ‘screening hypothesis’ questions whether the link between extra years of schooling and higher earnings is greater productivity. Spence (1973), a leading advocate of the ‘screening hypothesis’, argues that higher education is a signal to employers of a worker with higher quality. In his job-market signalling model (1973), Spence argues that the level of education is a tool for employers to identify workers of different quality. Supporting this view Blaug (1976) argues that education is a ‘screening device’ for employers. Blaug (1976) argues because there is a lot of uncertainty that employers face when recruiting workers, employers use education as a tool for finding the most suitable worker. Screening advocates such as Spence (1973) and Blaug (1976), believe that an individual with higher education receives a higher income not because they are more productive but because employers find that education is a useful signal in determining whose natural ability is suitable for the job. This also means according to Quiggin (1999) that proponents of the ‘screening hypothesis’ including Arrow (1973), Wiles (1974), and Stiglitz (1975) assume that higher education has no social value. This is because the ‘screening hypothesis’ refers to education as a device to rank workers according to their native ability, not for recognising that students learn from extra years of schooling. Quiggin (1999 p. 135) states not only is the empirical literature of the ‘screening model’ limited and inconclusive but if employers are using education as simply a means to rank workers of native ability, then the ‘earnings differential associated with higher levels of education should decline over time as employers acquire direct knowledge of their employees' ability’. Quiggin (1999) argues that this is not true as evidence found in both international and Australian studies show that the level of income an individual earns with post-school qualifications increases over time with age.

Several Australian studies, such as Miller and Volker (1984) and McNabb and Richardson (1989), have tried to determine the reason for the positive correlation between the level of education and earnings. In an attempt to solve the ‘screening hypothesis’ vs Human Capital Theory debate, the studies measure the differences in income between graduates who are in jobs where they are using skills acquired at university, with those graduates who are not using

skills acquired at university. These studies suggest that a university degree is more of a 'screening device' for employers than a sign of higher productivity. A more recent study by Lee and Miller (2000), however, argues that higher education is more than a 'screening device' it is a value adding process. Lee and Miller (2000) measure different levels of literacy and numeracy with levels of education and levels of income. They argue that there is not only a positive relationship between levels of education and levels of income but also the level of literacy and numeracy with level of income. They suggest between one third and one half of the effect of education on the level of income is the indirect effect that acquiring education has on improving one's level of literacy and numeracy skills. Lee and Miller (2000 p. 39) state:

> Education is certainly not simply a screen. It is associated with improvements in skills (here literacy and numeracy) that are rewarded well in the labour market. Hence education affects labour market outcomes through its effects on human capital skills that are embodied in people and which are not usually measurable.

3.2.2 The 'ability problem'

Closely related to the 'screening hypothesis' is the 'ability problem'. Becker (1993) argues ability causes differences in the demand for human capital and with expenditure held constant, a less able person achieves a lower rate of return on investment than a more able person.

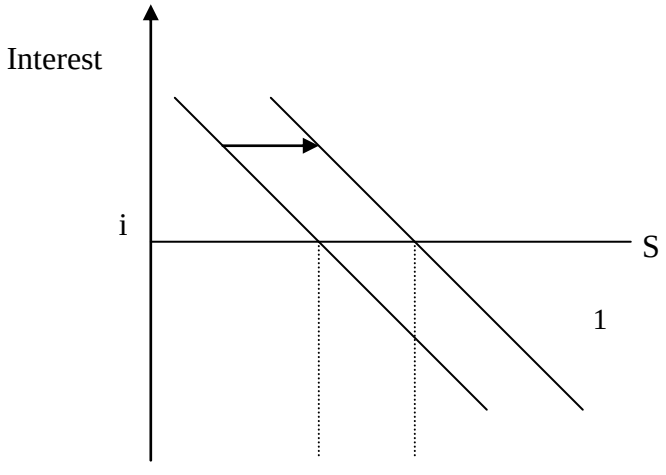
McConnell, Brue and Macpherson (2003) argue the 'ability problem' questions whether there is a 'cause and effect' relationship between the level of education and earnings and whether the factors held constant, such as ability, are significant limitations to the model. Rivlin (1975 p. 10) considers that 'the only reason that education is correlated with income is that the combination of ability, motivation and personal habits that it takes to succeed in education happens to be the same combination that it takes to be a productive worker'. Rivlin (1975) suggests that a greater proportion of the higher earnings enjoyed by a university graduate is attributed to ability not schooling.

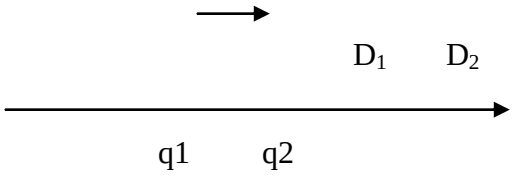
3.2.3 Quality versus quantity of education

In addition to individual ability, Kaufman (2000) acknowledges other factors such as, discrimination in the labour market for example, occupational discrimination, and the quality of education cause differences in earnings. The quality of schooling has led to great debate over the Human Capital Theory in regard to the issue of quality not quantity of education as being more important. Kaufman (2000) argues individuals of equal ability could possibly receive a different quality of education. An individual receiving a higher quality of schooling will receive a higher return on education and higher earnings represented by the new demand curve (D_2) (Figure 3.5). A study by Card and Krueger (1992) showed there was a positive correlation between the quality of schooling and better resources with the rate of return on education. Card and Krueger (2002 p. 3) state:

> Our estimates suggest that a decrease in the pupil/teacher ratio by five students is associated with a 0.4 percentage point increase in the rate of return to schooling. Similarly, a 10 percent increase in teachers' pay is associated with a 0.1 percentage point increase in the rate of return to schooling.

Figure 3.5 An increase in demand for education through a higher quality of schooling

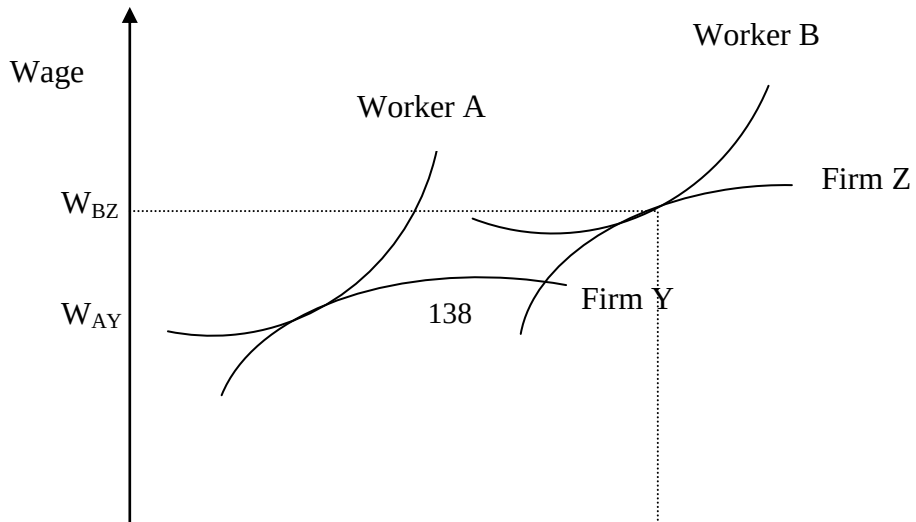


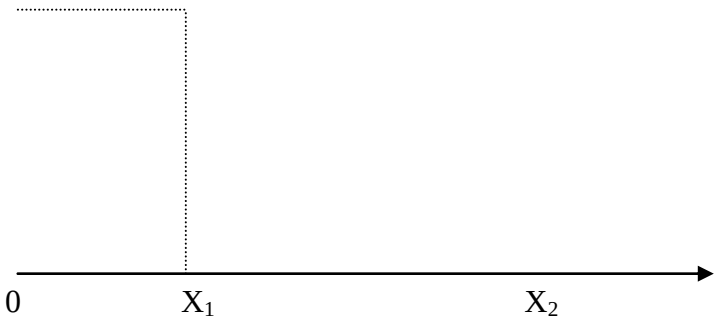


Source: Adapted from Kaufman 2000

Ehrenberg (2003), however, challenges critics of Human Capital Theory by questioning why employers are willing to pay higher wages to workers with more education, if they are not contributing higher productivity. Using Ehrenberg's (2003) example, an individual with a low level of education (worker A) will be employed by firm Y, where education adds least to employer productivity and an individual with higher education (worker B) is employed by firm Z, who compensates for higher education (Figure 3.6). The indifference curves for worker A and B illustrate the relationship between the level of education and earnings. For example, worker A for X_1 years of education receives $W_{AY,}$ while worker B receives a higher wage W_{BZ} for a higher level of education, X_2. The isoprofit curves for firms Y and Z are upward sloping showing the relationship between wages, the level of education and productivity. Isoprofit curves show zero profit, higher productivity is compensated by a higher wage. Firm Z recruits the higher educated individual (worker B) necessary for the position and pays the higher wage, $W_{BZ,}$ while firm Y recruits the less educated individual (worker A).

Figure 3.6 The education/wage relationship





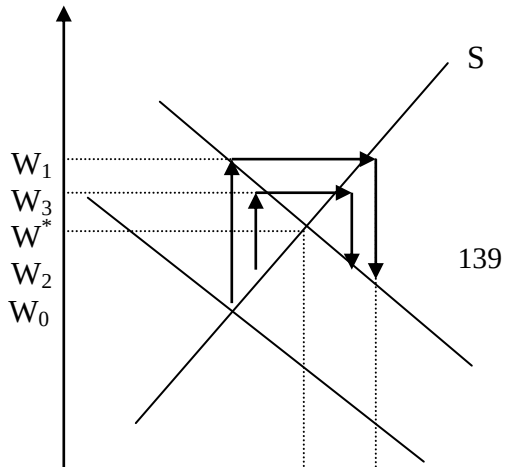
Years of worker education beyond compulsory level

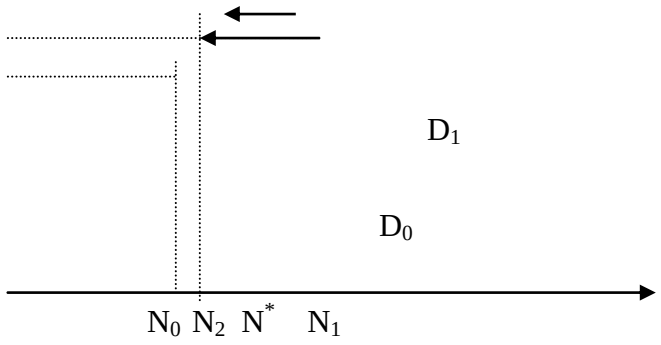
Source: Ehrenberg 2003 p. 308

Further support for investment in human capital came from the study by Ashenfelter and Krueger (1994) on Monozygotic twins. Ashenfelter and Krueger were able to conclude higher education leads to higher earnings with 'an additional year of schooling adding 16 percent to wages'. The study not only compared twins of higher education to other twins with lower education but also assessed the variability of earnings between twins where the factors, ability and family background could be held constant.

McConnell, Brue and Macpherson (2003) argue economists cannot accurately predict future earnings using past earnings profiles. A profitable return on investment into human capital in the past can lead to a decreasing rate of return in the future. This is derived from the inability of supply to immediately respond to short run changes in demand relating to the 'Cobweb' model (Figure 3.7).

Figure 3.7 'Cobweb' Model





Source: Adapted from Ehrenberg 2003 p. 303

Ehrenberg (2003) considers that, if there is an increase in the demand for university trained workers, demand will shift to D_1 from D_0 and wages to W_1 from W_0. The higher earnings will attract graduates in the future, creating a surplus with quantity of supply increasing from N_0 to N_1. The new supply will eventually lead to a fall in wages to W_2. In turn, the lower wages, in time, will result in workers leaving the industry and consequently supply will fall from N_1 to N_2 but be greater than N_0. At N_2 the quantity of demand will be higher and wages will rise to W_3, just below W_1 and the cycle continues. Although the cycle continues, the equilibrium is eventually restored at a new level, a consequence of adjustments to the quantity of demand and supply.

According to Kaufman (2000), variations in demand lead to greater differences in earnings than in changes in supply but the factors influencing supply represent the main causes of inequality and public policy changes. Becker (1993) emphasised an important factor influencing the variation in earnings is the unequal opportunity for schooling determined by the cost of education. Kaufman (2000) argues that the cost of education is further determined by a family's financial resources. For both the advantaged and disadvantaged individual, investing in education results in the cost of forgone earnings plus the interest attached, if money was invested. Kaufman (2000), however, considers that the key difference is that the disadvantaged individual will also have to rely on personal savings, work, or resort to loans to meet the cost. Kaufman (2000) further argues, if education is the 'surest route' to higher earnings, equal opportunity means equal access to education.

3.3 Private Rates of Return to higher education

3.3.1 International studies that measure the Private Rate of Return to higher education

Both the positive relationships between the level of education and earnings and the rates of return to education have been well documented overseas. There have been several international studies that have measured the PRR for different levels of education attainment for an individual nation. These studies include Blaug (1970), Maani (1996), Blau, Ferber and Winkler (1998), Palme and Wright (1998), Toh and Wong (1999), Ono (2001), Rathje and Emery (2002), and Dolton and Chung (2004). These studies have all suggested that while it is worthwhile for an individual to go to university, changes in the cost of tuition affects the PRR to education. In addition to these studies is the work of Psacharopoulos (1975, 1985, 1994), an ongoing researcher of the rates of return to education. Psacharopoulos's (1994) study includes international comparisons of the rates of return to education for 78 countries. Psacharapoulos's main findings include: the PRR to education decreases with each additional level of education, the PRR is greater for women than men, higher for academic studies than for vocational studies, and higher for developing countries than developed countries. Psacharapoulos's findings have proved valuable, shaping World Bank policies directed at developing countries. Even though these international studies provide empirical evidence to support the Human Capital Theory, this Chapter will focus upon Australian literature to examine the effect of changes in higher education policies on the PRR.

3.3.2 Australian studies and the four time frames of higher education policy

There are four basic time frames of higher education policy in Australia, that separate the studies measuring the rates of return to higher education. The four basic time frames include: free higher education, the period of uniform HECS fees from 1989 to 1996, the differential

HECS system from 1997 to 2004, and the 2005 HECS system characterised by 25 percent higher HECS fees and FEE-HELP.[24]

3.3.2.1 Free higher education (1974-1988)

In the period 1974 to 1988 Australia had a system of free higher education. There have been several Australian studies calculating the Private Rate of Return (PRR) of a free university degree including two early studies by Blandy and Goldsworthy (1975) and Chapman (1977). However, it was not until the study by Miller (1982) that the PRR to higher education was measured based on Australia's population as a whole. Blandy and Goldsworthy (1975) calculated the PRR to higher education for males in South Australia and Chapman (1977) calculated the PRR to higher education for males in the Australian Public Service but neither study was able to generalise the results for the average individual. Miller's (1982) study was unique as it used *1976 ABS Census data* to calculate the PRR for different levels of educational attainment for both males and females, born overseas, and born in Australia. Miller (1982) was able to construct age earning profiles, as the *1976 ABS Census data* was the first Census data since 1933 to include an income question. Despite the rise in conflicting views, such as the 'screening hypothesis', the age earning profiles constructed by Miller (1982) supported the two key assumptions of Human Capital Theory. First, the earnings differential between an individual with post-school qualifications compared to an individual without post-school qualifications widens with age, and second, there are steeper age earning profiles for an individual with post-school qualifications than for an individual without post-school qualifications. Not only do Miller's (1982) findings support the argument by Ehrenberg (2003), Kaufman (2000) and McConnell, Brue and Macpherson (2003) that the peak of the earnings profile is greater for the individual with higher education than for an individual with school qualifications, the findings by Miller (1982) also support Norris (2000), who further argued that the peak of the university graduates' earnings to be later in age between 45-54 years as compared to 35-44 years for the earnings profiles of all other groups. Miller (1982) found for Australian born males with no post-school qualifications their earnings peak at 35

[24] The structure and nature of these four stages were discussed in Chapter One.

years of age but for Australian born males with a bachelor's degree their earnings peak at 55 years of age. In addition to these findings, Miller (1982) also found that the age earnings profiles of overseas born males to be flatter than Australian born males and the age earning profiles of females significantly flatter than for all males. Miller (1982) also discovered that the age earning profiles of females were double peaked, firstly peaking around 25 to 29 years then declining to peak again between 50 to 54 years. The gap in between is due to women taking leave from the workforce to have a family. Miller (1982) argues that while these age earning profiles prove that individuals with greater human capital earn higher incomes they cannot alone conclude that education is a worthwhile investment. Therefore Miller (1982) calculates the PRR for both males and females using the formula 3.1.

Miller (1982) measures the PRR based on the following assumptions:

- There is no variation in the number of hours worked by the individual.
- There is 100 percent participation in the workforce.
- There is no unemployment and both the benefits of higher education.
- Forgone earnings are adjusted for income tax.

In addition to these assumptions are the assumptions that students pay $275 per year for university expenses and earn a real median income of a student for 1974, derived from the *Department of Education, Income and Expenditure Patterns of Australian Tertiary Students in 1974.* Miller (1982 p. 31) states student income includes 'the Tertiary Education Assistance Scheme, teacher training schemes, and other State Government, Federal Government, and private company scholarship schemes as well as income from part-time employment and from gifts'. In addition, Miller (1982) assumes secular income growth is two percent per annum. This suggests that the peak of an individual's age earning profile will continue to rise over time, in this case, at two percent per annum. Furthermore, differing from earlier Australian studies and several post-Miller studies, Miller (1982) considers of the impact of an individual's ability on the income they receive. In line with Becker (1993) arguing ability causes differences in the demand for human capital not higher education, Miller (1982)

considered Psacharopoulos's (1975) measurement of the PRR to education with an alpha co-efficient for innate ability. Psacharopoulos (1975) showed that the majority of a university graduate's income is a result of higher education. Psacharopoulos (1975) found that 16 percent of an individual's income was related to their ability and 21 percent of an individual's income was a consequence of their ability, religion and class. As a result of this, Miller (1982) assumed 80 percent of a university graduate's income was the product of existing human capital. The results of Miller's (1982) study shown in Table 3.2 suggest a bachelor degree is a worthwhile investment with a PRR of 21 percent. Miller (1982 p. 29) states 'the real rates of return would generally exceed the return which could be earned on alternative investments available to Australian youth'.

Table 3.2 The PRR to a bachelor degree for males and females, born in Australia and overseas

	Australian born male	Overseas born male	Australian born female	Overseas born female
Bachelor degree	21.10	21.10	21.20	21.00

Source: Modified from Miller 1982

Not only do the findings of Miller's (1982) study (Table 3.3) suggest that investing in a bachelor degree is profitable, they also indicate that the Private Rate of Return rises with each level of educational attainment with the exception of higher degrees[25]. This contradicts the findings of international studies, such as Blaug (1970), that suggest the PRR falls with each additional level of education. Miller (1982) found that except for higher degrees, overall, a bachelor degree had a higher PRR than a diploma and a graduate diploma had a higher PRR than a bachelor degree.

Table 3.3 The PRR for different levels of educational attainment

	Australian born male	Overseas born male	Australian born female	Overseas born female

[25] It should be noted that in the case of Australian born females, the PRR for a graduate diploma does not rise above the PRR of a bachelor degree but falls 2.1 percentage points and for Australian born males, the PRR is the same for both a bachelor degree and graduate diploma.

Diploma	16.10	17.40	16.85	16.70
Bachelor degree	21.10	21.10	21.20	21.00
Graduate diploma	21.10	24.80	19.10	22.45
Higher degree	12.70	12.10	12.85	11.80

Source: Modified from Miller 1982

Miller (1982) suggests the reason for this conflicting trend is the greater excess demand for graduates in Australia relative to overseas. There are two other significant factors influencing this trend: the length of degrees, and the cost of higher education. A bachelor degree is assumed to be three years in length and a graduate diploma is assumed to be four years in length. These represent minimum lengths of required study, therefore, it could be possible that the PRR to both a bachelor degree and graduate diploma are overestimated, as there are several bachelor degrees that are four years in length and a number of graduate diplomas that are five years in length. Secondly, higher education is free except for tuition costs such as textbooks and student union fees that total $275 per year.

The results found in post-Miller studies suggest that with each additional level of higher education the PRR to higher education falls. This is because post-Miller studies include HECS, as a cost of higher education, as well as forgone income. This is also supported by Miller's study which found that, if free education was replaced by a fee system of $2000 per annum, the PRR to all levels of educational attainment would fall. Table 3.4 shows that the PRR to a bachelor degree for an Australian born male would fall from 21.10 percent to 15.05 percent and for an Australian born female the PRR would fall from 21.20 percent to 14.10 percent, a decline of 29 percent and 33 percent respectively.

Table 3.4 The PRR for different levels of educational attainment with tuition costs at $2000 per annum

	Australian born male	Overseas born male	Australian born female	Overseas born female
Diploma	10.90	12.15	10.35	10.25
Bachelor degree	15.05	15.35	14.10	14.05
Graduate diploma	16.50	19.05	14.40	16.80
Higher degree	9.90	9.45	10.25	9.20

Source: Modified from Miller 1982

Table 3.4 includes a fee structure of $2000 per annum for all levels of educational attainment. Students, however, may be able to undertake a diploma from other higher education providers such as TAFE, whereby the cost of education is lower than if studying at university. The findings of post-Miller (1982) studies indicate that the PRR to a diploma is higher than a bachelor degree, because of the lower opportunity cost involved when studying.

Since the study by Miller (1982), the findings of the studies by Chapman and Chia (1989), Chia (1991), Maglen (1994) and Daly and Jin (1995), suggest that while a bachelor degree is still worthwhile, the PRR to higher education is falling over time. Like the study by Miller (1982), Chia (1991) and Maglen (1994) conducted time series studies of the PRR to a bachelor degree. Chia (1991) found that the PRR to a bachelor degree for males had fallen from 17.2 percent in 1978-79 to 16.2 percent in 1981-82 to 14.9 percent in 1985-86. Similar to the study by Miller (1982), Chia (1991) did not extend beyond the years 1985-86 therefore did not measure the impact of the introduction of HECS on the PRR to a university degree.

3.3.2.2 Uniform HECS fees (1989-1996)

In 1989 the *Higher Education Funding Act 1988* was implemented, introducing a uniform HECS fee for students. Between 1989 and 1996 higher education students paid a uniform student rate of contribution of $1800 per annum. Differing from Miller (1982) and Chia (1991), Maglen measured the PRR for both males and females for the years 1968-69 to 1989-90. As shown in Table 3.5 Maglen (1994) found that after the years 1974-75 the PRR to higher education started to decline, supporting the findings of both Miller (1982) and Chia (1991).

Table 3.5 A time series study of the PRR to a bachelor degree for the years 1968-69 to 1989-90

	1968-69	1974-75	1978-79	1981-82	1985-86	1989-90
Male	18.02%	18.11%	16.13%	14.99%	13.52%	13.48%
Female	18.19%	19.56%	13.73%	13.97%	13.18%	12.05%

Source: Modified from Maglen 1994

Miller (1982), Chia (1991) and Maglen (1994) all suggest that a greater supply of university graduates has consequently led to a fall in the relative earnings of a university graduate compared to a non-university graduate. The narrowing of the lifetime income differential between a university graduate and non-university graduate has both reduced the benefits for an individual investing in higher education and raised the opportunity cost of studying at university with students forgoing a much higher income. Even though these studies argue that the fall in the gross earnings differential has caused the PRR to a bachelor degree to fall, the findings by Maglen (1994) suggest that starting from 1989-90 variations in the cost of education will also affect the PRR of a university degree between individuals. Maglen (1994 p. 66) states:

> Variations in factors affecting the costs of doing a degree - living allowances, the length of time taken, the possibility of drop out - potentially have the greatest effect on variation in rates of return between individuals.

The results in Table 3.5 show that the PRR to a bachelor degree fell to 13.48 percent for males and 12.05 percent for females after the introduction of HECS in 1989. These estimates assume that the student had studied for three years and deferred their HECS repayments. If the student studied for three years but paid their HECS fees up-front, the PRR to a bachelor degree would fall to 13.05 percent for males and 11.64 percent for females (Maglen, 1994 p. 65). Maglen (1994) also found that the PRR to a university degree would fall approximately one percent for each additional year of study. For example, if a student undertakes a four year degree and

defers their HECS repayments, their PRR to a university degree would fall to 12.01 percent for males and 10.83 percent for females.

Despite the introduction of HECS affecting the PRR to a bachelor degree, Maglen (1994 p. 61) argues that the returns to a bachelor degree of at least 12.05 percent for females are greater than any return on alternative investments. A shortcoming of this argument, however, is there is no comparison of the risk involved with the alternative investments. Maglen (1994) notes that the student drop out rates at university range between 27 percent and 35 percent. Maglen's (1994) findings show that when the PRR to a bachelor degree is adjusted for student drop out rates then the return to a bachelor degree significantly falls. For example, if an individual undertakes a three year university degree and defers their HECS repayments but the PRR is adjusted for a 27 percent student drop out rate, then the PRR falls from 13.48 percent to 11.99 percent for males and to 10.72 percent from 12.05 percent for females. If it is assumed that 35 percent of all university students drop out before completing their degree, then the PRR would fall to 11.52 percent for males and 10.29 percent for females.

Although Maglen (1994) is the only known time series study to have adjusted the rates of return to higher education for HECS during this time frame, two additional studies have also measured the PRR to a bachelor degree for an individual who pays HECS. Of the two studies, by Chapman and Chia (1989) and Daly and Jin (1995) only Chapman and Chia (1989) calculated the PRR to a bachelor degree for both before and after the introduction of HECS. Daly and Jin (1995) did adjust their rates of return to higher education for HECS but their intention was not to measure the impact of HECS on the rates of return to a university degree but rather to compare the rates of return between Indigenous Australians and non-Indigenous Australians.

Daly and Jin (1995) measured the PRR to different levels of education attainment for both Indigenous Australians and non-Indigenous Australians using *1991 ABS Census data*. Among their calculations were the rates of return for an individual studying a three year degree adjusted for both HECS and employment probabilities, shown in Table 3.6.

Table 3.6 The PRR to a university degree for both Indigenous and non-Indigenous Australians

	No income support	With income support
Male Indigenous	17.8%	24.8%
Male non-Indigenous	17.1%	24.1%
Female Indigenous	15.4%	22.7%
Female non-Indigenous	10.4%	16.5%

Source: Modified from Daly and Jin 1995

Daly and Jin (1995) found that the rates of return to a three year bachelor degree were higher for Indigenous Australians than non-Indigenous Australians, with the largest gap found between Indigenous and non-Indigenous females receiving income support at 22.7 percent and 16.5 percent respectively.

Unlike Daly and Jin (1995), the study by Chapman and Chia (1989) aimed to measure the impact of HECS, referred to at the time as the 'tertiary tax', on the rates of return to higher education. Chapman and Chia (1989) used *ABS Income and Housing Survey 1985-86* to measure the PRR for both males and females for free education, the Higher Education Administration Charge (HEAC) [26] and HECS.

Table 3.7 PRR for males and females for free education, HEAC and HECS

	Males (%)	Females (%)
Free education	11.01	14.97
HEAC (1988)	10.81	14.65
HECS (1989)-deferred	10.51	14.85
HECS (1989)-up-front	10.04	13.48

Source: Modified from Chapman and Chia 1989

[26] HEAC, a flat fee of $250 per year was replaced in 1989 with a uniform HECS fee of $1800 per year. See Section 1.4.

Table 3.7 shows that PRR to a university degree decreased between 0.50 percentage points and 0.97 percentage points for males and between 0.12 percentage points and 1.49 percentage points for females when the rates of return for HECS are compared to those for free education. Supporting the findings of Maglen (1994), the size of the impact would differ depending on whether the university student deferred their HECS repayments or paid their HECS fees up-front. For example, if females deferred their HECS payment, their PRR to a bachelor degree would fall 0.12 percentage points but, if they paid their fees up-front, their PRR would fall 1.49 percentage points. Chapman and Chia (1989) argued that these results show that there is no financial gain in students paying their HECS fees up-front and also suggested that there would need to be a 40 percent discount given to those students who paid their HECS fees up-front before their PRR would equal the PRR of those students who had deferred. These estimates also suggest that the uniform HECS fee introduced by the Government did not significantly affect the PRR to a bachelor degree, if the individual deferred their HECS fees. Table 3.7 shows that if a female had deferred her HECS payments, her PRR to a university degree would be higher than under HEAC. Even though the introduction of a uniform HECS fee increased the cost of education over seven fold, the results in Table 3.7 suggest that there was only a small impact on the PRR to a university degree for males and a benefit for females, if they deferred their HECS fees. This feature of the income contingent charge became a rationale for the Government to increase HECS fees. A significant limitation of the study is the source of income data used to calculate the rates of return to education. The rate of return is most likely overestimated for females, who defer HECS given Chapman and Chia (1989) use income for an 'average female'. Chapman and Chia (1989) recognise the consequence of using data for an 'average' female, which includes women who both receive and do not receive an income. Chapman and Chia (1989) state:

> Say that four out of every five graduate females earn $25,000 per annum, with the other earning zero. The average income of the five is $20,000 per annum which, because of the pay-back threshold of $22,000 per annum, results in a calculation of a zero charge, even though in reality four of the women would be paying back up to $500 in that year.

This indicates that the PRR to higher education for females who defer should be lower than the estimate shown in Table 3.7. Even though Chapman and Chia (1989) recognise this limitation they conclude that there has been no significant effect on the rates of return to higher education.

3.3.2.3 The differential HECS system (1996-2004)

The 1996-97 budgetary changes in HECS significantly increased the cost of education for students, see Section 1.3. This would have arguably quickened the decline in the PRR to higher education, leaving doubt as to whether higher education was still a worthwhile investment.

Chapman and Salvage (1998) argued that the changes to Australia's higher education financing in the 1996-97 Budget, including the rising cost of a university degree together with a decrease in the HECS repayment threshold, could affect the financial attractiveness of a university degree. This study differed from previous studies calculating the PRR of a university degree, as it would measure the impact of a differential HECS system on the PRR for both males and females for the following five occupations: high school teachers, nurses, engineers, architects and lawyers. The study assumes that the hypothetical individual would enter university at 18 years of age, completes a four year degree and after graduating would receive either the award wage or medium wage for their occupation derived from the *1995 National Drug Survey*. The initial costs for the student are comprised of only forgone income, as there were no direct costs, such as textbooks or travel considered. Unlike other Australian studies HECS is calculated as a deferred liability and not as an up-front cost. The Productivity Commission (1997) supported this approach arguing that 75 percent of university students defer their HECS payments, so it should be calculated as a reduction in the graduate's income and not as a direct cost. The net benefit to the graduate is the higher income received over their working life minus their HECS repayments. The findings of Chapman and Salvage, in Table 3.8, show that the PRR decreases for all occupations after the introduction of the differential HECS system. For an average male the PRR to a university degree decreases from

10.11 percent to 9.42 percent and for an average female the PRR decreases from 6.31 percent to 5.77 percent.

Table 3.8 PRR before and after 1996-97 budgetary changes in HECS

Occupation	1996 HECS	1997 HECS	Decrease (%)
Average males	10.11	9.42	6.82
Average females	6.31	5.77	8.56
Male maths/science teacher	6.35	5.65	11.02
Female maths/science teacher	12.92	12.34	4.49
Male lawyer	14.69	13.86	5.57[27]
Female lawyer	17.99	17.26	4.06
Male nurse	1.74	1.37	21.26
Female nurse	11.10	10.75	3.15
Male architect	6.72	6.22	7.44
Female architect	11.50	10.96	4.70
Male engineer	13.48	12.77	5.27
Female engineer	17.30	16.67	3.64

Source: Modified from Chapman and Salvage 1998

The results in Table 3.8 show that not only does the PRR for all occupations fall but the impact varies depending on both gender and the type of occupation. For example, the largest decrease in the PRR to higher education is for male nurses at 21.26 percent followed by male maths/science teachers at 11.02 percent. After the introduction of the differential system the highest returns for higher education for both males and females (from the areas in the study) were law and engineering. The results of Chapman and Salvage's (1998) study, however, do not entirely support the findings of previous Australian studies that conclude women yield a higher PRR to a university degree than men. Miller (1982) argues women have a higher PRR to tertiary education than men, due to the greater financial benefit women receive from possessing a university degree than men. Miller (1982) argues that for men, the income differential between having no post-school qualifications and having post-school qualifications is not as large as it is for women. Despite this, Chapman and Salvage (1998) found that the PRR to higher education for an average male was higher than the PRR to higher

[27] The percentage decrease in the PRR for a male lawyer as calculated by Chapman and Salvage (1998) is incorrect. The percentage decrease in the PRR for a male lawyer is 5.65 percent not 5.57 percent.

education for an average female. As seen in Table 3.8, the PRR for an average male is 63 percent greater than the PRR for an average female. Yet their disaggregated results show that for the occupations they selected, women yield a higher PRR than men. For example, it is 685 percent more worthwhile for a female to study nursing than for a male.

Despite the PRR of return decreasing 6.82 percent for an average male and 8.56 percent for an average female and up to 21.26 percent for male nurses, Chapman and Salvage consider the impact of the 1996-97 budgetary changes in HECS small. Chapman and Salvage (1998 p. 12) state:

> While the internal rates of return have been reduced for all income groups as a consequence of the changes, it is accurate to describe these reductions as small.

The magnitude of the impact of the 1996-97 budgetary changes on the PRR of a university degree could be underestimated by Chapman and Salvage (1998). Chapman and Salvage calculated HECS as a deferred liability rather than an up-front cost, consequently, discounting the value of HECS in present value terms. This would reduce the effect of HECS on the PRR of a university degree compared to the situation where HECS was calculated as an up-front cost. Other limitations of the study by Chapman and Salvage (1998) include the income profiles used to calculate the PRR on a university degree for both males and females. Firstly, Chapman and Salvage (1998) assume that for all five occupations the graduate will only earn the award wage or median income. This is not realistic as for example, the study by Stokes (2005) found that 54 percent of male high school teachers and 34 percent of female high school teachers supplement their teaching income by additional work, some earning in excess of $6000 per annum. In addition, Stokes found that salaries for teachers in elite independent schools were generally around 20 percent above the award wage. Assuming that all graduates will only receive the award or median wage over their lifetime underestimates the return for a university degree. Not only did Chapman and Salvage (1998) calculate the PRR on a university degree using the award wage or median income of graduates but also calculated the PRR for females in the occupations such as: architects, lawyers and engineers based on male income. The only two occupations where Chapman and Salvage used female income to calculate the PRR for females were for nursing and teaching. As a result the PRR calculations

for female lawyers, architects and engineers may be overestimated. Two additional shortcomings of the study are the assumptions that, for all five occupations the individual was required to study a four year degree and that, the individual had neither received an income while studying or had incurred any direct costs, such as the cost of textbooks or student union fees. Of the five occupations compared in the study, teaching, engineering and architecture are the only three occupations where an individual is required to study for four years. A nursing student is required to study for three years and a law student usually studies at university for at least five years. This means that their assumption, where all students study at university for four years, has resulted in an underestimated value of the PRR for a nurse and overestimated values for the PRR for a lawyer. Chapman and Salvage have also miscalculated the PRR by not considering, the direct costs a student faces or the income they earn while studying, for all occupations. Furthermore, Chapman and Salvage (1998) calculate the PRR for a high school teacher assuming their specialisation is maths and science but no comparison is made between the PRR for high school teacher who specialises in for example, English and history with the PRR for a high school teacher who specialises in maths and science. These groups of teachers have different costs under the differential HECS system and as a result a different PRR for the same occupation.

This is, however, considered by the Productivity Commission. The Productivity Commission (1997) also conducted a study to measure the impact of the 1996-97 budgetary changes on the PRR of a university degree. The Productivity Commission drew upon the study of Chapman and Salvage (1998) to derive the age income profiles for seven occupations: architect, computer professional, high school teacher, engineer, lawyer, nurse and scientist. Unlike the study by Chapman and Salvage (1998), the Productivity Commission (1997) calculated the PRR for both males and females for only two occupations, teachers and nurses. The Productivity Commission (1997 p. 94) argued that there is no reliable information to calculate the PRR for the other five occupations based on gender. Similar to the study by Chapman and Salvage (1998), the Productivity Commission (1997) calculated HECS as a reduction in the graduate's income and not as a direct cost but, unlike Chapman and Salvage (1998), the Productivity Commission considered that in addition to forgone income there were other costs facing students who were undertaking a university degree. The Productivity Commission

calculated that tuition costs were $1054 per annum, indexed for 1996 from the Department of Employment Education and Training's (1987) estimation. They also assumed that a student while studying earns an income of $5960, derived from the study of Robinson (1996). The Productivity Commission's study also differs from that of Chapman and Salvage (1998) and from other previous Australian studies as it calculates the PRR for different alternative fee structures including: no tuition fees, a uniform HECS charge of $2478 per annum, a differential HECS system ($3300, $3500 and $4700), an over quota full fee regime (set at $1000 less than the international fee) and a differential HECS system with varying levels of cost recovery (from 40 percent cost recovery to 75 percent).

The Productivity Commission's (1997) findings (Table 3.9) show that under a system of no fees the PRR of a university degree is directly related to the graduate's income, with the cost of higher education affected by only the number of years the student studies at university. For example, the PRR for a lawyer is 18.1 percent, 34 percent higher than the PRR for a high school teacher at 11.9 percent, however, when the PRR of a lawyer is compared to the PRR of a computer professional at 23.3 percent, the lawyer's PRR is 22 percent lower. This is partly because the lawyer has a higher opportunity cost when studying at university, as a result of the additional years of study.

Table 3.9 The different PRR for seven occupations under five scenarios

	No fee	Uniform HECS charge	1996-97 differential HECS system	Full fee regime up-front	Cost recovery 40%
Architect	8.9	8.4	7.8	4.9	7.9
Computer Professional	23.3	21.7	20.8	12.8	21.0
Teacher I[a]	11.9	10.8	10.4	6.6	10.3
Teacher II[b]	11.9	10.8	10.1	6.6	10.3
Engineer	17.4	16.2	15.6	9.4	15.3
Lawyer	18.1	17.2	16.3	11.7	16.9
Nurse	13.6	12.3	11.5	5.5	11.2
Scientist	22.3	20.7	19.7	11.9	19.4

a Teacher I is a high school teacher who specialises in English and history.

b Teacher II is a high school teacher who specialises in mathematics and science.

Source: Modified from Productivity Commission 1997

Table 3.9 shows that the PRR to a university degree for any individual is at its highest when there is a system of free education. When tuition fees such as HECS are introduced into the market of higher education, the PRR to a university degree falls. This trend continues each time there is a rise in the level of student contributions towards the cost of higher education.

The Productivity Commission argues that the introduction of a uniform HECS charge of $2478 per annum has the greatest impact upon lawyers and computer professionals. The Productivity Commission (1997 p. 97) states that they have the 'greatest drop in return as their starting salaries tend to be higher, hence they pay the HECS charge back earlier than other occupations'. This argument is supported, if the absolute change in the PRR to higher education is considered. For example, computer professionals and scientists are most affected by the introduction of HECS with their PRR falling 1.6 percentage points (Table 3.10).

Table 3.10 The absolute change and percentage change in the PRR to higher education

	No fee	Uniform HECS charge	Absolute change	Percentage change
Architect	8.9	8.4	0.5	5.6
Computer Professional	23.3	21.7	1.6	6.9
Teacher I	11.9	10.8	1.1	9.2
Teacher II	11.9	10.8	1.1	9.2
Engineer	17.4	16.2	1.2	6.9
Lawyer	18.1	17.2	0.9	5.0
Nurse	13.6	12.3	1.3	9.6
Scientist	22.3	20.7	1.6	7.2

Source: Modified from Productivity Commission 1997

This argument, however, is limited as the absolute change in the PRR for lawyers is the second least affected by the introduction of HECS, with their PRR falling 0.9 percentage points. Moreover, if the percentage change in the PRR to higher education is calculated instead of the absolute change in the PRR to higher education, as done in the study by Chapman (1997), the most adversely affected by the introduction of HECS are nurses and high school teachers. The PRR for nurses and teachers fall 9.6 percent and 9.2 percent, respectively, whereas the PRR for computer professionals falls 6.9 percent and for lawyers 5.0 percent. Table 3.10 shows that when the percentage change is used to measure the impact of HECS on the PRR to higher education, lawyers are least affected. The results in Table 3.10

suggest that a uniform fee is inequitable as it does not consider the future income of graduates. It also suggests that the Productivity Commission's (1997) argument, that an income contingent charge system will have the greatest impact upon those earning the highest income, is only plausible, if the cost recovery levels are that substantial that it reduces the profitability of their investment by a larger percentage than graduates earning a lower income.

Even though a uniform HECS fee creates an inequitable higher education system, the Productivity Commission's findings in Table 3.9 suggest that the differential HECS system introduced by the Coalition Government does not promote a more equitable system. The Productivity Commission (1997 p. 98) suggests that the 1996-97 budgetary changes will lead to students shifting between courses and will cause some students choosing not to study at university at all. For example, out of the seven occupations examined by the Productivity Commission, an architect is the only occupation to have a PRR less than 10 percent after the introduction of a differential HECS system. The Productivity Commission's results also show that the PRR for both an architect and teacher II under a differential HECS system is less than half the PRR for a computer professional. The Productivity Commission's findings suggest that these differences in the PRR for different professions would result in more students choosing to become computer professionals and fewer students choosing to study architecture or education. This could then explain why, since the introduction of a differential HECS system, in certain fields such as information technology, there has been a surplus of university graduates and for high school teaching a shortage of university graduates (DEWR, 2004). However, according to both the 'cobweb' theory and the findings of past Australian studies on the PRR of a university degree, a surplus of graduates in a particular field such as information technology will eventually reduce the relative earnings received by the graduate, resulting in a decline in the PRR for a computer professional and consequently a fall in student demand to study information technology.

The findings of the Productivity Commission suggests that instead of the 1996-97 budgetary changes promoting a more equitable system, the changes introduced a new form of inequity, i.e. horizontal inequity. Under both a system of free education and a system with uniform HECS fees vertical inequity exists, as students pay the same contribution regardless of their

future income or PRR. The results of the Productivity Commission's study show that not only does vertical inequity still exist under the 1996-97 differential HECS system but also horizontal inequity occurs where there are different PRR's for the same occupation. Differing from all previous Australian studies, the Productivity Commission, using high school teachers as their example, showed that the PRR for a high school teacher would differ depending on their area of specialisation. As seen in Table 3.11, the PRR for a high school teacher under a system of free education and under a system with uniform HECS fees is the same regardless of the high school teacher's specialisation, however, under a differential HECS system a teacher who specialises in English and history has a higher PRR than a teacher who specialises in maths and science. A high school teacher who specialises in English and history has a PRR of 10.4 percent, whereas a high school teacher who specialises in maths and science has a PRR of 10.1 percent.

Table 3.11 Vertical and horizontal inequity

	No fee	Uniform HECS charge	1996-97 differential HECS system	Percentage change uniform HECS/differential HECS (%)
Architect	8.9	8.4	7.8	7.1
Computer Professional	23.3	21.7	20.8	4.1
Teacher I[a]	11.9	10.8	10.4	3.7
Teacher II[b]	11.9	10.8	10.1	6.5
Engineer	17.4	16.2	15.6	3.7
Lawyer	18.1	17.2	16.3	5.2
Nurse	13.6	12.3	11.5	6.5
Scientist	22.3	20.7	19.7	4.8

Source: Modified from Productivity Commission 1997

This result is because, under a differential HECS system, high school teacher graduates who specialised in maths and science pay band two level of HECS for their 'major', while high school teacher graduates who specialised in English and history pay only band one level of HECS for their 'major'. This means that the opportunity cost for a student majoring in maths and science is greater than the opportunity cost of a student majoring in English and history despite entering the same profession and earning the same income.

Although the findings in Table 3.11 show that the introduction of a differential HECS system would have adverse affects on the PRR for all graduates, the Productivity Commission states that it is impossible to be precise about the impact of a differential HECS system on students choosing to study at university. They refer to the findings by Chapman (1996) and argue that the uniform HECS charge had no discernible effect on university enrolments, so it is most likely that the differential HECS system will also have no discernible effect on university enrolments. However, as discussed in Chapter Two, the impact of changes in the cost of higher education upon the demand for university education is more accurately measured by the level of student applications for university and not the level of university enrolments. Moreover, the level of student applications for university fell in 1997 after the 1996-97 budgetary changes coinciding with a falling PRR to a bachelor degree.

Even though the Productivity Commission (1997) used the same income profiles as Chapman and Salvage to measure the impact of the 1996-97 budgetary changes in HECS on the PRR of different occupations, their findings differ from the results in the study by Chapman and Salvage (1998). This is a result of the Productivity Commission firstly, assuming that the student both earns an income while studying and incurs direct expenses such as the cost of books and materials while studying and secondly, by varying the number of years a student studies at university. Chapman and Salvage (1998) assumed for all occupations that the graduate would have studied a four year degree, whereas the Productivity Commission assumes that the length of the degree differs for each occupation. For example, the Productivity Commission assumes that the graduate studies for five years for architecture and three years for science. However, a shortcoming of the Productivity Commission's (1997) study is the number of years to study law is assumed to be four years, the same as Chapman and Salvage's study. This tends to be the minimum length and many students study double degrees that take five to six years. Therefore, like Chapman and Salvage, the Productivity Commission has underestimated the opportunity cost of an individual studying to become a lawyer.

The Productivity Commission's findings also show that an income contingent system such as HECS, benefits those graduates who take the longest to re-pay their HECS debt back the most. Under a HECS system, the longer it takes a graduate to repay their HECS debt the more financially better off they are. This is because HECS, if deferred and treated as a reduction in the graduate's income, reduces in present value over the graduates working life. This is supported by the last fee structure examined by the Productivity Commission, an income contingent system with various cost recovery levels. At 40 percent cost recovery levels[28], the PRR for an architect, computer professional and lawyer increase, as generally under the 1996-97 differential HECS system they would have repaid their HECS debt much faster. For teachers, nurses and scientists, however, their PRR would have decreased, as a consequence of them having to make their HECS repayments earlier.

A unique feature of this study by the Productivity Commission is the comparison made between the PRR of HECS students and students who pay full fees. Under the over quota full fee structure it is assumed that the student pays higher fees than a HECS student and pays these fees during the initial years of their investment. The Productivity Commission found that a system of full fees for domestic students would lower the PRR a further three to eight percentage points more than the PRR under a differential HECS system. This suggests that domestic students, paying fees higher than the FEE-HELP loan limit of $50,000, could have a PRR considerably lower than a HECS student for the same occupation.

Even though the Productivity Commission (1997) suggests that the differential HECS system will not adversely affect the overall level of enrolments in 1997, the review also suggests that a differential HECS system does not replace the uniform HECS system with a more equitable and fair higher education system. The Productivity Commission (1997 p. 107) states:

> Getting HECS 'right', in terms of the level and structure of course fees and the operation of the income-contingent loan mechanism, is important to the development of an efficient and equitable higher education sector.

[28] The course fee is set at 40 percent of the cost of actually running the course.

The review suggests that the two major criticisms of a uniform flat HECS system, that it does not consider the future income of graduates nor the differences in course costs is not resolved by a differential HECS system. In fact, the Productivity Commission sees no reason to link higher education fees to the future income of graduates. The Productivity Commission (1997 p. 109) concluded:

> Income distribution questions are best addressed through the taxation and social security systems, and reform to institutional barriers which may cause earnings to vary across occupations. Even if there were a case for linking HECS to future earnings, practical difficulties prevent this achievement.

The three tier system was designed to remove the equity concern put forward by Harrison (1995) that a uniform HECS system does not reflect the differences in course costs. The Productivity Commission (1997), however, argues that the differential HECS system consisting of three bands only partially addresses this problem. The Productivity Commission (1997 p. 109) argues that the three tier system:

> yields sizeable variation in the balance between private and public contributions towards course costs. The balance varies considerably both within and between the existing three fee bands.

Despite the Productivity Commission (1997) creating awareness of the failure of the differential HECS system to promote a more equitable higher education system, the Productivity Commission's alternative system is just as flawed. The Productivity Commission suggests that HECS should be a fixed proportionate fee based on the cost of the course. The Productivity Commission suggests that the fee should be equal to 50 percent of course cost recovery levels. Even though the Productivity Commission argues that a progressive income tax system in Australia removes the need for higher education fees to be tied to the future income of graduates, the fees outlined in Table 3.12 do not reflect the PRR of different occupations. Like the 1996-97 differential system introduced by the Government, the fixed

proportionate system is characterised by both horizontal and vertical inequity. If the fixed proportionate fee system had been introduced instead of the differential HECS system, the level of student fees would have been higher except for the disciplines: administration, economics, business and law. The occupation with the lowest PRR, architecture (Table 3.11) would have the largest cost increase and an even lower PRR.

Table 3.12 A fixed proportionate fee system at 50 percent of course cost recovery levels

Discipline	1997 HECS charge	Fixed proportionate fee
Arts, Humanities	3300	3418
Education	3300	4405
Nursing	3300	5184
Computing	4700	5184
Agriculture	4700	9048
Science	4700	7488
Administration, Business, Economics	4700	3418
Engineering	4700	7488
Law	5500	3418
Medicine	5500	9048
Veterinary Science	5500	9048

Modified from the Productivity Commission 1997

In addition to recommending a fixed proportionate fee system, the Productivity Commission (1997) also recommended that the cost base of HECS be expanded to include capital maintenance, that fee flexibility between universities be introduced and a penalty imposed for students who complete courses longer than the minimum time. They also recommended that interest rates be applied to deferred HECS loans to recover the cost of providing the loan. While the Productivity Commission argues that these changes would provide a more efficient higher education system, the question is at what price? This system suggests that a loss of equity is the price for greater efficiency.

A more recent study by Chapman and Ryan (2003) also investigated the impact of the 1996-97 budgetary changes in HECS on the PRR to a university degree. This study differed from the previous studies by Chapman and Salvage (1998) and the Productivity Commission (1997) in that it derived income profiles from the *1995-96 Income Distribution Survey*. The study

calculated the PRR for both females and males for three scenarios: no HECS, the introduction of HECS, and the 1996-97 budgetary changes. The results in Table 3.13 support the Productivity Commission's (1997) finding that as the cost of higher education increases the PRR to a university degrees falls for both males and females.

Table 3.13 The PRR of a university degree for males and females

	Male PRR	Female PRR
1988 (no HECS)	14.6	13.9
1989-90	14.1	13.8
1997-98	13.1	12.6

Source: Modified from Chapman and Ryan 2003

A significant limitation of these calculations of the average PRR to a university degree is the assumption that a student undertook a four year science degree. This means that the PRR to a university degree for both males and females could be underestimated for two reasons. Firstly, most science degrees are three years in length not four, as a consequence this methodology would raise the opportunity cost of studying at university and reduce the real PRR of the university degree. Secondly, there are other four year degrees that students choose to study at university where the student not only pays lower HECS fees than a student studying a science degree but also earns a higher income, therefore having a higher PRR than an individual with a science degree. According to Gradlink (2005) the median starting salary of a biological scientist is $36,000 and for a physical scientist $37,000, whereas the median starting salary of a high school teacher is $40,000. The assumption that a student studies a science degree for four years could also explain why, contrary to the general consensus of Australian studies, Chapman and Ryan (2003) found females have a lower PRR to higher education than males.

Even though the results of this study support the trend indicated by previous Australian studies that the PRR of a university degree is falling overtime, Chapman and Ryan (2003) do not acknowledge that the 1996-97 budgetary changes in HECS have affected the PRR to a university degree. Chapman and Ryan (2003) support the conclusions of both the Productivity

Commission (1997) and Chapman and Salvage (1998) that HECS has had no discernible affect on the PRR of higher education. Chapman and Ryan (2003 p. 8) state:

> Both the introduction of HECS, and the substantial changes in both the level of HECS charge and the generosity of the repayment rules introduced in 1997, were apparently associated with no major change to internal rates of return.

A significant limitation of these three studies aimed at assessing the impact of the 1996-97 budgetary changes in HECS upon the PRR of a university degree is the assumption that all higher earnings enjoyed by the graduate are a result of having a university degree. Unlike these three studies, Borland et al. (2000) followed the framework of Miller (1982) including the assumption that only 80 percent of the higher earnings enjoyed by the graduate are attributed to higher education.

The study by Borland et al. (2000) also differs from these previous studies for it calculates both the Private Rate of Return and Social Rate of Return for a three year and four year degree. The only previous Australian study to calculate both the PRR and SRR was by Miller (1982). Borland et al. (2000) argue the validity of both the PRR and SRR calculated in the study by Miller (1982) are limited as the study was conducted at a time when HECS did not exist. The SRR measured by Borland et al. (2000) will be discussed in Chapter Five. Borland's et al. (2000) calculations of the PRR to higher education are for a hypothetical individual undertaking a three year degree between 1995 and 1997, who commences employment at the age of 21 in 1998, and retires at 60 years of age. Borland et al., unlike the study by the Productivity Commission and the study by Chapman and Salvage, assumes HECS is an initial cost, where the student pays band two level HECS up-front at a value of $4215.60 per year. Similar to the Productivity Commission's (1997) study, Borland allows for direct costs to the value of $1100 per annum in calculating the PRR to higher education and assumes the student while studying earns the average weekly earnings of a full-time male student aged between 18 and 20 years. The benefit to the individual of obtaining a higher education is the difference between the average weekly earnings for a male with a bachelor degree and the average weekly earnings for a male who has completed high school. The average weekly earnings for

both a male who has a bachelor degree and a male who has completed high school and for a male student while studying are derived from the *ABS 1997 Training and Education Experience Survey (TEES).* However, Borland et al. (2000 p. 17) state 'calculations of average earnings for persons with a bachelor degree are made using all persons with a bachelor degree or above'. Keeping consistent with the framework of Miller (1982), Borland et al. (2000) assume real earnings growth is at two percent per annum and marginal income tax rates for 1997-98 are applied to all forms of income.

Borland et al. (2000) found for a three year degree the PRR was 15.0 percent, but if the individual undertakes a four year degree the PRR falls to 12.0 percent. According to Borland et al. (2000), these estimates are higher than the study by Chapman and Salvage (1998), as Chapman and Salvage used the *1995 Drug Strategy National Survey* for income data where the earnings of graduates are estimated lower. These findings by Borland et al. (2000) support previous studies that also suggest a four year degree gives a lower Private Rate of Return than a three year degree and support previous studies that show the PRR on a university degree is falling.

A shortcoming of this study by Borland et al. (2000) is that the PRR is calculated for a hypothetical individual using male income. The study does not calculate the PRR separately for males and females, nor does it calculate the PRR for various degrees or occupations.

Another limitation of this study is the assumption that the individual pays band two level HECS up-front. According to Chapman (1996), 75 percent of students defer their HECS payments, therefore, HECS should be treated as a reduction in the graduate's income rather than an up-front cost. This is supported by the statistics of student liability status for 2004 recorded by DEST. DEST (2004a) found that management and commerce was the discipline with the highest percentage of students who pay their HECS full up-front at 26 percent, however, across all disciplines 77 percent of students defer their HECS liability.

Many of the limitations of the study by Borland et al. (2000) were overcome in the study by Borland (2002). So that estimates can be compared with recent studies, the methodology employed in the study by Borland (2002) for the 'base case' is consistent with the study by

Miller (1982) and the study by Borland et al. (2000). Similar to the study by Borland et al. (2000), Borland (2002) calculates the PRR for a 'base case' of assumptions, however, the study differs from Borland et al. (2000) to include a sensitivity analysis on the estimates of the 'base case'. Also different to previous studies, Borland (2002) estimates the PRR by level of qualification, by field of qualification and by position of a university graduate in the earnings distribution of university graduates. The study also includes adjustments made to the level of HECS and direct costs faced by university students. Unlike Borland (2000), the study by Borland (2002) does not consider the alpha coefficient.

The PRR calculated for a 'base case' of assumptions is for a hypothetical individual who is assumed to undertake a three year degree between 2001 and 2003, pay up-front band two level of HECS and pay $2000 per annum in direct costs. Consistent with the assumptions made in Borland et al. (2000), income for both a high school graduate and a university graduate are assumed to be average weekly earnings for a male from the 1997 TEES. It is also assumed that the student will earn an income of a male student aged between 18 years and 20 years, derived from the ABS 1997 TEES and real earnings growth is two percent per annum. Unlike the study by Borland et al. (2000), retirement is assumed to be 65 years not 60 years. The PRR estimated for the 'base case' of assumptions is 14.5 percent, down from 15 percent as estimated by Borland et al. (2000). These estimates suggest that the PRR to higher education continues to fall.

Table 3.14 The PRR to a bachelor degree

	Private Rate of Return (PRR) (%)
Base case	14.5
Level of qualification	
Postgraduate degree	6.5
HECS	
Band one	15.5
Band three	14.0
Zero HECS	18.5
Direct costs	
Direct costs $7000	12.0
Field of qualification	
Business and Administration	18.0
Society and Culture	11.0
Science	11.0

Engineering	19.5
Earnings distribution for university graduates	
25th percentile	Not defined
75th percentile	22.5

Source: Modified from Borland 2002

Borland (2002) found that the PRR varied among students depending on the level of HECS fees they paid. If students paid band three level of HECS, their PRR fell to 14.0 percent, whereas if students paid band one level of HECS, their PRR increases to 15.5 percent. Table 3.14 shows that if there was zero HECS, the PRR to a bachelor degree would increase to 18.5 percent. Contrary to the findings of previous studies, Borland (2002) argues that these estimates are evidence supporting the argument that HECS has adversely affected the PRR to a university degree. Borland (2002) also found that, if direct costs increase from $2000 to $7000, the PRR decreases to 12.0 percent. The study by Borland (2002) also supports previous findings that the more years studied at university the lower the PRR, with the PRR for postgraduate degrees at 6.5 percent.

A significant limitation of previous Australian studies, such as Borland et al. (2000), is the use of average weekly earnings for a bachelor degree or above to calculate the return to a bachelor degree. Borland (2002) estimates the PRR to a bachelor degree using earnings for both a bachelor degree and above and for a bachelor degree only. Borland (2002) conceded that the PRR is overestimated when using earnings for a bachelor degree and above. If average weekly earnings for a bachelor degree are used to calculate the PRR to a bachelor degree, then the PRR to a bachelor degree falls to 13.5 percent from the 'base case' estimation of 14.5 percent (Borland, 2002 p. 16). This indicates that the estimates of previous Australian studies are also likely to be overestimated.

Borland's (2002) study is also unique for the study calculates the PRR for different qualifications. Of the four broad categories of qualifications, engineering had the highest PRR at 19.5 percent, business and administration had the second highest PRR at 18.0 percent, whereas both society and culture and science had a PRR of 11.0 percent. These results suggest

that the average PRR is not a clear indication of how worthwhile it is for an individual investing in their human capital, with the PRR varying between qualifications. It also suggests that the decision for an individual to study at university is even more complex with greater differences in the PRR between qualifications since the differential HECS system was introduced.

Borland (2002) shows that just as the PRR for different qualifications varied so does the PRR for the various positions of a graduate's income along the income distribution of graduates. For those graduates who were at the 25th percentile on the earnings distribution of graduates, the net benefit of their degree equalled a loss of $83,585, whereby the rate of return was negative. This suggests that the PRR for a hypothetical individual of 14 percent can be misleading as the graduates who are at the 25th percentile on the income distribution of graduates will not benefit from a university education at all. For those graduates who were at the 75th percentile on the income distribution of graduate's, the rate of return is 22.5 percent, eight percentage points higher than the PRR for the 'base case'.

Similar to the study by Borland et al. (2000), Borland (2002) does not calculate a separate PRR for females or use median income for all persons to calculate the PRR for the 'base case', therefore the conclusions that are drawn are for a hypothetical male. This is because Borland (2002) uses the same earnings data as Borland et al. (2000), except that it is indexed for 2001. This study is then limited in explaining the trends in female participation in higher education and in estimating how worthwhile it is for a female to undertake a university degree. Another limitation of this study is that Borland (2002) calculates the PRR for four broad categories of qualifications but assumes the individual studies at university for three years. This is an inaccurate assumption as, for example, an engineering degree is a minimum of four years in length. If the study had assumed that the student studying engineering had studied for four years instead of three years, then the PRR to engineering would be significantly lower. Furthermore, the four categories of qualifications engineering, business and administration, society and culture and science are too broad and do not cover all areas of higher education. For example, there are a number of degrees within society and culture that would deliver

different PRR to higher education and there are other areas such as health not considered in this study.

Even though Borland (2002) found that those students at the 25th percentile on the income distribution of graduates make a loss of $83,585 from their investment in human capital, Borland does not specify which groups make up the bottom 25 percent. It would be beneficial to know whether this group for example, is comprised mainly of females in specific occupations or those from certain socially disadvantaged groups, as this would provide useful information for making public policy decisions. It would also provide a clearer understanding of the different rates of return to higher education for various groups.

In addition to these studies is the study by Lewis, Daly and Fleming (2004). Lewis, Daly and Fleming (2004) followed the framework of Borland. The aim of this study was to assess whether it was worthwhile for an individual to study an economics degree instead of a business degree or law degree. The study compared the PRR of an economics degree for the Census years 1986, 1991, 1996 and 2001 with the PRR of a law degree, and PRR of a business degree. In addition to measuring the PRR for a 'base case' of assumptions for these three degrees, Lewis, Daly and Fleming measured the impact of changing three key assumptions on the PRR to all three degrees. These include assuming that the student takes four years to complete their degree not three, adjusting the graduate's income for age related probability of employment, and assuming the student had received an income while studying. Even though Lewis, Daly and Fleming followed the assumptions of Borland (2002), that both the student pays their HECS fees on completion of their course and that they pay $2000 per annum in direct expenses, their PRR to higher education was 15.90 percent, higher than the estimation by Borland (2002) of 14.5 percent. A possible reason for the differences in these estimations is Lewis, Daly and Fleming used income from ABS Census data to calculate the PRR to higher education not ABS TEES 1997. Nevertheless, contrary to the consensus of previous Australia studies that suggest the PRR is falling over time, Lewis, Daly and Fleming found that the PRR to higher education increased between 1986 and 2001 for all degrees. Table 3.15 suggests that the growth in the PRR of a business degree is relatively small compared to both a law degree and an economics degree.

Table 3.15 PRR for males, 1986 to 2002, for various degrees

	Economics	Law	Business	Other
PRR 1986	11.62	10.05	11.60	12.60
PRR 1991	14.24	14.50	12.50	14.10
PRR 1996	14.76	13.50	12.80	13.60
PRR 2001	17.60	16.40	13.40	15.90

Source: Lewis, Daly and Fleming 2004

Table 3.15 also shows that the PRR to a law degree was below all other degrees prior 1991 before rising above the PRR of a business degree, while the PRR of an economics degree has remained the highest except for the year 1991. These results firstly suggest that it is more worthwhile for an individual to invest in an economics degree instead of a law degree or a business degree. Secondly, these results suggest that the higher student fees and charges faced by university students have not impacted upon the PRR of a university degree. This contradicts both the findings of previous studies that suggest the falling PRR to higher education has quickened since the introduction of higher HECS charges, and the Human Capital Model that suggests increases in the cost of study will decrease the PRR to higher education. Lewis, Daly and Fleming suggest that the modest growth in the PRR of business degrees is due to the surplus number of graduates. Their study suggests that there is an inverse relationship between the number of surplus graduates and the PRR to higher education. This is supported by the level of enrolments measured in the study by Millmow (2004). Millmow (2004) found that between 1995 and 2000 the growth in student enrolments for marketing and distribution was the largest at 128.6 percent followed by administration and management at 91.2 percent, whereas the growth in student enrolments for economics was -8.5 percent. The decline in enrolments between 1995 and 2000 is correlated with a sharp rise in the PRR to an economics degree from 14.76 percent to 17.60 percent. The impact of the number of graduates in the labour market on the PRR to a university degree is reinforced by the changes to the PRR to university degrees, when adjustments are made for the probability of employment. According to Lewis, Daly and Fleming if the PRR to a economics degree is adjusted for employment probability, then the PRR to an economics degree for 2001 rises nearly two percent to 19.58 percent, whereas for a law degree the PRR rises by 1.7 percent to 18.1 percent and for a business degree the PRR rises by 1.6 percent to 15.0 percent. In agreement with previous studies, if the level of student earnings increases then the PRR to a university

degree increases and if the student studies for four years instead of three years, then the PRR to a university degree falls. However, there are two shortcomings to these latter findings by Lewis, Daly and Fleming. Lewis, Daly and Fleming assume that the student earns an income of $11,466 per annum, derived from McInnis and Hartley (2002). This is considerably higher than other studies, as it assumes that a student on average earned $15 per hour and worked approximately fifteen hours per week in 2001. Not only is the figure high but when they compare the PRR over the four Census years, they use the finding of McInnis and Hartley (2002) for the years 1996 and 2001, while for the years 1986 and 1991 they assume the student earns no income. This makes it difficult to accurately assess the impact of a student earning an income on the PRR of a university degree over time. The study also assumes that if a student studied for an extra year, four years in total, the PRR to a university degree would fall but a student who studies a law degree studies generally a minimum of five years. This means that the study should have assumed that the law student had taken five or six years to complete their degree not four. Consequently, the PRR to a law degree are overestimated as they do not take into account the entire opportunity cost of the student studying a law degree. Moreover, for all degrees the PRR is overestimated as there is limited consideration of occupations. For example, it is assumed that a graduate who studied economics will work as an economist. This does not consider the other occupations that these graduates occupy, such as economics teachers or public servants. According to Gradlink (2006), 32.6 percent of all economics graduates under the age of 25 years were employed in the clerical, service and sales sector in 2005. Not only does the limited scope of occupations over estimate the PRR to a university degree but assuming that the student is male and earns a male income, with no alpha coefficient for student ability, also overestimates the return to a university degree. These results, however, could provide an argument for the Government to shift the cost of higher education to the students, as the PRR increasing over time suggests that higher fees and charges have no adverse affect on the PRR to higher education.

Furthermore, the aim of this study is also questioned as the results of the study show that student perceptions affect the PRR to higher education. With this in mind, Lewis, Daly and Fleming (2004 p. 1) argue that the study was to rectify students perceptions that an ‘economics degree does not provide a financially rewarding career’. It is these student perceptions of an

economics degree, however, that have resulted in the PRR to an economics degree to increase. Raising student awareness of the greater return to an economics degree could result in a rise in the number of students enrolling in economics, therefore graduating and consequently impacting upon the PRR to an economics degree.

As a continuation of the 2004 study, Daly, Fleming and Lewis (2006) measure the PRR for both males and females who studied at university from the 1986 and 1991 Population Census. However differing from the 2004 study Daly, Fleming and Lewis (2006) use cross sectional data to make ex ante estimates of the PRR as well as using longitudinal calculations to make ex post estimates of the PRR. The estimates measure only part of the PRR to higher education, as the income data covers only the first few years of the graduates working life. For example, the 1986 cohort measures the PRR using the income for a person up to the age of 36 years. Meanwhile, the PRR for the 1991 cohort uses the income for a person up to the age of 31 years. The longitudinal estimates (ex post) and the cross section estimates (ex ante) for the 1986 and 1991 cohorts are shown in Table 3.16.

Table 3.16 The ex post and ex ante estimates of the PRR for males and females for 1986 and 1991 cohorts for various degrees

	Ex post estimates for 1986	Ex ante estimates for 1986	Ex post estimates for 1991	Ex ante estimates for 1991
Males				
Law	8.0	4.0	5.0	4.0
Commerce/Business	6.0	4.0	3.0	0.0
All degrees	7.0	5.0	5.0	2.0
Females				
Law	9.0	7.0	6.0	6.0
Commerce/Business	4.0	4.0	0.0	-2.0
All degrees	7.0	4.0	3.0	3.0

Source: Daly, Fleming and Lewis 2006

Daly, Fleming and Lewis (2006) also measure the impact of both the introduction of HECS and the 25 percent increases in HECS on the student cohort for 1986 using longitudinal calculations. Daly, Fleming and Lewis (2006) found that the introduction of HECS would have reduced the PRR for all degrees by one percent, whereas the 2005 HECS fees would

have more than halved the return for commerce and business graduates (Table 3.17). Daly, Fleming and Lewis (2006 p. 263) state:

> These hypothetical calculations suggest that the introduction of HECS has had a substantial negative effect on the Private Rate of Return to higher education.

Table 3.17 The ex post estimates of the PRR for males and females for the 1986 cohort for the introduction of HECS and the 25 percent increase in HECS

	1986 HEAC	1991 HECS	2005 HECS
Males			
Law	8.0	7.0	5.0
Commerce/Business	6.0	5.0	3.0
All degrees	7.0	6.0	5.0
Females			
Law	9.0	8.0	6.0
Commerce/Business	4.0	2.0	1.0
All degrees	7.0	6.0	4.0

Source: Daly, Fleming and Lewis 2006

It should also be noted that this study is limited as it does not produce a longitudinal measurement of the PRR based on the full lifetime earnings of the graduates. Daly, Fleming and Lewis (2006 p. 265) state:

> These results show that university graduates from the 1986 and 1991 cohorts of 18-21 year olds have, in the first part of their working lives, achieved Private Rates of Return to their investment in education that were at least as good and often better than they could have expected ex ante by looking at cross sectional calculations of the Private Rate of Return.

Another approach to measuring the PRR involves the use of microsimulation models. Even though international studies such as O'Donoghue (1999) had used microsimulation models to calculate the rates of return on higher education, no Australian study before Johnson and Lloyd (2000) had taken this approach. According to O'Donoghue (1999), this approach analyses complex situations at the micro level and allows analysts to assess the impact of policy changes on the individual. Johnson and Lloyd (2000) calculate the PRR to higher

education using the NATSEM RED model. Johnson and Lloyd (2000 p. 5) state the microsimulation model differs from other Australian studies for it calculates the 'rate of return for individuals not for an aggregate rate of return to a level of study'. The NATSEM RED model, therefore, examines individuals and groups of individuals with similar characteristics. Johnson and Lloyd (2000) used data from the *1994-95 Continuous Income Survey* to calculate the PRR for a male who studies a three year science degree and retires at 65 years of age. The PRR to a science degree of 13.4 percent is fairly consistent with the estimate made by Chapman and Ryan (2003) for a male studying a four year science degree at 13.1 percent. This study is limited when assessing the impact of HECS on the PRR to a university degree, as Johnson and Lloyd do not estimate the PRR for other time periods. The aim of the NATSEM RED model is to make a comparison between the PRR of a science degree with the Government Rate of Return of a science degree. Furthermore, it is even more difficult to make comparisons with the PRR in this study with estimates in other studies given the NATSEM RED model is a microsimulation approach that has many assumptions. For example, it is assumed that the male university graduate will work full-time until 62 years of age, then work part-time for the next two years before leaving the workforce at 64 years of age. The NATSEM RED model also assumes that the individual receives one year mature age allowance before retiring at 65 years and receives an annuity that is $132,000 higher than the annuity of a HSC graduate. Johnson and Lloyd (2000) also assume that the student while studying at university receives student assistance from the Government and chooses to defer their HECS repayments. These last two assumptions reduce the total opportunity cost for a student studying a three year science degree to $40,000 (Johnson and Lloyd, 2000 p. 16). The estimate in this study of 13.4 percent for a science degree is higher than for example, Borland's (2002) estimate of the PRR for a science degree of 11 percent, as Borland (2002) made none of these assumptions. Although the microsimulation model can effectively draw conclusions for a group of people with similar characteristics, it is limited for drawing conclusions for a hypothetical individual. Normally, studies calculating the PRR for a specific case would be higher than the aggregate return for all university education. However, studies such as Borland (2002) show that the return on a science degree is lower than the PRR for both a 'base case' and other disciplines such as business and administration. This suggests that Johnson and Lloyd's (2000) estimate of the PRR for a science degree is most likely lower than

the PRR for a university degree in general. This therefore limits the effectiveness in comparing the estimate made by Johnson and Lloyd (2000), with the estimates of other Australian studies, as Johnson and Lloyd (2000) calculate the PRR for a specific case whereas all other Australian studies calculate the aggregate return for university education. Borland (2002) suggests that even though the NATSEM RED model is more sophisticated and flexible than any other Australian study on the rate of returns to education with the range of factors considered, such as superannuation, the flexibility of the study makes it difficult for policy makers to draw any conclusions. Borland (2002 p.19) states:

> Generally policy makers will be most interested in prospective estimates of the rate of return to university education - that is, for future cohorts of students. This means that it is then necessary to define what will be the population of students and to forecast their age-earnings profiles.

According to Borland (2002 p. 19) the NATSEM RED model is also unique for it draws upon life experiences but the assumption that students do not earn an income while studying 'is clearly at odds with actual experience'.

3.3.2.4 The 2005 HECS system (2005 - present)

The first study to consider the impact of the 2005 changes to the HECS system was Beer and Chapman (2004). The study by Beer and Chapman (2004) measure the impact the *Higher Education Support Act 2003* has on the present value of HECS repayments for both HECS-HELP and FEE-HELP students for nine hypothetical situations. The nine hypothetical situations include male and female graduates on high, middle and low incomes, and for females, both without children and with two children. Chapman and Beer (2004) do not calculate the rates of return to higher education but instead calculate the present value of HECS repayments by discounting the value of future HECS repayments made by graduates into today's value. The findings suggest that the changes under HECS-HELP (25 percent higher HECS fees together with a higher repayment threshold) will have various effects on the level of the present value of debt for different groups of graduates. According to Beer and

Chapman (2004), there will be no effect on the level of present value of debt for low income males but for low income females without children and for low income females with two children, the present value of their HECS debt repayments will fall 66 percent and 86 percent respectively. Whereas, for all middle income graduates the present value of their HECS debt repayments will increase, nine percent for females with two children and 18 percent for both middle income males and middle income females without children. The most adversely affected are high income earners with all graduates including women with two children experiencing a 23 percent increase in the present value of their HECS debt repayments. These findings suggest that the higher HECS repayment threshold protects low income earners, in particular women, but for both middle and high income graduates they will be worse off as they will make up to 23 percent higher HECS repayments. In addition to measuring the impact of HECS-HELP on the level of student debt, Beer and Chapman assess the impact of FEE-HELP on the present value of HECS repayments for various groups of graduates. In order to measure the impact of FEE-HELP on students studying a four year degree Beer and Chapman refer to two situations, where the cost of study is covered by a FEE-HELP loan and where the cost of study is not covered by a FEE-HELP loan. The first scenario assumes that the individual pays only $12,500 per year to study at university, a total of $50,000 for the four year degree. The second situation assumes that the individual pays $13,333 per year to study at university and therefore reaches the $50,000 FEE-HELP limit within three years, leaving the individual to pay up-front $13,333 to complete their four year degree. Table 3.18 shows that under the FEE-HELP system both low income females with no children and low income females with two children who pay $12,500 per annum, have lower debt repayments in present value than a HECS-HELP student. For example, a female with two children covered by a FEE-HELP loan repays in present value, $1400, seven times less than if she was enrolled as a HECS-HELP student. For all other graduates who pay $12,500 per annum the present value of their debt repayments are greater than the repayments of a HECS-HELP student. The largest difference in the present value of debt repayments between a HECS-HELP student and a student covered by a FEE-HELP loan is $15,900 for a high income male. As can be seen in Table 3.18, no FEE-HELP student covered by a FEE-HELP loan ends up repaying in present value terms the $50,000 loan, with the highest debt repayment made by a high income male at $31,100.

Table 3.18 Present value of repayments for HECS-HELP and FEE-HELP individuals

	Males	Females, no children	Females, two children
Low income			
HECS individual	12,600	12,000	9900
Full fee paying student ($12,500 per year)	16,300	4100	1400
Full fee paying student ($13,333 per year)	27,200	15,100	12,300
Middle income			
HECS individual	14,200	13,900	13,300
Full fee paying student ($12,500 per year)	26,600	25,200	20,200
Full fee paying student ($13,333 per year)	37,500	36,200	31,100
High income			
HECS individual	15,200	15,100	15,100
Full fee paying student ($12,500 per year)	31,100	30,400	27,400
Full fee paying student ($13,333 per year)	42,100	41,400	38,400

Source: Modified from Beer and Chapman 2004

According to Beer and Chapman (2004), those most adversely affected by the changes made under the *Higher Education Support Act 2003* are low income graduates who have paid full fees that are higher than the FEE-HELP loan limit of $50,000.

Beer and Chapman (2004 p. 13) state:

> The results are particularly striking for females, with just one year's up-front payment meaning an increase in the present value of the debt of over 300 percent (from about $4,000 to over $15,000) for females with no children and about a factor of eight (from $1,400 to $12,300) for females with two children.

This study by Beer and Chapman (2004) highlights the regressive nature of a higher education system with full fees. For example, students can enter courses with lower entrance scores, if they are able to pay full fees, yet according to Table 3.18 students do not repay in present value terms their FEE-HELP loan. It also shows that for most graduates the present value of their level of HECS debts will rise with the increase in HECS fees of 25 percent. A shortcoming of this study is it only measures the present value of repayments for individuals. It does not measure the impact of recent increases in student fees and charges on the PRR to higher education. The increase in the present value of repayments for most individuals would suggest that since the study by Borland et al. (2000) that the PRR would have fallen further again.

3.4 Conclusion

The decision making involved in choosing whether to go or not go to university and to privately invest in human capital is complex. The Human Capital Model suggests that while the opportunity cost for an individual to study at university is less than the benefits the individual receives then it is worthwhile for the individual to invest in their human capital. Numerous studies have shown that there is a positive relationship between the level of earnings and education and therefore suggest students should invest in a university education. According to Chia (1990) students should base their decisions on the Private Rate of Return to a university degree, that is, the minimum rate of return that an individual would need to earn to consider higher education a profitable investment.

There have been a number of studies that have measured the rate of return to a university degree but caution is needed in interpreting these results. This is because there are four main time frames of higher education policy in which these studies have been conducted. Studies such as Miller (1982) that were conducted during the period of free education suggest that higher education is a profitable investment, with the return greater than any alternative

investments available to students at the time. Miller (1982) also found that the PRR to higher education was greater for females than males and higher for three year than four year degrees.

Post-Miller (1982) studies, however, have shown that as Australia's higher education policy develops and moves towards a user pays system the rates of return to a university degree have fallen. Even before the introduction of HECS, time series studies such as Chia (1991) and Maglen (1994) suggested that the earnings differential between individuals with post-school qualifications and those without was narrowing due to the increased supply of university graduates. This consequently raised the opportunity cost of studying at university and reduced the benefit of obtaining a university degree. The fall in the PRR to a university degree was further hastened by the introduction of HECS.

Besides Maglen (1994), Chapman and Chia (1989) is the only study during the time of uniform HECS fees to measure the impact of the introduction of HECS on the PRR of a university degree. However, the findings of this study were limited as Chapman and Chia (1989) used data for the 'average' male and female to measure the rates of return to education. As a result the impact of the introduction of HECS on the PRR to a university degree was underestimated. The findings in the studies by Chapman and Chia (1989) and Maglen (1994) and the estimates of the rates of return from later time series studies, such as the Productivity Commission (1997), show that the PRR to a university degree declined with the introduction of HECS and that the greatest impact was for those who paid their HECS fees up-front. These studies' results also showed that a system of uniform HECS fees embraced horizontal inequity as all university graduates would pay the same fees regardless of their Private Rate of Return. Chapman and Chia's (1989) argument, however, that there is minimal impact of higher tuition fees on the rate of return to a bachelor degree for those who defer their HECS, became the rationale for the Federal Government to further increase student HECS fees in 1997 and again in 2005.

To overcome the lack of fairness of the uniform HECS system, the Federal Government introduced the differential HECS system in 1997. The higher fees were supposedly based both on the future income of graduates and the cost of the course. The impact of higher tuition fees

would again prove to worsen the PRR to university education. The 1996-97 budgetary changes in HECS labelled to be the most 'radical' by Chapman and Salvage (1998) attracted a lot of attention. Most of the Australian literature measuring the impact of HECS on the rates of return to higher education was conducted during this time period. Studies including the Productivity Commission (1997), Borland et al. (2000), Borland (2002) and Chapman and Ryan (2003) show significant declines in the rates of return to higher education after the 1996-97 increases in HECS. Not only did the PRR to higher education fall but the studies by the Productivity Commission (1997), Chapman and Salvage (1998) and Borland (2002) suggested that Australia's higher education system would be characterised by horizontal inequity as well as vertical inequity. For example, the Productivity Commission (1997) found that the PRR for a high school teacher would differ depending on the teacher's specialisation. If the high school teacher specialised in English and history, their PRR would be 10.4 percent, whereas if the high school teacher specialised in maths and science, their PRR would be 10.3 percent. Borland (2002) estimated that the PRR to a three year bachelor degree for a hypothetical individual after the 1996-97 budgetary changes was 14.5 percent, however, if there had been free higher education, Borland (2002) estimated that the PRR to a three year bachelor degree would increase to 18.5 percent. Despite Borland (2002) suggesting there had been a fall in the PRR to a three year bachelor degree of four percentage points as a result of increases in HECS fees, the Government allowed increases in HECS fees of up to 25 percent and introduced FEE-HELP for 2005.

The study by Chapman and Beer (2004) is the only study to measure the impact of these 2005 changes on the return of a university degree. However, instead of calculating the rates of return to higher education, they measured the present value of HECS repayments. This thesis will differ to the study by Chapman and Beer (2004), as it will examine the PRR to various occupations, both before and after the 2005 changes to HECS. This study will also measure the PRR for both a 'base case' individual and for broad occupations based on gender using income data from the *ABS Income and Housing Survey (2003-04) CURF*. The methodology and estimates of this study of the PRR to higher education will be discussed in Chapter Four.

Chapter 4: Measuring the Private Rate of Return to higher education in Australia

4.1 Methodology

As discussed in Chapter Three, the Human Capital Model suggests that an individual will invest in their human capital when the costs borne immediately are worthwhile because of the return received later. The cost of a university degree is the opportunity cost of an individual studying at university and the return is the income premium the university graduate receives. The summary statistic that uses a discount rate to compare the total cost of study with the net benefits of higher education is known as the Private Rate of Return. As discussed in Section 3.1, the return on investment is only worthwhile when the Private Rate of Return is greater than the return on an alternative investment, such as the interest rate on savings.

The aim of this study is to measure the rate of return of a university degree for 2004 and to examine the effect that the 25 percent increase in HECS in 2005 has upon the rate of return to various categories of students and university graduates. Estimates of rates of return are based on the Mincer equation (Mincer, 1958). The specific rates of return in this study are calculated using Formula 3.1 (Borland, 2002 p. 2) from Chapter Three.

$$PV_C = \sum_{t=1}^{n} C_t/(1+r)^t \quad (3.1)$$

$$PV_B = \sum_{t=n+1}^{m} B_t/(1+r)^t$$

Then:

$PV_B - PV_C = 0$ and solve for r.

Where:

C_t = opportunity costs for university degree in year t;

B_t = benefit of university degree in year t;

n = length of education;

m – n = years in workforce; and

r = rate of return.

This study measures the income of a university student, a year 12 graduate, and a university graduate based on ABS *Household Expenditure Survey (HES) and Survey of Income and Housing (SIH) 2003-04 Confidentialised Unit Record Files (CURF)* at person level. The study uses person level rather than income unit level data as it takes into consideration the participation in employment of the university graduates and year 12 leavers with no non-school qualifications.

The ABS *Household Expenditure Survey (HES) and Survey of Income and Housing (SIH) 2003-04 CURF* contains a sample of dwellings surveyed throughout Australia from July 2003 to June 2004. The sample does not include non-private dwellings or dwellings in remote or Indigenous areas. Computer assisted interviewing was used to collect information from persons aged 15 years and over in the selected households. The 22,286 persons interviewed were asked questions regarding personal and household characteristics such as, marital status, student status, qualifications, birthplace and detailed information on their income, assets and liabilities (ABS 2006c).

The methodology is based on that of Borland (2002)[29] except that the sample used to obtain the estimates include male and female wage and salary earners aged 18-60 years working part-time and full-time. Average earnings in the job with main employer are calculated for disaggregated age workforce groups- 18, 19, 20, 21, 22, 23, 24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54 and 55, 56, 57, 58, 59, 60 years.

It is assumed that age-earnings profiles derived using the 2003-04 HES and SIH CURF data apply over the future time period encompassed in this study. Real earnings growth for both high school and university graduates is assumed to be one percent per annum, equal to the average annual change in real average weekly earnings (AWE) for the years 1983 to 2005.

4.1.1 Measuring the costs of higher education for a student

The first stage in measuring the costs of higher education is to measure the income a student forgoes while studying. The net forgone student income is equal to the difference between the income of a year 12 graduate and a university student. The opportunity cost of studying at university is the net forgone student income plus education costs including HECS fees and tuition costs. This is represented by Areas B and C in the Human Capital Model (see Figure 3.1).

Table 4.1 provides a summary of how this is calculated in this model.

Table 4.1 A summary of the costs incurred while studying at university

Forgone income
Income of a year 12 graduate *minus*
The income a student earns while studying (including employee earnings and income from scholarships and youth allowance)
Education expenses
HECS *plus*
Tuition expenses

[29] Lewis, Daly and Fleming (2004) also based their methodology on Borland's (2002) in their study of the PRR for economics degrees in Australia.

Total Expenses
Forgone income *plus*
Education expenses

4.1.1.1 Income of a student

The weekly earnings for both male and female full-time university students for the ages 18 to 24 years were measured using Ordinary Least Squares (OLS) regression analysis. The formula used to calculate this is:

$$Lw_t = \beta_0 + \beta_1 A + \beta_2 F + \beta_3 P/T + \beta_4 E + \beta_5 N + \mu \quad (4.1)$$

Where Lw = log of earnings in year t, β_0 = a constant term, A = age in years, F = dummy variable for female, P/T = dummy variable for part-time work, E = dummy variable for country of birth (English speaking excluding Australia), N = dummy variable for country of birth (non-English speaking), and μ = error term

The regression equation does not include occupations or industries as the sample sizes available in the CURF for the classifications were too small. The base case in this model is that for a single male student who was born in Australia and works full-time.

In calculating the log of earnings for full-time students, the student income is weighted according to the proportion of students who worked part-time and not in paid employment. For those students who were not in paid employment their income was zero. The calculation of earnings for a full-time student does not consider those students who study full-time and work full-time[30].

[30] Due to both the limited sample size and some ambiguity in the CURF identifier, education status, the earnings for both part-time and full-time students could not be calculated accurately, so this alternative approach was taken.

The weekly employee incomes of university students for the ages 18 to 24 years were then multiplied by 52 to give annual gross employee income[31]. The employee incomes of the university students were then adjusted for real income growth of one percent per annum equal to the average annual change in real average weekly earnings (AWE) for the years 1983 to 2005. This one percent real income growth is applied from the second year of study for 2004 and from the first year of study in 2005. This real adjusted annual employee income was then added to the income a student receives, from youth allowance and scholarships (based on the CURF sample) and then adjusted for tax (refer to Tables 4.2 and 4.3).

Table 4.2 Individual income tax rates for 2003-04

Taxable income	Tax in this income
$0-$6000	Nil
$6001-$21,600	17 cents for each $1 over $6000
$21,601-$52,000	$2,652 + 30 cents for each $1 over $21,600
$52,001-$62,500	$11,772 + 42 cents for each $1 over $52,000
$62,501 and over	$16,182 + 47 cents for each $1 over $62,500

Source: Adapted from ATO (2006)

Table 4.3 Individual income tax rates for 2004-05

Taxable income	Tax in this income
$0-$6000	Nil
$6001-$21,600	17 cents for each $1 over $6000
$21,601-$58,000	$2,652 + 30 cents for each $1 over $21,600
$58,001-$70,000	$13,572 + 42 cents for each $1 over $58,000
$70,001 and over	$18, 612 + 47 cents for each $1 over $70,000

Source: Adapted from ATO (2006)

4.1.1.2 The income of a year 12 graduate with no post-school qualifications for ages 18-24 years

To calculate the forgone income of studying at university the differences between the student income and the earnings of a full-time worker are measured. The student regression equation

[31] The sample included the average earnings of people working over 52 weeks.

(as discussed earlier) is 4.1. The OLS regression equation for a male year 12 graduate with no post-school qualifications for the ages 18 to 24 years is equation 4.2.

$$Lw_t = \beta_0 + \beta_1 A + \beta_2 A^2 + \beta_3 P/T + \beta_4 E + \beta_5 N + \sum_{j=1}^{9} \alpha_j O_j + \sum_{j=1}^{16} \theta_j I_j + \sum_{j=1}^{3} \pi_j S_j + \mu \qquad (4.2)$$

Where Lw = log of earnings in year t, β_0 = a constant term, A = age in years, A^2 = age squared in years, P/T = dummy variable for part-time work, E = dummy variable for country of birth (English speaking excluding Australia), N = dummy variable for country of birth (non-English speaking), O = nine dummy variables for occupations, I = 16 dummy variables for industry, S = three dummy variables for income unit status and μ = error term

The base case is a single male without dependent children who is born in Australia. The person works full-time as a professional in the industry category, property and business services.

Separate regression equations were also created for females for the ages 18-24 years. The only difference between the regression equations for males and females is for females the coefficient age cubed was included in the regression equation. For males the lifetime earnings profile forms a quadratic polynomial where in general income increases overtime; however, for females their lifetime earnings forms a cubic polynomial characterised by interruptions such as child rearing.

The OLS regression equation for a female year 12 graduate with no post-school qualifications for the ages 18 to 24 years is equation 4.3.

$$Lw_t = \beta_0 + \beta_1 A + \beta_2 A^2 + \beta_3 A^3 + \beta_4 P/T + \beta_5 E + \beta_6 N + \sum_{j=1}^{9} \alpha_j O_j + \sum_{j=1}^{16} \theta_j I_j + \sum_{j=1}^{3} \pi_j S_j + \mu \qquad (4.3)$$

Where Lw = log of earnings in year t, β_0 = a constant term, A = age in years, A^2 = age squared in years, A^3 = age cubed in years, P/T = dummy variable for part-time work, E = dummy variable for country of birth (English speaking excluding Australia), N = dummy variable for country of birth (non-English speaking), O = nine dummy variables for occupations, I = 16 dummy variables for industry, S = three dummy variables for income unit status and μ = error term

The base case is a single female with no dependents who is born in Australia. The person works full-time as a professional in the industry category, property and business services.

4.1.1.3 Education expenses

As discussed in Chapter Three, the opportunity cost of a university education consists of HECS, forgone income, books, tuition and extra travel. The Department of Education, Science and Training's student contribution tables for 2004 and 2005 are used to determine the level of HECS a student pays to study at university. This model calculates the return of a university degree for both students who pay their HECS fees up-front and for those students who defer their HECS debt.

(i) Up-front model

For the base case it is assumed that the student pays band two level of HECS up-front (with 25 percent discount and 20 percent discount respectively) at $4025.25 for 2004 and $5479.20 for 2005[32]. It is also assumed that students in 2005 pay 25 percent higher HECS fees, as a result of the higher education policy changes (Table 4.4).

Table 4.4 Student contribution levels for Commonwealth Supported Places for 2004 and 2005

Student contribution band	2004	2005 including 25% higher fees

[32] Borland (2002) also assumed students paid band two level of HECS.

		indexed for 2005
Band three (Law, Dentistry, Medicine, Veterinary Science)	$6283	$8018
Band two (Accounting, Administration, Economics, Commerce, Mathematics, Statistics, Computing, Built Environment, Health, Engineering, Science, Surveying, Agriculture)	$5367	$6849
Band one (Humanities, Behavioural Science, Social Studies, Foreign Languages, Visual and Performing Arts)	$3768	$4808
National priorities (Education, Nursing)	$3768	$3847
Up-front discount	25 percent	20 percent

Source: Modified from AVCC (2006a)

(ii) Deferred mode

In addition to measuring the rate of return for students who pay their HECS fees up-front, a separate model has been constructed to measure the rate of return for the 75 percent of students who defer the HECS repayments (DEST 2004d)[33]. In order to estimate the compulsory level of HECS repayments the graduate must pay each year, Table 4.4 is used. In the deferred model there is no discount and graduates make their repayments when they reach the income threshold, see Tables 1.5 and 1.6.

In measuring education expenses in both models the cost of books, tuition and extra travel are equal to Borland's (2002) estimation, indexed to the CPI Tertiary Education Cost Index. The student outlay for books, tuition and extra travel for 2004 is $2289 and $2360 for 2005, adjusted in real terms. This is supported by University of New South Wales (2006) that

[33] DEST (2004d) found that in 2004, 413,085 students of the 550,579 students attending university opted to defer their HECS liabilities.

estimates that the cost of textbooks are a minimum $500 per year, the cost of field trips and equipment are approximately $1000 per year, and the annual fee for university guilds and sports associations is $513.60. In addition to these costs is the cost of parking for students at $8.00 per day or $960 per annum[34].

4.1.2 Private Rate of Return

According to Human Capital Theory, an individual's level of income is directly related to their level of education and experience. The Human Capital Model suggests that an individual with a university degree will receive a higher income over their lifetime compared to an individual who has only completed year 12. The income differential otherwise known as the wage premium is represented by Area A in Figure 3.1.

4.1.2.1 Income of a university graduate and year 12 graduate with no post-school qualifications for the ages 21 to 60 years

To estimate the log of earnings for both, a year 12 graduate and a university graduate for the ages 21 to 60 years, separate OLS regression equations were formed for males and females.

The OLS regression equation for a male including both university graduates and year 12 graduates with no post-school qualifications for the ages 21 to 60 years is equation 4.4.

$$Lw_{tm} = \beta_0 + \beta_1 A + \beta_2 A^2 + \beta_3 A^3 + \beta_4 P/T + \beta_5 B + \beta_6 E + \beta_7 N + \sum_{j=1}^{3} \tau_j L_j + \sum_{j=1}^{8} \alpha_j O_j + \sum_{j=1}^{16} \theta_j I_j + \sum_{j=1}^{3} \pi_j S_j + \sum_{j=1}^{11} \sigma_j NS_j + \mu \quad (4.4)$$

[34] The annual figure for student parking assumes that the student attends university for four days per week, for 30 weeks in the year.

Where Lw = log of earnings in year t, β_0 = a constant term, A = age in years, A^2 = age squared in years, A^3 = age cubed in years, P/T = dummy variable for part-time work, B= dummy variable for left before year 12, E = dummy variable for country of birth (English speaking excluding Australia), N = dummy variable for country of birth (non-English speaking), L= three dummy variables for level of non-school qualification, O = eight dummy variables for occupations, I = 16 dummy variables for industry, S = three dummy variables for income unit status, NS = 11 dummy variables for non-school qualifications and μ = error term

The base case is for a sole person with no dependents who completed year 12 and is born in Australia. The person has a bachelor degree in management and commerce and works full-time as a professional in the industry category, property and business services.

A separate equation was used to measure the income of female university graduates and year 12 graduates with no post-school qualifications for ages 21 to 60 years.

The OLS regression equation for female university graduates and year 12 graduates with no post-school qualifications for the ages 21 to 60 years is equation 4.5.

$$Lw_{tm} = \beta_0 + \beta_1 A + \beta_2 A^2 + \beta_3 A^3 + \beta_4 P/T + \beta_5 B + \beta_6 E + \beta_7 N + \sum_{j=1}^{3} \tau_j L_j + \sum_{j=1}^{8} \alpha_j O_j + \sum_{j=1}^{16} \theta_j I_j + \sum_{j=1}^{3} \pi_j S_j + \sum_{j=1}^{11} \sigma_j NS_j + \mu \quad (4.5)$$

The base case is for a sole person with no dependents who completed year 12 and is born in Australia. The person has a bachelor degree in management and commerce and works full-time as a professional in the industry category, property and business services.

The earnings of both the year 12 graduate and the university graduate are then multiplied by 52 to give the annual gross employee earnings. The earnings are then adjusted for real income growth of one percent per annum. These earnings are then adjusted for employment probability. The unemployment rates for 2004 for a university graduate and year 12 graduate

with no post-school qualifications are 3.0 percent and 6.56 percent respectively. This is based on the unemployment rate for those categories in 2004 (ABS, 2004). To allow for limitations of the Human Capital Model, such as screening effects and innate ability, the difference between a university graduate's income and year 12 graduate's income is multiplied by 80 percent (Ashenfelter and Krueger, 1994). Sensitivity analysis will later be applied to measurements at a 90 percent and a 100 percent level. The tax payable is calculated for each year using the ATO 2003-04 and 2004-05 income tax tables shown in Table 4.2 and Table 4.3.

4.1.2.2 Calculating the Private Rate of Return model

For all rates of return females and males will be measured separately. The base case scenario is for an 18 year old individual studying a three year bachelor degree in commerce in 2004 who enters the workforce at the age of 21 in 2007. It is assumed that the student will pay band two level of HECS up-front and retire at 60 years of age. Variations to the base case model will include; changing the length of degree from three years to four years, measuring the return for different qualifications and different occupations, and comparing the rate of return for FEE-HELP students with HECS-HELP students, in 2004 and 2005.

4.1.2.3 Limitations of the PRR model

4.1.2.3.1 Some general limitations of the PRR model

Fox et al. (2001) suggest there are two weaknesses of the Private Rate of Return model that underestimate the value of higher education. Firstly, they argue that the Private Rate of Return model incorrectly assumes that all facets of human capital, expenditure are investment outlays. Fox et al. (2001 p. 6) state that 'a substantial component of human capital acquisition could more accurately be described as consumption expenditure'.

They use the example of a student studying languages at university to support this argument. Fox et al. (2001) argue that courses such as Italian or English literature are not just a form of

investment for students acquiring greater human capital, they are also courses that deliver consumption benefits such as the enjoyment of travel and the ability to understand opera. They conclude that a proportion of a student's expenditure on higher education is consumption expenditure and this would consequently affect the reliability of the rate of return on higher education. They suggest a more accurate model would be one that also considers the value of consumption expenditure on higher education. Fox et al. (2001 p. 6) state:

> By conceptualising educational attainment only as investment and ignoring the component of expenditure that is consumption, measurements will underestimate the rate of return on human capital investments.

In addition to consumption expenditure, they also argue that the benefits of the PRR model are limited to the higher income the university graduate receives. They argue non-pecuniary income and factors, such as the pleasantness of tasks and how stimulating the job is, are not considered when calculating the rate of return. Fox et al. (2001) argue that university graduates are more likely to occupy jobs with attractive traits than year 12 graduates.

Another significant limitation of the PRR model relates to Australia's market for higher education characterised by asymmetric information. In Section 2.2.1, James (1999 p. 7) argues the case that universities have the information that students want such as the quality of their degrees but students are 'not in a position to judge quality until they have experienced it'. According to Fox et al. (2001), this situation where students are uncertain about the quality and career prospects of a course also means that the PRR model on higher education is limited in being able to explain why students invest in higher education. Therefore, Fox et al. (2001) argue estimates of the PRR can only partly explain why students study at university and what courses they choose.

Moreover, Fox et al. (2001) suggest that socio-economic backgrounds impede student expectations and aspirations where factors such as social conditioning, role models, student networks and financial background are not considered, when measuring the PRR to higher education. This suggests that estimates of the PRR will indicate which areas of higher

education are most worthwhile but they cannot explain who or which groups of society enjoy the high PRR on higher education. Section 2.2.4 showed that there was a much lower proportion of students from low socio-economic backgrounds attending university and as a result fewer disadvantaged students are receiving the benefits of higher education.

Ono (2001) argues that studies comparing the PRR between males and females are misleading as they do not show the income inequality that exists in many OECD countries. Ono (2001), using 1995 OECD data, measured the PRR for 17 countries including Australia. Ono states that the Mincer equation measures the opportunity cost for females studying at university by comparing the earnings of a female year 12 graduate with the earnings of a female university graduate. According to Ono this is the relative opportunity cost of a female studying at university not the absolute opportunity cost. Therefore, the results will only partially reflect the opportunities between men and women. Ono argues that in order to measure the absolute opportunity cost for women studying at university the income of a female university graduate should be compared to the income of a male year 12 graduate. Female university graduates earn less than male year 12 graduates in many OECD countries. After allowing for absolute opportunity cost, Ono found that nine out of the 17 countries including Australia had negative returns for female university graduates.

Powdthavee and Vignoles (2006) state that a significant limitation of the PRR model is that estimates of PRR are based on retrospective data and that current labour market earnings cannot accurately predict the future earnings of university graduates nor labour market trends. Powdthavee and Vignoles (2006) use the example of the shortage of language university graduates in England in the 1980s and 1990s to argue why caution is needed when interpreting Private Rates of Return and market trends. They point out that the high Private Rate of Return to languages in the late 1980s to early 1990s led policy makers to increase the number of university students studying languages but only a few years later the PRR for language university graduates significantly decreased. This relates to the 'cobweb model', which suggests that the supply of university graduates will change in response to changes in income but with a lag time effect. Not only do problems arise from using retrospective data, but problems arise from the number of variables used in the regression equation. The PRR is a measurement of human capital that shows the relationship between education and earnings. A

shortcoming of the Mincer equation, emphasised by Becker (1993), is by adding more variables to the regression equation the relationship between education and earnings is less obvious.

Caplan (2007) argues that Private Rates of Return are also misleading to both policy makers and students for estimates of the Private Rates of Return to higher education do not measure the number of students who fail or drop out of university. Caplan argues the PRR only considers the best-case scenario where students complete each year of schooling.

A further limitation of the PRR model is that it measures the market value on the return on education. Psacharopoulos and Patrinos (2002) argue that the PRR model cannot measure the return for public sector employment, as public sector wages do not reflect market wages. Therefore, the PRR model cannot provide information to policy makers on shortages in areas such as teaching and nursing. However, Psacharopoulos and Patrinos (2002 p. 2) state:

> Civil service pay based rate of return estimates are useful in private calculations regarding the incentives set by the state to invest in education and opt for employment in the public sector.

This issue will be discussed further in Chapter Six.

4.1.2.3.2 Particular limitations of this model

The model used in this study is based on Borland (2002), as a result the specific limitations are similar to the ones that Borland pointed out in his paper. These include that the income of a university graduate and year 12 graduate are based upon those workers who are earning paid incomes from full-time and part-time employment. It does not consider the income of workers who are self employed or not in the labour force. Many doctors and lawyers would fit into this situation and as a result the PRR for these categories would be biased. Furthermore, the differences in earnings between a university graduate and year 12 graduate are assumed to be the result of differences in the level of education. Even with incorporating an alpha coefficient

of 20 percent it is not certain what proportion of the higher earnings enjoyed by the university graduate are a result of a university degree and not for example, ability.

Using retrospective data also means that the PRR model does not allow for labour market trends, such as changes in the nation's unemployment rate, Australia's aging population or skill shortages. Over the last decade, the nation's unemployment rate has declined, raising the likelihood of a person without a university education gaining employment and consequently reducing the wage premium of a university degree. Therefore, current estimates of the PRR to a university degree could overestimate the return a graduate will receive on their investment in higher education, if the nation's unemployment rates continue to fall.

The nation's falling unemployment rate coincides with another trend, Australia's aging population. The proportion of Australia's population aged 65 years and over has increased significantly in the last decade causing the unemployment rate to fall. The ABS (2004a) has predicted the median age of Australia to increase from 35.4 in the year 2000 to 46.7 in the year 2050. This suggests that the proportion of Australia's population aged between 15 years and 65 years will continue to decline, placing a downward pressure on both the nation's unemployment rate and the wage premium of a university degree.

Not only does the PRR model use retrospective data, it also assumes that the income of a graduate will remain constant over time, only allowing for real income growth. However, skills shortages and changes in the supply of university graduates have caused variations in both the salaries and PRR for university graduates. For example, the salary of mining engineers increased 7.7 percent in 2005 due to a shortage of qualified graduates seeking full-time employment (Vines, 2005). According to Graduate Careers (2006b), 100 percent of mining engineer graduates seeking full-time employment were in full-time employment in 2006. It is therefore expected that the rate of return for mining engineers will increase in the future, until the supply of mining engineers meets the demand for mining engineers. In turn a slow down in demand for different resources would also impact on the future level of income. According to Macken (2006) the largest increases in average weekly earnings for non-managerial occupations between 1986 and 2005 were for economists and lawyers increasing

407 percent and 302 percent, respectively. Meanwhile, the average weekly earnings of nurses and mining engineers increased 244 percent and 243 percent respectively. The 10th lowest increase in average weekly earnings was for secondary school teachers at 205 percent.

Skills shortages make it difficult to predict the future income of graduates. The study by Lewis, Daly and Fleming (2004) suggest that it is even more difficult to estimate the PRR of a university degree for the future as current rates of return will affect the future number of graduates. For example, Lewis, Daly and Fleming (2004) argue that high unemployment rates and the relatively low pay of economists compared to other university graduates in the 1990s led to fewer students choosing to study economics, consequently leading to fewer economics graduates. This in turn has resulted in a shortage of economists today, which has consequently lifted the income of an economist in comparison to other professions and raised the PRR to an economics degree. These findings suggest that there will be fluctuations in the PRR to a university degree, as a response to changes in the supply of graduates, and not a single PRR that can be assumed for the future. This is derived from the inability of supply to immediately respond to short run changes in demand relating to the 'Cobweb' model.

Like the study by Borland (2002), this study measures the rate of return to higher education for an extra individual not for a group of individuals. The 'partial equilibrium' exercise therefore assumes that earnings of the university graduate will not be affected by a single person. Borland (2002) suggests the possibility of a 'general equilibrium' approach that would take into account the effect of changes in the proportion of workers with degrees. However, this is also limited as the changes in the proportion of graduates have varied in the past and therefore cannot accurately predict future earnings.

4.2 Results

4.2.1 Measuring the income of university students

The earnings of a university student were calculated using equation 4.1. The dummy variable, country of birth (English speaking excluding Australia) was not statistically significant at the five percent level and was excluded from the model. The log of earnings for a university student was therefore estimated using the four dummy variables; age, gender (female), part-time work, and country of birth (non-English speaking). The final equation for the model was 4.6.

$$Lw_t = \beta_0 + \beta_1 A + \beta_2 F + \beta_3 P/T + \beta_4 N + \mu \quad (4.6)$$

Table 4.5 provides the descriptive statistics for the university students' sample of income earners. Of the university students earning an income 81 percent were working part-time. Just over half of all students studying at university and earning an income are female at 53 percent. The majority of students studying at university and earning an income are Australian born at 77 percent, with 16 percent of students born in a non-English speaking country. Only seven percent of the students were born in an English speaking country other than Australia.

Table 4.5 Descriptive statistics for a university student earning an income for the ages 18 to 24 years

	Mean	Std. Deviation
Log of income	5.466	0.766
Age	20.75	1.897
Gender		
Male (base case)	0.474	0.500
Female	0.526	0.500
Type of employment		
Full-time employment (base case)	0.188	0.391
Part-time employment	0.813	0.391
Country of birth		
Australia (base case)	0.766	0.424

An English speaking country other than Australia	0.073	0.260
A non-English speaking country	0.162	0.368
N	384	

In addition to the data sample in Table 4.5, 33 percent of all university students studying in 2003-04 were not in paid employment. The overall proportion of students were 33 percent without paid employment, 54 percent in part-time employment and 13 percent in full-time employment. The number of university students working has steadily increased. According to the AVCC (2003e p. 1) 'in 1984 about five in 10 undergraduates were employed during the semester'. By 2004 this number had risen to almost seven in 10 undergraduates.

To calculate the earnings for a full-time university student, the student income was weighted according to the proportions of students who worked part-time and who were not in paid employment.

The estimated results in Table 4.6 show that both gender (at 10 percent significance level) and country of birth (at one percent significance level) have an impact on the income a student earns while studying at university. For instance, the income of a female university student is 9.79[35] percent lower than her male counterpart. Meanwhile, a student who is born in a non-English speaking country earns on average 20.23 percent less than a student who is born in Australia.

Table 4.6 Coefficient of results for the earned income of a university student for the ages 18 to 24 years

Variables	Unstandardised B	Standard error	t	Sig.
(Constant)	4.517	0.388	11.63	0.000
Age	0.089	0.017	5.164	0.000
Part-time employment	-0.998	0.083	-12.02	0.000

[35] Dummy variable coefficients are an approximate measure of the difference between the reference group and the comparison group. The measurement used here is calculated as exp(coefficient) - 1.

Country of birth non-English speaking	-0.226	0.085	-2.665	0.008
Gender-female	-0.103	0.062	-1.674	0.095
N	384			
Standard error of the estimate	0.600			
Adjusted R square	0.387			

The income from youth allowance and scholarships (Table 4.7) is added to the gross income earned and adjusted for tax. This produces the net received income figures in Table 4.8.

Table 4.7 University student gross income including youth allowance and scholarships for 2004

Ages	Annual gross income for male students ($)	Annual gross income for female students ($)	Youth allowance and scholarships for male students ($)	Youth allowance and scholarships for female students ($)
18	6633	5719	1251	865
19	6374	6294	433	934
20	7551	7485	993	1568
21	8164	8538	923	2006
22	9492	9643	1498	2431
23	10,323	10,393	1498	2431
24	11,263	10,914	1520	2124
Average	8543	8426	1160	1766

This study found that a full-time student has a net income on average around $8000 per year between the ages 18 to 24 while studying at university (Table 4.8). The results in Table 4.8 suggest that a male who entered university at the age of 18 years in 2004, who studies a three year degree, will have a net income of $20,123 over the period.

Table 4.8 Net income of full-time university students for the ages 18 to 24 years

Ages	Net income for male student in 2004 ($)	Net income for female student in 2004 ($)	Net income for male student in 2005 ($)	Net income for female student in 2005 ($)
18	6525	5719	6570	5768
19	6310	6244	6360	6288
20	7288	7233	7342	7282
21	7796	8106	7857	8161
22	8898	9023	8965	9083

23	9588	9646	9662	9712
24	10,369	10,079	10,449	10,151
Average	8111	8007	8172	8064

A female, however, will earn less during her three year degree with an income of $19,196. These estimates are significantly lower than the student income assumed by Lewis, Daly and Fleming (2004) at $11,466 per annum but are consistent with the Productivity Commission's (1997) estimation of $5960 per year, if adjusted for wage growth. Unlike studies such as the study by Borland (2002), the income of a full-time university student includes the income students receive from youth allowance and scholarships. As shown in Table 4.7, the average gross income a female student receives from youth allowance and scholarships is higher than her male counterpart, a difference of $606 per year. The income from youth allowance and scholarships adds on average 14 percent towards male students' incomes and 21 percent towards female students' incomes.

4.2.2 Measuring the income of a year 12 graduate with no post-school qualifications

The income for a year 12 graduate for the ages 18 to 24 years is based on the regression equation for a year 12 graduate with no post-school qualifications for the ages 18 to 60 years. For the descriptive statistics for year 12 graduates for the ages 18 to 24 years refer to Appendix A, Tables A1 and A2. For the coefficients of results for year 12 graduates for the ages 18 to 24 years refer to Appendix A, Tables A3 and A4.

The regression equation produced the estimated incomes in Table 4.9. These results show that males with no post-school qualifications earn on average 32 percent more than females between 18 to 24 years. The net forgone income of the university student is discussed in Section 4.2.5.

Table 4.9 The net income of a year 12 graduate with no post-school qualifications

Age	Male 2004	Female 2004	Male 2005	Female 2005
18	$21,759	$15,598	$21,938	$15,744
19	$22,659	$16,654	$22,847	$16,811

20	$23,564	$17,696	$23,761	$17,863
21	$24,471	$18,713	$24,678	$18,890
22	$25,377	$19,578	$25,593	$19,736
23	$26,278	$20,369	$26,502	$20,534
24	$27,167	$21,114	$27,403	$21,287
Average	$24,468	$18,532	$24,675	$18,695

4.2.3 The up-front costs of higher education

Students studying at university have the option of paying their HECS fees up-front and as a result receive a discount. In 2004, students who paid their HECS fees up-front received a 25 percent discount; however, in 2005, this discount was reduced to 20 percent. The HECS fees in Table 4.10 are the amount students pay after receiving the discount. The total cost includes both the HECS fees students are charged as well as the costs students incur for tuition such as textbooks. As can be seen in Table 4.10, the cost of studying at university varies depending on both the length of the degree and the level of HECS the student pays. For example, the total cost of a student studying a three year commerce/business degree in 2004 is $18,943, whereas the cost of a student studying a four year engineering degree is $25,256, a difference of $6313. As shown in Table 4.10 the cost of studying at university rose in 2005 after the 25 percent higher HECS fees. However, the cost for students paying up-front increased more than 25 percent, as the discount that students received was reduced by five percent. For example, the HECS fees for a creative arts degree (band one) in 2004 were $8478. The HECS fees for the same degree in 2005 were $11,539, an increase of 36 percent. In 2005, the annual total cost of a creative arts degree increased $3274 from $15,345 to $18,619. Meanwhile the annual total cost of undertaking an engineering degree increased $6101 from $25,256 to $31,357.

Table 4.10 The up-front costs for various university degrees

	Length of degree		
Costs	Three year bachelor degree	Four year bachelor degree	Five year/ postgraduate degree
HECS 2004			
Band one	$8478	$11,304	$14,130
Band two	$12,076	$16,101	$20,126

Band three	$14,137	$18,849	$23,561
HECS 2005			
Band one	$11,539	$15,386	$19,232
Band two	$16,438	$21,917	$27,396
Band three	$19,243	$25,658	$32,072
Tuition costs			
Beginning 2004	$6867	$9155	$11,444
Beginning 2005	$7080	$9440	$11,800
Total cost			
HECS 2004			
Band one	$15,345	$20,459	$25,574
Band two	$18,943	$25,256	$31,570
Band three	$21,004	$28,004	$35,005
HECS 2005			
Band one	$18,619	$24,826	$31,032
Band two	$23,518	$31,357	$39,196
Band three	$26,323	$35,098	$43,872

4.2.4 The deferred costs of higher education

The total cost of studying at university is even greater for students who choose to defer their HECS repayments. In 2005, a student will pay more than $50,000 to study a five year degree with a level three HECS band, such as medicine. For these students who cannot afford to pay their HECS fees up-front or decided not to, they will pay nominally an extra $8018 for the same medicine degree as those who pay their HECS fees up-front.

Table 4.11 The deferred costs for various university degrees

	Length of degree		
Costs	Three year bachelor degree	Four year bachelor degree	Five year/ postgraduate degree
HECS 2004			
Band one	$11,304	$15,072	$18,840
Band two	$16,101	$21,468	$26,835
Band three	$18,849	$25,132	$31,415
HECS 2005			

Band one	$14,424	$19,232	$24,040
Band two	$20,547	$27,396	$34,245
Band three	$24,054	$32,072	$40,090
Tuition costs			
Beginning 2004	$6867	$9155	$11,444
Beginning 2005	$7080	$9440	$11,800
Total cost			
HECS 2004			
Band one	$18,171	$24,227	$30,284
Band two	$22,968	$30,623	$38,279
Band three	$25,716	$34,287	$42,859
HECS 2005			
Band one	$21,504	$28,672	$35,840
Band two	$27,627	$36,836	$46,045
Band three	$31,134	$41,512	$51,890

4.2.5 The opportunity cost of the university degree

According to the Human Capital Model, the total cost of a university degree includes the net forgone income a student bears while studying. Table 4.12 shows the total cost of various university degrees based on gender. Net forgone income is equal to the income a student earns while studying minus the income of a year 12 graduate. As can bee seen in Table 4.12, for all degrees the net loss is greater for a male student than a female student. The cause of the difference is not the tuition costs or HECS fees but rather the net forgone income. However, Table 4.12 shows that there is little difference between the total income a male student earns while studying and the total income a female student earns while studying at approximately $1000. The difference lies in the income a male student has to forgo while studying compared to a female student. For example, a male student studying a three year business degree in 2005 forgoes a total income of $68,546, whereas a female student forgoes a total income of $50,417, a difference of $18,129. The difference is even greater for longer degrees such as a five year degree at band two, where a male student forgoes an additional $29,774 compared to the female student. The minimum net loss for a student undertaking a university degree in 2005 is $52,583 for a female and $66,030 for a male. Table 4.12 shows that from 2005

females for the first time can incur a net loss in excess of $100,000. For females to incur a net loss of more than $100,000 they would have to study a five year degree with a band three HECS level such as medicine. However, for males they would only need to study a four year degree at a band two HECS level to incur a loss of more than $100,000. This means that males wanting to become high school teachers in the fields of business/economics, maths/science or computing would incur a net loss of around $100,000, whereas the net loss for a male studying a three year business degree is $70,827 for 2004 and $75,902 for 2005. These estimates are higher than Borland's (2002) estimate of a net loss of $52,563. However, Borland (2002) measured the rate of return for 2001 using band two level of HECS for 2001 and estimated a lower level of forgone earnings at $31,158.

Table 4.12 The net loss for a university student under three time periods and three HECS rates

Costs	Length of degree Three year bachelor degree	Four year bachelor degree	Five year/ postgraduate degree
Total cost (tuition plus HECS)			
HECS 2004			
Band one	$18,171	$24,227	$30,284
Band two	$22,968	$30,623	$38,279
Band three	$25,716	$34,287	$42,859
HECS 2005			
Band one	$21,504	$28,672	$35,840
Band two	$27,627	$36,836	$46,045
Band three	$31,134	$41,512	$51,890

Table 4.12 The net loss for a university student under three time periods and three HECS rates (contd.)

Costs	Length of degree Three year bachelor degree	Four year bachelor degree	Five year/ postgraduate degree
The net income loss for Year 12 male graduate			
2004	-$47,859	-$64,534	-$81,012
2005	-$48,275	-$65,096	-$81,724
The net income loss for Year 12 female graduate			

2004	-$30,753	-$41,360	-$51,915
2005	-$31,079	-$41,810	-$52,461
Net loss for male students			
HECS 2004			
Band one	-$66,030	-$88,761	-$111,296
Band two	-$70,827	-$95,157	-$119,291
Band three	-$73,575	-$98,821	-$123,871
HECS 2005			
Band one	-$69,779	-$93,768	-$117,564
Band two	-$75,902	-$101,932	-$127,769
Band three	-$79,409	-$106,608	-$133,614
Net loss for female students			
HECS 2004			
Band one	-$48,924	-$65,587	-$82,199
Band two	-$53,721	-$71,983	-$90,194
Band three	-$56,469	-$75,647	-$94,774
HECS 2005			
Band one	-$52,583	-$70,482	-$88,301
Band two	-$58,706	-$78,646	-$98,506
Band three	-$62,213	-$83,322	-$104,351

4.2.6 The benefit of the university degree

The benefit of a university degree is the wage premium. This is the difference between the income a university graduate earns and the income they would have earned if they entered the workforce after year 12. It is assumed under Human Capital Theory that the student will choose to go to university if their expected benefits are greater than their costs.

4.2.6.1 Descriptive statistics

The CURF data for university graduates and those who have no post-school qualifications is summarised in Tables 4.13 and 4.14. The CURF data sample comprises 5207 males and 5014 females income earners between the ages 21 and 60 years.

4.2.6.1.1 Male incomes

Table 4.13 outlines the descriptive statistics for employed males aged 21 to 60 years. It shows 76 percent of males in paid employment are Australian born and 43 percent are in a relationship with dependent children. Table 4.13 also shows that a higher proportion of employed males are born in a non-English speaking country than an English speaking country other than Australia, at 14 percent and 11 percent respectively. For employed males, 30 percent are in a relationship with no dependent children, while 26 percent are single with no dependent children. The least common marital status for employed males is single with dependent children at one percent.

i. Type of employment, years of schooling and level of education

The male sample shows 89 percent of males are working full-time and only 11 percent of males are working part-time. The male sample also shows that the majority of employed males have either no non-school qualifications or other non-school qualifications[36]. Only 15 percent of employed males have a bachelor degree and six percent a postgraduate degree. Fifty one percent of males in the CURF sample did not complete year 12.

Table 4.13 Descriptive statistics for employed males for the ages 21 to 60 years

	Mean	Std. Deviation
Log of income	6.639	0.592
Age	39.47	10.70
Age squared	1672	859.6
Age cubed	75121	54938
Country of birth		
Australia (base case)	0.756	0.431
An English speaking country other than Australia	0.105	0.307
A non-English speaking country	0.139	0.346

[36] Other non-school qualifications include; diploma and advanced diploma, certificate I to certificate IV and any certificates not defined.

Marital status		
Lone person with no dependent children (base case)	0.264	0.436
Lone person with dependent children	0.013	0.119
Couple with dependent children	0.428	0.495
Couple with no dependents	0.296	0.456
Type of employment		
Full-time employment (base case)	0.889	0.318
Part-time employment	0.111	0.314
Years of schooling		
Completed year 12 (base case)	0.487	0.500
Left before year 12	0.513	0.500
Level of education		
Bachelor degree (base case)	0.147	0.362
No non-school qualifications	0.366	0.487
Postgraduate degree, graduate diploma	0.062	0.240
Other non-school qualifications	0.426	0.495
Type of occupation		
Professional (base case)	0.181	0.384
Managers and administrators	0.099	0.298
Associate professionals	0.142	0.349
Tradespersons	0.184	0.388
Advanced clerical and service workers	0.008	0.086
Intermediate clerical, sales and service workers	0.098	0.297
Intermediate production and transport workers	0.149	0.356
Elementary clerical, sales and service workers	0.049	0.215
Labourers and related workers	0.092	0.289

Table 4.13 Descriptive statistics for employed males for the ages 21 to 60 years (contd.)

	Mean	Std. Deviation
Type of non-school qualification		
Management and commerce (base case)	0.102	0.301
Natural and physical sciences	0.028	0.165
Information technology	0.027	0.161
Engineering and related technologies	0.248	0.432
Architecture and building	0.056	0.229
Agriculture, and environmental studies	0.025	0.156
Health	0.022	0.146

Education	0.025	0.155
Society and culture	0.054	0.227
Creative arts	0.016	0.127
Food and hospitality	0.034	0.180
Mixed field programmes	0.000	0.000
Field not determined	0.006	0.078
Not applicable	0.359	0.479
Type of industry		
Property and business services (base case)	0.103	0.109
Agriculture	0.033	0.178
Mining	0.020	0.139
Manufacturing	0.175	0.380
Electricity	0.018	0.132
Construction	0.097	0.296
Wholesale trade	0.063	0.243
Retail trade	0.107	0.309
Accommodation and cafes	0.032	0.177
Transport and storage	0.074	0.262
Communication services	0.026	0.158
Finance and insurance	0.027	0.163
Government administration and defence	0.074	0.261
Education	0.053	0.224
Health and community services	0.039	0.194
Cultural and recreational services	0.021	0.142
Personal and other services	0.039	0.194
N	5207	

ii. Occupation

The most common occupations are professionals and tradespersons, both at 18 percent. The high number of males working as tradespersons could be explained by the high proportion of males who have not completed year 12 but have other non-school qualifications. Out of all occupations, males are least likely to occupy advanced clerical and service jobs.

iii. Non-school qualifications

The most common type of non-school qualification for males is engineering and related technologies at 25 percent, followed by management and commerce at 10 percent. The least popular qualifications for males are health and creative arts at two percent.

iv. Industry

Table 4.13 shows that the three main industries where males are employed are, manufacturing at 18 percent, followed by retail trade at 11 percent, and property and business services at 10 percent.

4.2.6.1.2 Female incomes

Table 4.14 outlines the descriptive statistics for employed females aged 21 to 60 years. Like males, the majority of employed females are Australian born at 77 percent and 36 percent are in a relationship with dependent children. However, unlike the male sample where only one percent of all employed males are single with dependent children, Table 4.14 shows that eight percent of all employed females are single with dependent children. Table 4.14 also shows that 32 percent of employed females are in a relationship with no dependent children, while 24 percent of employed females are single with no dependent children. Like the case for males, a higher proportion of employed females are born in a non-English speaking country than an English speaking country other than Australia, at 12 percent and 11 percent respectively.

Table 4.14 Descriptive statistics for employed females for the ages 21 to 60 years

	Mean	Std. Deviation
Log of income	6.244	0.725
Age	39.56	10.53
Age squared	1676	838.7
Age cubed	75052	53142
Country of birth		

Australia (base case)	0.770	0.421
An English speaking country other than Australia	0.107	0.309
A non-English speaking country	0.123	0.328
Marital status		
Lone person with no dependent children (base case)	0.237	0.425
Lone person with dependent children	0.078	0.268
Couple with dependent children	0.361	0.480
Couple with no dependents	0.323	0.468
Type of employment		
Full-time employment (base case)	0.547	0.499
Part-time employment	0.453	0.498
Years of schooling		
Completed year 12 (base case)	0.547	0.498
Left before year 12	0.454	0.498
Level of education		
Bachelor degree (base case)	0.192	0.395
No non-school qualifications	0.382	0.486
Postgraduate degree, graduate diploma	0.073	0.260
Other non-school qualifications	0.353	0.478
Type of occupation		
Professional (base case)	0.250	0.430
Managers and administrators	0.044	0.205
Associate professionals	0.125	0.331
Tradespersons	0.022	0.148
Advanced clerical and service workers	0.065	0.246
Intermediate clerical, sales and service workers	0.295	0.456
Intermediate production and transport workers	0.023	0.149
Elementary clerical, sales and service workers	0.106	0.307
Labourers and related workers	0.071	0.256

Table 4.14 Descriptive statistics for employed females for the ages 21 to 60 years (contd.)

	Mean	Std. Deviation
Type of non-school qualification		
Management and commerce (base case)	0.173	0.379
Natural and physical sciences	0.024	0.153
Information technology	0.010	0.098

Engineering and related technologies	0.016	0.126
Architecture and building	0.004	0.065
Agriculture, and environmental studies	0.008	0.090
Health	0.113	0.317
Education	0.084	0.277
Society and culture	0.106	0.308
Creative arts	0.030	0.171
Food and hospitality	0.040	0.196
Mixed field programmes	0.001	0.032
Field not determined	0.008	0.087
Not applicable	0.383	0.486
Type of industry		
Property and business services (base case)	0.116	0.319
Agriculture	0.014	0.117
Mining	0.004	0.065
Manufacturing	0.069	0.253
Electricity	0.004	0.065
Construction	0.015	0.123
Wholesale trade	0.029	0.167
Retail trade	0.125	0.330
Accommodation cafes	0.052	0.223
Transport and storage	0.026	0.159
Communication services	0.013	0.114
Finance and insurance	0.042	0.201
Government administration and defence	0.084	0.277
Education	0.131	0.337
Health and community services	0.219	0.413
Cultural and recreational services	0.023	0.150
Personal and other services	0.035	0.184
N	5014	

i. Type of employment, years of schooling and level of education

More females than males complete year 12 at 55 percent, and a higher proportion of females have a bachelor degree at 19 percent. Despite a higher proportion of females having a higher

level of education, a lower percentage of females hold full-time jobs. A significant proportion of females employed, work part-time at 45 percent. This differs from males with only 11 percent of males working part-time.

ii. Occupation

Table 4.14, shows that the most popular occupation for female employment is intermediate clerical, sales and service work at 30 percent, with 25 percent of all females working as professionals. Only two percent of females are tradespersons, and only four percent of females are managers and administrators.

iii. Non-school qualifications

Unlike males, the most common type of non-school qualification for females is management and commerce at 17 percent. However, only two percent of females hold a non school qualification in engineering and related technologies, whereas 22 percent of females hold a non-school qualification in either health or society and culture.

iv. Industry

There are considerable differences in industry of employment for males and females with 22 percent of females working in health and community services and only 4 percent of males. Following health, the next most popular industries for females to work in are the industry categories: education and retail trade, both at 13 percent, and property and business services at 12 percent.

4.2.6.2 Factors influencing the income of employees

The empirical results show a considerable difference in the impact of factors influencing the income of male and female employees. These are displayed in Table 4.15 and Table 4.16.

4.2.6.2.1 Male incomes

i. Country of birth and marital status

Table 4.15 shows that the place of birth can have some effect on the income a male earns but these are not significant at the five percent level. For example, the income of a male born in an English speaking country other than Australia is 1.81 percent more than a male born in Australia. Meanwhile, a male born in a non-English speaking country earns 3.44 percent less than a male born in Australia.

It can also be seen in Table 4.15 that the income of a male is significantly higher when they are in a relationship, than if they are a lone person with no dependent children. The income of a male in a relationship ranges between 10.85 percent and 11.07 percent higher than a lone person with no dependent children[37]. The estimation results also show that there is little difference between the income of a male lone person with no dependent children and the income of a male lone person with dependent children. The income of a male lone person with dependent children being 0.80 percent lower than the income of a male lone person with no dependent children (base case).

Table 4.15 Coefficient of results for employed males for the ages 21 to 60 years

Variables	Unstandardised B	Standard error	t	Sig.
(Constant)	6.290	0.078	80.79	0.000

[37] This supports the findings of previous studies such as Kidd and Meng (1997) who found that marriage has a wage premium for males.

Age	0.010	0.003	6.404	0.000
Age squared	5.02E-04	0.001	-2.765	0.006
Age cubed	8.20E-06	0.000	-5.656	0.000
Country of birth				
An English speaking country other than Australia	0.018	0.022	0.821	0.412
A non-English speaking country	-0.035	0.020	-1.737	0.083
Marital status				
Lone person with dependent children	-0.008	0.061	-0.126	0.900
Couple with dependent children	0.103	0.018	5.736	0.000
Couple with no dependents	0.105	0.019	5.522	0.000
Type of employment				
Part-time employment	-0.737	0.023	-32.66	0.000
Years of schooling				
Left before year 12	-0.054	0.016	-3.287	0.001
Level of education				
No non-school qualifications	-0.127	0.032	-3.909	0.000
Postgraduate degree, graduate diploma	0.111	0.032	3.429	0.001
Other non-school qualifications	-0.037	0.026	-1.446	0.148
Type of occupation				
Managers and administrators	0.021	0.028	0.750	0.453
Associate professionals	-0.023	0.026	-0.883	0.377
Tradespersons	-0.130	0.027	-4.772	0.000
Advanced clerical and service workers	-0.151	0.081	-1.869	0.062
Intermediate clerical, sales and service workers	-0.148	0.029	-5.073	0.000
Intermediate production and transport workers	-0.146	0.029	-5.115	0.000
Elementary clerical, sales and service workers	-0.245	0.038	-6.520	0.000
Labourers and related workers	-0.323	0.031	-10.38	0.000

Table 4.15 Coefficient of results for employed males for the ages 21 to 60 years (contd.)

Variables	Unstandardised B	Standard error	t	Sig.

Type of non-school qualification				
Natural and physical sciences	0.022	0.047	0.469	0.639
Information technology	0.016	0.047	0.336	0.737
Engineering and related technologies	0.003	0.028	0.105	0.917
Architecture and building	-0.034	0.038	-0.890	0.374
Agriculture, and environmental studies	-0.120	0.049	-2.465	0.014
Health	0.247	0.055	4.484	0.000
Education	0.062	0.054	1.139	0.255
Society and culture	-0.020	0.037	-0.548	0.584
Creative arts	-0.146	0.057	-2.552	0.011
Food and hospitality	0.026	0.044	0.590	0.555
Field not determined	0.073	0.088	0.834	0.404
Type of industry				
Agriculture	-0.066	0.044	-1.489	0.137
Mining	0.500	0.053	9.429	0.000
Manufacturing	0.096	0.028	3.430	0.001
Electricity	0.243	0.055	4.444	0.000
Construction	0.122	0.032	3.788	0.000
Wholesale trade	0.021	0.035	0.612	0.541
Retail trade	-0.083	0.030	-2.733	0.006
Accommodation and cafes	-0.130	0.044	-2.934	0.003
Transport and storage	0.160	0.034	4.669	0.000
Communication services	0.127	0.047	2.714	0.007
Finance and insurance	0.191	0.047	4.056	0.000
Government administration and defence	0.138	0.033	4.224	0.000
Education	0.027	0.040	0.681	0.496
Health and community services	-0.147	0.043	-3.403	0.001
Cultural and recreational services	-0.023	0.051	-0.442	0.659
Personal and other services	-0.005	0.041	-0.113	0.910
N	5207			
Standard error of the estimate	0.478			
Adjusted R square	0.349			

ii. Type of employment, years of schooling and level of education

Out of all the variables measured in Table 4.15, the largest negative impact on the income a male earns is the type of employment. For instance, the income of a male who works part-time is 52.15 percent less than the income of a male who works full-time. From the estimation results in Table 4.15, it can be seen that the level of education impacts upon the income males earn. For example, a male with other non-school qualifications will earn 3.63 percent less than a male with a bachelor degree (although this is not significant at the five percent level) and a male with no non-school qualifications will earn 11.93 percent less than a male with a bachelor degree (significant at one percent). Meanwhile, a male with a postgraduate degree or graduate diploma will earn 11.74 percent more than a male who has a bachelor degree (significant at one percent). For males who did not complete year 12, their income is significantly lower at 5.26 percent less than those who did complete year 12. These results support the Human Capital Model that an individual's income will increase with higher levels of educational qualifications.

iii. Occupation

Table 4.15 also shows that the income of a male professional (base case) is higher than the income of all other occupations except for male managers and administrators who earn 2.12 percent more than male professionals. For example, the income of male advanced clerical and service workers is 12.19 percent lower than the income of male professionals and the income of male elementary clerical, sales and service workers is 21.73 percent less than the income of male professionals. Those earning the lowest income (significant at the one percent level) are male labourers and related workers earning an income that is 27.60 percent less than male professionals.

iv. Non-school qualifications

According to the CURF data, the most valuable non-school qualification and significant at the one percent level is health. The income for a male with a non-school qualification in health is 28.02 percent higher than the income for a male with a non-school qualification in management and commerce (base case). However, the industry category, health is a mixed field category including doctors, who study a six year medicine degree and earn a minimum income of $51,338, and nurses, who study a three year bachelor degree and earn a minimum income of $41,067[38]. Table 4.15 also shows that the income of a male with a non-school qualification in education is 6.40 percent higher than the income of a male with a non-school qualification in management and commerce. However, males with a non-school qualification in agriculture and environmental studies and males with a non-school qualification in creative arts earn significantly less by 11.31 percent and 13.58 percent respectively, than a male with a non-school qualification in management and commerce.

v. Industry

Apart from the type of occupation, the type of industry also has an impact on the income a male earns. Table 4.15 shows that the incomes for males in 10 out of the 16 industry categories are higher than the income of males working in the base industry category, property and business services. The industry category, mining has the most positive significant impact upon income with a 64.87 percent premium. However, according to the estimation results, a male working in the industry category, accommodation and cafes will earn 12.19 percent less than a male working in the industry category, property and business services. Meanwhile, the income of a male working in the industry category, health and community services is significantly the lowest, at 13.67 percent lower than the income of a male working in the base industry category, property and business services.

4.2.6.2.2. Female incomes

[38] These figures are the minimum salary figures for 2006 (My Career, 2006).

i. Country of birth and marital status

Table 4.16 shows that the income a female is higher, but not at the five percent significance level, if she is born in Australia rather than being born overseas. Contrary to males, the results also show that the marital status of females significantly affects their income. The income for a female is highest when she is a lone person with no dependent children. For all other scenarios the income of a female is lower. Unlike males, where there is minimal difference between the income of a lone person with or without dependent children, the income of a female falls 12.37 percent below the base case if she is a lone person with dependent children.

ii. Type of employment, years of schooling and level of education

The impact of completing year 12 on the income of females is similar to that of males. For a male who does not complete year 12 his income is 5.26 percent lower than males who do, and a female who does not complete year 12 has an income 5.35 percent lower than females who do. The impact of having a bachelor degree on the income of a female is greater than the impact of a bachelor degree on the income of a male. For a female with no non-school qualifications her income is 13.32 percent lower than the income of a female with a bachelor degree. For a male his income is 11.93 percent lower than the income of a male with a bachelor degree. However, the value of a postgraduate degree or graduate diploma is not as great for a female as it is for a male. The income for a female with a postgraduate degree or graduate diploma is 4.81 percent higher than the income of a female with a bachelor degree, whereas the income of a male with a postgraduate degree or graduate diploma is 11.74 percent higher than the income of a male with a bachelor degree. Table 4.16 also shows that similar to males the income of females is significantly affected by the type of employment. For females working part-time their income is 45.99 percent lower than those working full-time.

Table 4.16 Coefficient of results for employed females for the ages 21 to 60 years

Variables	Unstandardised B	Standard error	T	Sig.
(Constant)	6.154	0.092	66.56	0.000
Age	0.020	0.004	7.070	0.000
Age squared	3.21E-04	0.001	-0.590	0.555
Age cubed	9.02E-06	0.000	-6.410	0.000
Country of birth				
An English speaking country other than Australia	-0.051	0.026	-1.945	0.052
A non-English speaking country	-0.029	0.026	-1.140	0.254
Marital status				
Lone person with dependent children	-0.132	0.034	-3.829	0.000
Couple with dependent children	-0.110	0.024	-4.646	0.000
Couple with no dependents	-0.014	0.022	-0.609	0.542
Type of employment				
Part-time employment	-0.616	0.018	-34.52	0.000
Years of schooling				
Left before year 12	-0.055	0.020	-2.759	0.006
Level of education				
No non-school qualifications	-0.143	0.034	-4.194	0.000
Postgraduate degree, graduate diploma	0.047	0.035	1.328	0.184
Other non-school qualifications	-0.107	0.027	-3.937	0.000
Type of occupation				
Managers and administrators	0.120	0.043	2.798	0.005
Associate professionals	-0.080	0.031	-2.581	0.010
Tradespersons	-0.304	0.060	-5.031	0.000
Advanced clerical and service workers	-0.205	0.040	-5.177	0.000
Intermediate clerical, sales and service workers	-0.271	0.027	-9.967	0.000
Intermediate production and transport workers	-0.369	0.060	-6.103	0.000
Elementary clerical, sales and service workers	-0.420	0.040	-10.59	0.000
Labourers and related workers	-0.465	0.041	-11.35	0.000

Table 4.16 Coefficient of results for employed females for the ages 21 to 60 years (contd.)

Variables	Unstandardised B	Standard error	T	Sig.
Type of non-school qualification				
Natural and physical sciences	0.004	0.057	0.078	0.938
Information technology	-0.005	0.083	-0.061	0.951
Engineering and related technologies	0.043	0.066	0.649	0.516
Architecture and building	-0.077	0.125	-0.617	0.537
Agriculture, and environmental studies	-0.237	0.091	-2.602	0.009
Health	0.064	0.036	1.779	0.075
Education	0.037	0.041	0.891	0.373
Society and culture	0.040	0.033	1.229	0.219
Creative arts	-0.050	0.051	-0.993	0.321
Food and hospitality	0.003	0.046	0.060	0.952
Field not determined	0.096	0.094	1.023	0.306
Type of industry				
Agriculture	-0.191	0.073	-2.622	0.009
Mining	0.464	0.125	3.700	0.000
Manufacturing	0.190	0.040	4.800	0.000
Electricity	0.334	0.126	2.664	0.008
Construction	0.199	0.069	2.896	0.004
Wholesale trade	0.096	0.053	1.824	0.068
Retail trade	0.001	0.037	0.024	0.981
Accommodation and cafes	-0.025	0.043	-0.573	0.566
Transport and storage	0.249	0.055	4.497	0.000
Communication services	0.178	0.074	2.392	0.017
Finance and insurance	0.180	0.046	3.914	0.000
Government administration and defence	0.210	0.037	5.719	0.000
Education	0.048	0.037	1.310	0.190
Health and community services	0.053	0.032	1.656	0.098
Cultural and recreational services	-0.057	0.058	-0.982	0.326
Personal and other services	-0.018	0.050	-0.366	0.714
N	5014			
Standard error of the estimate	0.562			

Adjusted R square	0.399

iii. Occupation

Similar to males, the income of a female is highest when she is a professional (base case) with the only exception being female managers and administrators. For females the income of a manager and administrator is significantly higher by 12.75 percent than the income of a professional. However, the income of a female is significantly more than 30 percent lower than the income of a female professional if she is an intermediate production and transport worker, or an elementary clerical, sales and service worker or a labourer or related worker.

iv. Non-school qualifications

The most significant negative impact on income of a non-school qualification is for agriculture and environmental studies. The income of a female with a non-school qualification in agriculture and environmental studies is 21.10 percent lower than the income of a female with a non-school qualification in management and commerce (base case). Table 4.16 shows that the income for a female will also fall in comparison to the non-school qualification management and commerce for non-school qualifications in creative arts, information technology and architecture and building. However, the income for a female will rise 3.77 percent for a non-school qualification in education, 4.08 percent for a non-school qualification in society and culture and 6.61 percent for a non-school qualification in health.

v. Industry

Similar to male employees, mining has a significant positive impact on the income a female earns. Females who work in the industry category, mining have incomes that are 59.04 percent higher than the income females earn in the base industry category, property and business services. However, unlike the situation for males, the income for females working in the industry category, health and community services is 5.44 percent higher than the income of females working in the industry category property and business services. Table 4.16 shows that for four of the 16 industries the income for females will fall in comparison to females working in the industry category, property and business services. For example, the income for

a female working in the industry category, agriculture is 17.39 percent lower than the income for a female working in the industry category, property and business services.

The considerable differences between male and female income patterns show that economic models need to take into account both male and female incomes and employment patterns when calculating the rates of return to education and not just male income patterns.

4.3 The Private Rates of Return to higher education

Section 4.3 provides new estimates of the Private Rates of Return to higher education for the years 2004 and 2005. In order to measure the impact of the 2005 budgetary changes in HECS, sensitivity analysis is used. This includes measuring the rates of return for different fee payment types, different forms of marital status, different qualifications and different occupations at 80 percent, 90 percent and 100 percent levels. It is assumed that a university education is a good investment decision if the Private Rate of Return is greater than the real interest rate at three percent; this being the current real 10 year Government bond rate for Australia.

4.3.1 Fee payment types

The Private Rate of Return (PRR) to a university degree is calculated for different fee payment types for both males and females and for the years 2004 and 2005. This includes measuring the PRR for students who pay their HECS fees up-front and for those who defer their HECS repayments, for students who pay full fees up-front and for those using FEE-HELP, and for an environment of no HECS fees for students. For all fee payment models, it is assumed that the graduate is single with no dependent children. It is difficult to make comparisons with previous studies due to different time periods and methodologies. It would be expected, however, that the PRR would be lower in this study due to the narrowing of the earnings gap in the last 30 years. According to the ABS (2004a) in 1976 the median gross weekly income of people with higher education qualifications was almost double the income of those without. In 2001 the difference was less than 50 percent.

4.3.1.1 Up-front model for three year, four year and postgraduate degrees

For students enrolled in Commonwealth Supported Places (CSP), they have the option of choosing either to pay their HECS fees up-front or defer their HECS repayments. Sections 4.3.1.1.1 and 4.3.1.1.2 measure the rates of return for 'average' students who choose to pay their HECS fees up-front. For these students, their HECS fees not only increased by 25 percent in 2005 but the discount they received for paying their HECS fees up-front decreased from 25 percent in 2004 to 20 percent in 2005. These 'average' students are paying band two HECS and earning a 'weighted' income based on the proportion of students studying a variety of degrees based on the CURF.

4.3.1.1.1 Male

Table 4.17 shows the Private Rates of Return (PRR) to higher education for 2004 and 2005, for single males with no dependents who pay their HECS fees up-front. The results show that even after the introduction of the 25 percent higher HECS fees in 2005, it is still a worthwhile investment for males to study at university. For example, for 2005 the PRR to a three year bachelor degree for males who pay their HECS fees up-front was 11.08 percent at the 100 percent level, 10.10 percent at the 90 percent level, and 9.08 percent at the 80 percent level. This shows that even after the PRR to a university degree has been reduced 20 percent for innate ability, the rate of return for males is still greater than the real interest rate of three percent.

However, the results in Table 4.17 also show that for males who pay their HECS fees up-front, the rate of return for all degrees has decreased in 2005. For example, the PRR to a three year bachelor degree for males (at the 80 percent level) has decreased 0.29 percentage points in 2005 to 9.08 percent.

Table 4.17 The PRR for males for various lengths of degrees when HECS fees are paid up-front

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004 HECS			
Three year degree	11.46	10.44	9.37
Four year degree	8.51	7.70	6.83
Postgraduate degree	9.32	8.48	7.59
2005 HECS			
Three year degree	11.08	10.10	9.08
Four year degree	8.27	7.47	6.63
Postgraduate degree	9.11	8.28	7.41

This estimate is lower than the estimate in the study by Borland (2002) at 14.5 percent. Borland (2002) calculated that the rate of return to a three year bachelor degree was 14.5 percent or 13.5 percent if the incomes from those who complete a bachelor degree only are included. These estimates by Borland (2002) are higher than those calculated in this study, as Borland (2002) measured the PRR for an individual entering university in 2001 and calculated the rates of return at the 100 percent level. It could then be argued that the rate of return to a three year bachelor degree (at the 100 percent level) for males has dropped more than two percentage points between 2001 and 2005. This study suggests that the fall in the PRR between 2001 and 2005 is partly a consequence of both increases in the level of HECS and the narrowing of the wage premium. Previous studies such as Chia (1991) and Maglen (1994) also found the wage premium of a university degree narrowing. They argued that this was a consequence of the increased supply of university graduates. Nevertheless, the results in Table 4.17 show the opportunity cost of studying at university has increased for males, while the benefit of obtaining a university degree has been reduced as a result of the HECS changes between 2004 and 2005.

The results in Table 4.17 also suggest that in just over 20 years the PRR to a three year bachelor degree has more than halved if compared to Miller's (1982) estimate of 21.10 percent during the period of free education. This study supports other post-Miller studies (Productivity Commission 1997, Chapman and Salvage 1998, Borland 2001, and Borland 2002) that show that as Australia's higher education policy develops and moves towards a user pays system the rates of return to a university degree fall. However, compared to all previous studies, this is

the first known Australian study where the PRR to a three year bachelor degree for males is below 10 percent. Even though Chapman and Salvage (1998) found the PRR for an average male in 1997 to be 9.42 percent, this was based on a four year bachelor degree.

Table 4.17 also shows that if males take an extra year to complete a three year bachelor degree the PRR falls significantly. In 2005, the PRR for males who take four years to complete a three year bachelor degree is 6.63 percent, 2.45 percentage points lower than if they completed the degree in three years. This is consistent with the study by Borland (2002), who estimated that the PRR falls three percent if a male takes four years instead of three years to complete a three year bachelor degree. However, the PRR for males does not continue to fall with each additional level of educational attainment. For example, even though the rate of return for a postgraduate degree is lower than a bachelor degree, it is higher than a male who takes four years to complete a three year bachelor degree. This is because the income of males with a postgraduate degree is on average higher than those with a bachelor degree only.

4.3.1.1.2 Female

The PRR to higher education for the years 2004 and 2005 for single females with no dependents that pay their HECS fees up-front are shown in Table 4.18. The results in Table 4.18 show that the PRR to higher education for females are vastly different to the rates of return for males. On average females receive a higher rate of return than males. For example, in 2005 the PRR to a three year bachelor degree (at the 80 percent level) for females is 12.69 percent, 3.61 percentage points higher than the return for the same degree for males. These results differ from the study by Miller (1982), who found that the PRR to a three year bachelor degree for females only 0.10 percentage points higher than the PRR for males for the same degree. This suggests firstly, that the gap between the PRR for male and females is increasing, and secondly, that studies measuring the rate of return for females using male income such as Chapman and Salvage (1998) underestimates the PRR females receive.

Table 4.18 The PRR for females for various lengths of degrees when HECS fees are paid up-front

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004 HECS			
Three year degree	15.98	14.70	13.38
Four year degree	12.26	11.27	10.24
Postgraduate degree	11.15	10.25	9.29
2005 HECS			
Three year degree	15.14	13.94	12.69
Four year degree	11.68	10.74	9.75
Postgraduate degree	10.69	9.82	8.90

Similar to male graduates, the PRR to higher education for females who pay their HECS fees up-front declined in 2005. However, this study shows that the impact of higher HECS fees is more detrimental to the PRR of females than males. For example, the PRR for a three year bachelor degree for females decreased 0.69 percentage points, whereas for males the PRR decreases 0.29 percentage points (at the 80 percent level for 2005).

Also differing to males is the value of additional levels of educational attainment. Unlike the situation for males where a postgraduate degree is more valuable than a four year bachelor degree, for females the rate of return falls for each additional level of educational attainment after a bachelor degree. Therefore, while a bachelor degree is more beneficial for females than males, postgraduate study is not. These results show that for both males and females who pay their HECS fees up-front the 25 percent increase in HECS reduced the benefits of study at university.

4.3.1.2 Deferred model for three year, four year and postgraduate degrees

According to DEST (2004a) 78 percent of university students defer their HECS repayments, therefore this study also measures the PRR to a university degree for students who defer their HECS repayments. These rates of return calculate HECS as a reduction in the graduate's income and not as a direct cost.

4.3.1.2.1 Male

Table 4.19 shows the PRR to higher education for the 2004 and 2005 for males who defer their HECS fee repayments. It can be seen in Table 4.19 that the PRR's are higher for males who defer their HECS fee repayments than for males who pay their HECS fees up-front. For example, the PRR to a three year bachelor degree in 2005 (at the 80 percent level) is 9.96 percent for males who defer their HECS fee repayments, and 9.08 percent for those who pay their HECS fees up-front (Table 4.17).

Table 4.19 The PRR for males for various lengths of degrees when HECS fees are deferred

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004 HECS			
Three year degree	11.88	10.92	9.92
Four year degree	8.81	8.05	7.24
Postgraduate degree	9.74	8.94	8.09
2005 HECS			
Three year degree	11.90	10.96	9.96
Four year degree	8.87	8.11	7.31
Postgraduate degree	9.82	9.03	8.18

The results in Table 4.19 also show that contrary to the PRR for males who pay their HECS fees up-front, the PRR for males who have deferred their HECS repayments has increased in 2005. This is likely as a result of a higher income threshold for repaying fees, and the value of the cost of study being discounted over time. This shows that the 2005 changes in HECS do not appear to have had any major adverse effect on the PRR for males who decide to defer their HECS repayments.

4.3.1.2.2 Female

The PRR to higher education for the years 2004 and 2005 for females who defer their HECS repayments are shown in Table 4.20. The results in Table 4.20 suggest that the return to a university degree for females who defer their HECS repayments is higher than the return for males. The PRR (at 100 percent level) to a three year bachelor degree for females for both

2004 and 2005 is above 17 percent. For females who study a three year bachelor degree and defer their HECS repayments, their PRR (at the 80 percent level) for 2005 is 4.67 percentage points higher than the PRR for males who defer their HECS repayments and study the same 'average' degree. This shows that the difference in the PRR between males and females to a three year bachelor degree is even greater for those who defer their HECS repayments than for those who pay their HECS fees up-front.

Table 4.20 The PRR for females for various lengths of degrees when HECS fees are deferred

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004 HECS			
Three year degree	17.23	15.98	14.68
Four year degree	13.19	12.23	11.23
Postgraduate degree	12.05	11.17	10.24
2005 HECS			
Three year degree	17.14	15.91	14.63
Four year degree	13.17	12.23	11.23
Postgraduate degree	12.06	11.20	10.28

However, unlike the case for males, the PRR for females who defer their HECS repayments varies in 2005. For example, the PRR for females studying a three year bachelor degree who defer their HECS repayments (at the 80 percent level) decreases 0.05 percentage points in 2005, whereas the PRR for males who defer their HECS repayments and study the same degree (at the 80 percent level) increases 0.04 percentage points in 2005. The PRR for females who defer their HECS repayments to study a postgraduate degree (at the 80 percent level) increased 0.04 percentage points in 2005. The difference in the rates of return to a three year bachelor degree between males and females is the result of both the 25 percent increase in HECS fees and tax cuts, which tended to favour male income earners. Even though both males and females in this study gained an extra two years to repay their HECS debt back in 2005[39], the increase in the total HECS repayments had significantly reduced the benefit of a university degree for the ages 27, 28, 29 years. Meanwhile the changes to tax rates favoured higher

[39] For 2005 both males and females will not repay their full HECS debt back until they are 29 years of age.

income earners between $52,000 and $58,000 and $62,500 and $70,000 (see Tables 4.2 and 4.3). This generally favoured male graduates due to their higher incomes in these ranges. Therefore, the PRR for males did not decline. Instead there was a slight improvement as a consequence of the benefits from the tax cuts being greater than the larger HECS repayments.

4.3.1.3 Full fees model - A three year degree band two level of HECS

In addition to measuring the PRR for students enrolled in Commonwealth Supported Places (CSP), this study measures the impact of the 2005 budgetary changes on the PRR for students enrolled in full fee paying positions. It is assumed that these students are studying commerce and are based on the fees charged by the UNSW in 2004 and 2005 of $18,720 per year. Sections 4.3.1.3.1 and 4.3.1.3.2 discuss the methodology for measuring those students who pay their full fees up-front.

4.3.1.3.1 Male

Table 4.21 shows the PRR for males who pay full fees up-front to study a three year bachelor degree. The results in Table 4.21 show that the PRR is considerably lower for males who pay full fees up-front to study a three year bachelor degree, compared to those who are enrolled in a CSP studying the same degree. For instance, the PRR for a three year bachelor degree (at the 80 percent level) for 2005 for males who pay for a full fee paying position up-front is 5.79 percent. Meanwhile, for males enrolled in a CSP, their PRR for the same degree is 9.96 percent, if they defer their HECS repayments, or 9.08 percent, if they pay their HECS fees up-front. This shows that by charging males full fees up-front to study a three year bachelor degree that it will reduce their PRR by more than a third[40].

Table 4.21 The PRR to a three year degree for males when full fees are paid up-front

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004	7.10	6.34	5.54

[40] It should be noted that a proportion of students who enrol in full fee paying positions transfer to a HECS CSP place by year two.

2005	7.36	6.59	5.79

The results in Table 4.21 suggest that it is still a worthwhile investment for males to pay full fees to study a three year bachelor degree, as the PRR (at the 80 percent level) has increased 0.29 percentage points in 2005 to be 2.79 percent higher than the real interest rate. However, if a male was able to receive, a real return of six percent on an alternative investment then the results in Table 4.21 would suggest that it is not worthwhile for a male to pay full fees to gain a university education.

4.3.1.3.2 Female

Table 4.22 shows for the Private Rates of Return for females who pay full fees up-front to study a three year bachelor degree. Similar to the situation with males, the PRR for females who pay full fees up-front is significantly lower than the PRR for females enrolled in a CSP. However, the impact of up-front full fees on the PRR of females is even greater than the impact of up-front full fees on males. Table 4.22 shows that in 2005 the PRR for females who pay full fees up-front to study a three year bachelor degree is 7.97 percent. This return is 4.72 percentage points lower than the PRR for females enrolled in a CSP who pay their HECS up-front, and 6.66 percentage points lower than for females enrolled in a CSP who defer their HECS repayments. In other words, the PRR to a three year bachelor degree for females would decline by between 37 percent and 46 percent if CSP positions were replaced by full fee paying positions.

Table 4.22 The PRR to a three year degree for females when full fees are paid up-front

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004	9.48	8.63	7.73
2005	9.71	8.86	7.97

Despite the impact that up-front full fees has had upon the PRR to a university degree, the results in both Table 4.21 and Table 4.22 show that the PRR to a three year bachelor degree for students who pay their full fees up-front has increased in 2005. An underlying reason for the improvement in the rate of return is the fees used to calculate the PRR in this study were

those charged by the University of New South Wales to study a three year commerce degree. For both 2004 and 2005 the fee for a full fee paying position remained at $18,720. So while the income of a university graduate increased between 2004 and 2005 the fees charged by the university to study the degree remained the same.

4.3.1.4 FEE-HELP deferred model - A three year degree band two level of HECS

Students enrolled in full fee paying places have the option of paying their fees up-front or deferring their payment known as FEE-HELP. Students are allowed a maximum of $50,000 plus the 20 percent loan fee. Table 4.23 shows the PRR's for a three year bachelor degree for students who take out a FEE-HELP loan. The results in this study show that the PRR to a three year bachelor degree is considerably higher for those students who take out a FEE-HELP loan than for those students who pay their full fees up-front. For example, the PRR for a male who takes out a FEE-HELP loan in 2005 to study a three year bachelor degree is 8.01 percent (at the 80 percent level). This is 2.22 percentage points higher than for a male who pays their full fees up-front to study the same degree. Meanwhile, the difference is even greater for females. The PRR for a female who takes out a FEE-HELP loan in 2005 to study a three year bachelor degree is 12.08 percent (at the 80 percent level). This is 4.11 percentage points higher than a female who pays their full fees up-front.

Table 4.23 The PRR to a three year degree for males and females when full fees are deferred

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2005			
Male	9.71	8.88	8.01
Female	14.31	13.21	12.08

Even though the PRR to a three year bachelor degree is higher for students who take out a FEE-HELP loan compared to those who pay their full fees up-front, the PRR is not as high as for those students enrolled in CSP. For students studying a three year bachelor degree in 2005, the PRR is the highest for students who are enrolled in a CSP and defer their HECS repayments.

4.3.1.5 No HECS model - A three year degree band two level of HECS

This study also considers the scenario of the PRR in an environment of no HECS fees. Table 4.24 shows the PRR for both males and females for both before and after the 25 percent increase in HECS and for no HECS fees.

Table 4.24 The PRR to a three year degree for males and females for 2004 and 2005 HECS and no HECS

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004 HECS[41]			
Male	11.46	10.44	9.37
Female	15.98	14.70	13.38
2005 HECS			
Male	11.08	10.10	9.08
Female	15.14	13.94	12.69
No HECS fees for 2004			
Male	13.59	12.43	11.23
Female	19.83	18.29	16.69
No HECS fees for 2005			
Male	13.81	12.65	11.45
Female	19.92	18.39	16.81

The results in Table 4.24 show that the PRR to higher education is the highest when there are no HECS fees in 2005, at 11.45 percent for males and 16.81 percent for females (at the 80 percent level). The results also show that as the level of student contributions increase the PRR to a university degree falls (based on a student who pays their HECS fees up-front). This study found that if there were no HECS fees in 2005, the PRR to a university degree would increase 32 percent for females and 26 percent for males. The finding in this study that the PRR to a university degree increases when there are no HECS fees is supported by both the study by Miller (1982) and the study by Borland (2002). However, Miller (1982) who measured the PRR to a university degree under a system of free education calculated the PRR

[41] The PRR's for both 2004 and 2005 are for students who pay their HECS fees up-front.

to be significantly higher at 21.10 for males and 21.20 for females. Meanwhile, Borland (2002) calculated the PRR to a university degree for males in 2001 to be 18.50 percent, if there were no HECS fees. The fall in the PRR to a university degree with no HECS fees reinforces that there has been a significant drop in the wage premium of a university degree.

4.3.2 Marital status

The Private Rates of Return discussed in Section 4.3.1 were calculated for a single person with no dependents. Section 4.3.2 looks at the impact the 2005 increases in HECS has upon the PRR to a university degree for types of marital status other than a single person with no dependents. The rates of return are limited to those students enrolled in CSP. This study measures the PRR for both students who pay their HECS fees up-front and for those who defer their HECS repayments. An area for further research would be to measure the rate of return to higher education for different types of marital status for students who are enrolled in full fee paying places.

4.3.2.1 Up-front model

4.3.2.1.1 Male

The results in Table 4.25 show the PRR to a university degree for males of different marital status who pay their HECS fees up-front. As seen in Table 4.25, the highest PRR to a university degree for males, is for males married with no dependent children at 12.36 percent (at the 80 percent level for 2005). The lowest return is for a single male with dependent children at 8.82 percent (at the 80 percent level for 2005). These results suggest that studies measuring the PRR to a university degree for a single male with no dependents underestimate the return males receive. This study shows that in 2005 the PRR for males married with no dependent children is 3.28 percentage points higher than the PRR for a single male with no dependents.

Table 4.25 The PRR to a university degree for males who pay their HECS fees up-front for 2004 and 2005 based on marital status

Year	Private Rate of Return 100 percent	90 percent	80 percent
2004			
Lone person with no dependent children	11.46	10.44	9.37
Lone person with dependent children	11.15	10.15	9.11
Married with no dependent children	15.36	14.07	12.74
Married with dependent children	15.29	14.01	12.67
2005			
Lone person with no dependent children	11.08	10.10	9.08
Lone person with dependent children	10.79	9.83	8.82
Married with no dependent children	14.88	13.64	12.36
Married with dependent children	14.81	13.58	12.30

The results in Table 4.25 also show that for all males who pay their HECS fees up-front, the PRR to a university degree has decreased in 2005. For example, the PRR for a male married with no dependent children decreased from 12.74 percent in 2004 to 12.36 percent in 2005 (at the 80 percent level), while the PRR for a single male with dependent children decreased from 9.11 percent in 2004 to 8.82 percent in 2005 (at the 80 percent level). In 2005 the PRR for a single male with dependent children enrolled in a CSP who pays his HECS fees up-front is only 0.81 percentage points higher than PRR for a single male with no dependent children enrolled in FEE-HELP position (at the 80 percent level). If the FEE-HELP student could take advantage of tax deductibility benefits, as discussed in Section 2.2.5, then their PRR could be higher than the CSP graduate.

4.3.2.1.2 Female

This study also measured the PRR to a university degree for females of different marital status who pay their HECS fees up-front. The results in Table 4.26 show that marital status has a significant impact on the return to higher education for females. The results also show that not the same type of marital status is favourable to both males and females. For example, for females the highest PRR to a university degree is for a single female with no dependent children at 12.69 percent (at the 80 percent level for 2005), whereas for males the highest PRR to a university degree is for males married with no dependent children. The results in this study also show that the lowest PRR to a university degree out of all persons is for a single female with dependent children at 8.09 percent (at the 80 percent level for 2005). In 2005 the PRR to a university degree for a single female with dependents is 4.60 percentage points lower than the PRR for single females with no dependents (at the 80 percent level). The results in this study suggest that the marital status of a lone person with dependent children is more detrimental to the PRR for females than males, given the PRR for single males with dependent children is only 0.26 percentage points lower than the PRR for males with no dependent children.

Table 4.26 The PRR to a university degree for females who pay their HECS fees up-front for 2004 and 2005 based on marital status

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Lone person with no dependent children	15.98	14.70	13.38
Lone person with dependent children	10.31	9.46	8.56
Married with no dependent children	15.38	14.15	12.88
Married with dependent children	11.26	10.34	9.37
2005			
Lone person with no dependent children	15.14	13.94	12.69
Lone person with dependent children	9.76	8.95	8.09
Married with no dependent children	14.56	13.41	12.21
Married with dependent children	10.66	9.79	8.87

The results in Table 4.26 show that like males the PRR to a university degree for females who pay their HECS fees up-front, has decreased in 2005. For example, the PRR for a single female with no dependent children decreased from 13.38 percent in 2004 to 12.69 percent in 2005 (at the 80 percent level), while the PRR for a single female with dependent children decreased from 8.56 percent in 2004 to 8.09 percent in 2005 (at the 80 percent level). In 2005 the PRR for a single female with dependent children enrolled in a CSP who pays her HECS fees up-front is 3.99 percentage points lower than the PRR for a single female with no dependent children enrolled in FEE-HELP position (at the 80 percent level) in the 'average' degree. This suggests that certain socially disadvantaged groups are gaining the least from the current HECS system. This provides a challenge for policy makers that will be discussed in the policy recommendations in Chapter Seven.

These results also suggest that if studies conclude that the return to a university degree is higher for females than males, then these studies may only be taking into account the marital status of a lone person with no dependents. For all forms of marital status other than a lone person with no dependents, males have a higher PRR than females.

4.3.2.2 Deferred model

4.3.2.2.1 Male

The Private Rates of Return to higher education for males of different marital status who defer their HECS repayments are shown in Table 4.27. The results show that for all males the PRR is higher when they choose to defer their HECS repayments, rather than pay their HECS fees up-front. For example, for males married with no dependent children the PRR for those who defer their HECS repayments is 13.59 percent, whereas for those who pay their HECS fees up-front their PRR is 12.36 percent (at the 80 percent level for 2005).

The results in Table 4.27 also show that for all males who defer their HECS fees, their PRR rises in 2005 even after the 25 percent increases in HECS. This is partly because of the changes to the HECS repayment system reducing the cost of study in discounted terms. For

example, a single male with dependent children studying a three year degree in 2004 would repay his HECS debt back by the age 27 years. However, the increase in the income threshold in 2005 has resulted in the single male with dependent children not repaying his HECS debt back until he is 29 years. A similar pattern also occurred in the other categories.

Table 4.27 The PRR to a university degree for males who defer their HECS fees for 2004 and 2005 based on marital status

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Lone person with no dependent children	11.88	10.92	9.92
Lone person with dependent children	11.55	10.61	9.63
Married with no dependent children	16.05	14.82	13.52
Married with dependent children	15.99	14.76	13.47
2005			
Lone person with no dependent children	11.90	10.96	9.96
Lone person with dependent children	11.57	10.65	9.68
Married with no dependent children	16.09	14.87	13.59
Married with dependent children	16.01	14.79	13.52

4.3.2.2.2 Female

Table 4.28 shows the Private Rates of Return to higher education for females of different marital status who defer their HECS repayments. The results in Table 4.28 show that, as was the case for males, the PRR is higher for females who defer their HECS repayments than for those who pay their HECS fees up-front. For example, in 2005 the PRR for a single female with dependent children is 9.18 percent, if she chooses to defer her HECS repayments (Table 4.28), or 8.09 percent is she chooses to pay her HECS fees up-front (at the 80 percent level). Therefore, the results in this study suggest that on average CSP students regardless of their marital status should consider carefully their payment options, as the PRR is higher for those who defer their HECS repayments than for those who pay their HECS fees up-front.

Table 4.28 The PRR to a university degree for females who defer their HECS fees for 2004 and 2005 based on marital status

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Lone person with no dependent children	17.23	15.98	14.68
Lone person with dependent children	10.87	10.09	9.25
Married with no dependent children	16.57	15.37	14.12
Married with dependent children	11.94	11.08	10.17
2005			
Lone person with no dependent children	17.14	15.91	14.63
Lone person with dependent children	10.76	9.99	9.18
Married with no dependent children	16.45	15.27	14.04
Married with dependent children	11.87	10.98	10.09

Contrary to males, Table 4.28 shows that the PRR to a university degree for females falls after the 2005 budgetary changes in HECS. This suggests that the 25 percent increase in HECS fees has had a more adverse impact on the PRR to a university degree for females than males. The results in this study also show that for both females who paid their HECS fees up-front (Table 4.26) and females who deferred their HECS repayments (Table 4.28) their PRR fell in 2005. These findings also suggest that the gap between the PRR between males and females who defer their HECS fees has closed as a consequence of the 2005 HECS changes. For example, the PRR for females married with no dependent children who deferred their HECS repayments decreased from 14.12 percent in 2004 to 14.04 percent in 2005. Meanwhile, the PRR for males married with no dependent children who deferred their HECS repayments increased from 13.52 percent to 13.59 percent.

However, caution is needed with interpreting the estimates in Table 4.28 as the rates of return are assuming that the female graduate will repay her HECS debt and not leave the workforce. For example, a single female with dependent children who chooses to defer her HECS

repayments in 2005 will not repay her HECS debt until she is 32 years of age. This assumes that the single female with dependent children once graduating will work full-time and will not have any work interruptions. However, in reality, at times females will either work part-time or not work at all and will therefore not reach the income threshold to repay their HECS debt. According to Standfield (2003 p. 1) only 77 percent of females pay back all of their HECS debt by the time they are 65 years of age compared to 93 percent of men. An area of further study would be to measure the impact of HECS on the PRR for a university degree for women who follow different employment paths as a result of marital status and dependent children.

4.3.3 Qualifications

In addition to measuring the PRR for males and females based on marital status, this study measured the impact of the 2005 budgetary changes on PRR to different qualifications for both males and females. The income profiles for the qualifications were weighted based on the occupations and industries that those graduates worked in according to the CURF sample.

4.3.3.1 Up-front model

4.3.3.1.1 Male

Private Rates of Return to study vary considerably with the qualifications graduates attain. The PRR to different qualifications for single males with no dependent children who pay their HECS fees up-front are shown in Table 4.29. The results show that there are significant variations in the rates of return between qualifications. Out of the seven qualifications examined, two have a PRR greater than the average case for a male of 9.08 percent (at the 80 percent level for 2005). The highest PRR for males who pay their HECS fees up-front is for the qualification, IT at 10.29 percent (at the 80 percent level in 2005). This suggests that it is a worthwhile investment for males to pay their HECS fees up-front to study a degree in IT. However, this may not be the case for males studying a degree in creative arts. The PRR for

creative arts is not only below the real interest rate but is negative at minus 0.50 percent[42]. This suggests that it is not a worthwhile investment for males to pay their HECS fees up-front to study creative arts at university. The main reason for the negative rate of return is the wage premium male creative arts graduates' receive is not sufficient to cover the opportunity cost of studying at university.

Table 4.29 The PRR to different qualifications for males who pay their HECS fees up-front for 2004 and 2005

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Creative Arts[12]	0.52	0.05	-0.46
Commerce	10.85	9.87	8.85
IT	12.90	11.78	10.62
Education	9.61	8.73	7.81
Engineering	10.34	9.42	8.45
Science	12.00	10.94	9.84
Society and Culture	10.22	9.28	8.30
2005			
Creative Arts[12]	0.48	0.01	-0.50
Commerce	10.50	9.95	8.57
IT	12.48	11.41	10.29
Education	9.53	8.67	7.76
Engineering	10.06	9.16	8.22
Science	11.61	10.59	9.53
Society and Culture	10.02	9.11	8.15

The results in Table 4.29 show that in general the higher rates of return for males who pay their HECS fees up-front are for shorter degrees. For example, three year bachelor degrees, such as science and IT, have a higher rate of return than four year bachelor degrees, such as education and engineering. It should also be remembered that the rates of return for married males are likely to be approximately three percentage points higher than the return for single males with no dependent children.

[42] The sample size for males with a non-school qualification in creative arts was 14 and these results should be considered with caution but earnings for creative artists were the lowest out of all qualifications for males.

Table 4.29 also shows that for all qualifications for males who pay their HECS fees up-front the PRR has decreased in 2005. Even for the national priority education, the PRR for males who pay their HECS fees up-front has decreased in 2005. This is because only units in education are exempt from the higher HECS fees in 2005, and in order to complete an education degree units other than education are studied such as units in humanities at band one level of HECS, as in this example.

The results in Table 4.29 are fairly consistent with the estimates of Borland (2002). Borland calculated the PRR to four degrees (business and administration, society and culture, science and engineering) for males who paid their HECS fees up-front for the year 2001. Borland (2002) found that for both qualifications, science and society and culture, the PRR was 11 percent. These estimates are similar to those estimates for science and society and culture in Table 4.29 at the 100 percent level.

4.3.3.1.2 Female

The Private Rates of Return to different qualifications for females who pay their HECS fees up-front are shown in Table 4.30. The results show that the PRR does vary for females who pay their HECS fees up-front depending on which degree they study at university. However, the differences in the rates of return are not as great for females as for males. For example, the highest PRR for females who pay their HECS fees up-front is for the qualification, society and culture at 14.49 percent (at the 80 percent level in 2005). This is 1.8 percentage points higher than the return for an average female graduate at 12.69 percent (at the 80 percent level in 2005). The lowest rate of return is for the qualification, creative arts at 7.93 percent, 6.56 percentage points lower than the qualification society and culture. Despite the PRR for the qualification, creative arts being the lowest of all qualifications in Table 4.30, it is still a profitable investment for females.

Table 4.30 The PRR to different qualifications for females who pay their HECS fees up-front for 2004 and 2005

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Creative Arts	9.95	9.13	8.27
Commerce	15.07	13.87	12.62
IT	15.20	13.99	12.73
Education	14.10	12.99	11.84
Engineering	14.78	13.62	12.41
Science	15.25	14.03	12.76
Society and Culture	17.94	16.52	15.06
2005			
Creative Arts	9.55	8.76	7.93
Commerce	14.28	13.14	11.96
IT	14.40	13.26	12.07
Education	13.73	12.67	11.55
Engineering	14.12	13.02	11.68
Science	14.44	13.29	12.10
Society and Culture	17.24	15.89	14.49

Similar to the case for males, the PRR to all qualifications for females who pay their HECS fees up-front decreased in 2005. However, the results in Table 4.29 and Table 4.30 show that there a significant differences in the rates of return to different qualifications between males and females. For all qualifications single females with no dependent children have a higher rate of return than single males with no dependent children. The greatest difference is in the rate of return for the qualification, creative arts. While creative arts has the lowest PRR for both males and females, the return for females is 7.93 percent compared to -0.50 percent for males (at the 80 percent level in 2005). This is because the wage premium of a creative arts degree is much larger for females than for males. For example, in 2005 the difference in the net income between a male creative arts graduate and a male year 12 graduate was on average approximately $2000 per year, whereas the difference in the net income between a female creative arts graduate and a female year 12 graduate was on average approximately $11,000 per year. Another key difference is that for females the qualification with the highest PRR is society and culture, whereas for males it is IT. Again, it should be remembered that the PRR would be lower for other categories of marital status for females.

4.3.3.2 Deferred model

4.3.3.2.1 Male

The Private Rates of Return to different qualifications for males who defer their HECS repayments are shown in Table 4.31. The results show that for all qualifications except creative arts, the PRR increases in 2005. However, the increase in the PRR for most qualifications is between 0.04 and 0.06 percentage points. The results also show that for all qualifications, except creative arts, the PRR is higher for males who defer their HECS repayments than for males who pay their HECS fees up-front, with the difference greater for those graduates earning a higher income. For example, in 2005 the PRR to the qualification, IT for males who defer their HECS repayments is 11.30 percent, 1.01 percentage points higher than the PRR for those who pay their HECS fees up-front (at the 80 percent level). Meanwhile in 2005 the PRR to the qualification, education for males who defer their HECS repayments is 8.23 percent, 0.47 percentage points higher than the PRR for those who pay their HECS fees up-front (at the 80 percent level).

Table 4.31 The PRR to different qualifications for males who defer their HECS repayments for 2004 and 2005

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Creative Arts	0.34	-0.07	-0.52
Commerce	11.23	10.31	9.35
IT	13.41	12.35	11.24
Education	9.79	8.97	8.09
Engineering	10.76	9.89	8.97
Science	12.45	11.46	10.41
Society and Culture	10.38	9.50	8.58
2005			
Creative Arts	0.31	-0.09	-0.53
Commerce	11.25	10.35	9.39
IT	13.43	12.39	11.30
Education	9.92	9.10	8.23
Engineering	10.82	9.96	9.04
Science	12.47	11.49	10.46
Society and Culture	10.40	9.54	8.64

For males who defer their HECS repayments to study creative arts their PRR has not only decreased to -0.53 percent in 2005, their PRR is lower than the PRR for males who pay their HECS fess up-front at -0.50 percent (at the 80 percent level). This suggests that the 2005 HECS system has not improved the PRR to qualifications for male graduates on low incomes. In order for the PRR for males with the qualification, creative arts to improve, the graduates would have to repay their HECS debt at an even slower rate in order to reduce the cost of study in discounted terms.

4.3.3.2.2 Female

The Private Rates of Return to different qualifications for females who defer their HECS repayments are shown in Table 4.32. The findings show that the 2005 budgetary changes in HECS have had a different impact on the PRR for females compared to males. For all qualifications, other than education and engineering, the PRR has decreased in 2005 for females who have deferred their HECS repayments. This differs to the PRR for males, where except for the qualification creative arts, the PRR increased in 2005 for males who deferred their HECS repayments.

Table 4.32 The PRR to different qualifications for females who defer their HECS repayments for 2004 and 2005

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Creative Arts	10.19	9.45	8.65
Commerce	16.23	15.06	13.83
IT	16.37	15.18	13.95
Education	14.76	13.69	12.57
Engineering	16.03	14.88	13.68
Science	16.42	15.23	13.99
Society and Culture	18.79	17.43	16.00
2005			
Creative Arts	10.08	9.36	8.58
Commerce	16.11	14.96	13.76
IT	16.26	15.10	13.88
Education	14.80	13.75	12.64
Engineering	16.00	14.87	13.69
Science	16.29	15.13	13.91
Society and Culture	18.68	17.34	15.94

However, the results in Table 4.32 show that the PRR for females deferring their HECS repayments to study degrees such as society and culture are very rewarding at 15.94 percent (at the 80 percent level in 2005). Even the return for females deferring their HECS fees to study creative arts is still worthwhile, at 8.58 percent higher than both the return for males deferring their HECS repayments to study creative arts, and education (at the 80 percent level in 2005).

4.3.4 Occupations

This study differs from previous Australian studies, as it measures the Private Rates of Return to both different qualifications and different occupations. This allows for comparisons to be made between the PRR of a particular qualification with the PRR for an occupation where the qualification is needed. For example, the PRR to an education degree compared to the PRR to a secondary teacher. This information would be useful for individuals who base their decision of which university degree to study on future career choices. Secondary school teachers are divided into two categories; those who pay HECS band one, such as humanities teachers and those who pay HECS band two to become economics, business, science, mathematics and computing teachers.

4.3.3.1 Up-front model

4.3.4.1.1 Male

The Private Rates of Return to different occupations for males who pay their HECS fees up-front are shown in Table 4.33. As can be seen the highest PRR for males who pay their HECS fees up-front is for the occupation, economist/financier at 14.10 (at the 80 percent level in 2005). This return is more than double the return that male teachers receive at 6.37 percent for secondary teachers who specialise in HECS band two subjects, and 6.75 percent for secondary teachers who specialise in HECS band one subjects. Out of the four occupations in Table 4.33, a male nurse has the second highest PRR at 8.62 percent (at the 80 percent level for 2005). However, the PRR for males who pay their HECS fees up-front to become a nurse or

secondary teacher is below the rate of return for an average degree at 9.08 percent (at the 80 percent level for 2005).

Table 4.33 The PRR to different occupations for males who pay their HECS fees up-front for 2004 and 2005

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Economist/financier	17.43	15.99	14.50
Nurse	10.54	9.58	8.58
Secondary teacher- HECS band one	8.47	7.65	6.79
Secondary teacher- HECS band two	8.13	7.33	6.49
2005			
Economics/finance	16.92	15.53	14.10
Nurse	10.55	9.61	8.62
Secondary teacher- HECS band one	8.40	7.60	6.75
Secondary teacher- HECS band two	7.98	7.20	6.37

For all occupations, other than nursing, the PRR for males who pay their HECS fees up-front decreases in 2005. For example, the PRR for male who pays their HECS fees up-front to become an economist/financier decreases 0.40 percent to 14.10 percent in 2005 (at the 80 percent level). However, the PRR for a male nurse increases from 8.58 percent in 2004 to 8.62 in 2005 (at the 80 percent level).

The large differences in the PRR partly explain why many males choose not to study secondary teaching at university and why many male teachers leave the field of teaching (Stokes, 2005). These results also suggest that the current HECS system embraces both vertical and horizontal inequity. For instance, a male economics teacher and a male economist pay the same fees to study economics for three years. In addition, the economics teacher pays for a fourth year to complete an education qualification. The economist/financier, however, earns 22 percent more than the economics teacher. The results also show horizontal inequity with regards to the occupation of a secondary teacher. Despite the humanities secondary teacher and the economics secondary teacher earning the same income, the PRR differs depending on the area of specialisation. This is because under a differential system, units such as economics, mathematics and science are at band two level of HECS, while units in

humanities such as English and history are at band one level of HECS. Similar situations occur for the other HECS band two subject areas for teachers.

4.3.4.1.2 Female

The Private Rates of Return to different occupations for females who pay their HECS fees up-front are shown in Table 4.34. Like males, the highest PRR for females who pay their HECS fees up-front is for an economist/financier at 17.85 percent and the lowest PRR is for a secondary teacher who specialises in HECS band two at 10.31 percent (at the 80 percent level for 2005). The results in Table 4.34 show that for all occupations females have a higher PRR than males. For example, the PRR for females who pay their HECS fees up-front to become an economist/financier is 3.75 percentage points higher than the return males receive for the same occupation. The difference is even greater for the occupation of a nurse with the PRR for females who pay their HECS fees up-front 5.66 percentage points higher than the PRR for males. Unlike the case for males, the PRR for females who pay their HECS fees up-front to become a nurse is higher than the PRR for an average degree for a female at 12.69 percent (at the 80 percent level for 2005).

Table 4.34 The PRR to different occupations for females who pay their HECS fees up-front for 2004 and 2005

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Economist/financier	22.33	20.57	18.75
Nurse	15.81	14.56	13.25
Secondary teacher- HECS band one	13.41	12.35	11.24
Secondary teacher- HECS band two	12.80	11.78	10.71
2005			
Economist/financier	21.22	19.57	17.85
Nurse	15.57	14.35	13.08
Secondary teacher- HECS band one	13.05	12.03	10.96
Secondary teacher- HECS band two	12.31	11.34	10.31

The results in Table 4.34 show that for all occupations the PRR decreases in 2005 for females who pay their HECS fees up-front. The results in Table 4.34 also show that the impact of the 2005 increases in HECS fees is more detrimental to the PRR for females who pay their HECS

fees up-front than the PRR for males who pay their HECS fees up-front. For example, the PRR for a female who pays their HECS fees up-front to become an economist/financier decreases 0.90 percentage points in 2005 to 17.85 percent. This decline in the PRR for females is more than double the decline in PRR for males who pays their HECS fees up-front to become an economist/financier, decreasing 0.40 percentage points in 2005. The 2005 changes in HECS has also created a situation where the PRR for males who pay their HECS fees up-front to become a nurse has increased in 2005, whereas the PRR for females who pay their HECS fees up-front to become a nurse has decreased in 2005. Again this is largely a consequence of the different income profiles of males and females. The findings in Table 4.34 also show that the PRR to a secondary teacher is lower than the PRR to the qualification, education at 11.55 percent (at the 80 percent level for 2005). The differences in the rates of return suggest that female graduates with an education degree have higher rates of return if they work in areas other than teaching. These results suggest that females should consider career options when choosing a degree. Again there is both vertical and horizontal inequity between the PRR of band two courses of study and for secondary teachers.

4.3.3.2 Deferred model

4.3.4.2.1 Male

The Private Rates of Return to different occupations for males who defer their HECS repayments are shown in Table 4.35. Like males who pay their HECS fees up-front, the most rewarding occupation for males who defer their HECS repayments is the occupation of an economist/financier at 15.53 percent (at the 80 percent level for 2005). In 2005 the PRR for a male who defers their HECS repayments to become an economist/financier return is 5.57 percentage points higher than the PRR for an average degree for a male who defers their HECS repayments at 9.96 percent (at the 80 percent level). For all other occupations, the rates of return are lower than the PRR for an average male graduate who defers their HECS repayments. The lowest PRR is for males who defer their HECS repayments to become a secondary teacher who specialises in HECS band two subjects at 6.94 percent (at the 80 percent level for 2005).

Table 4.35 The PRR to different occupations for males who defer their HECS repayments for 2004 and 2005

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Economist/financier	18.31	16.91	15.54
Nurse	10.75	9.86	8.91
Secondary teacher- HECS band one	8.60	7.84	7.03
Secondary teacher- HECS band two	8.37	7.63	6.84
2005			
Economics/finance	18.53	16.97	15.53
Nurse	10.93	10.03	9.09
Secondary teacher- HECS band one	8.72	7.96	7.16
Secondary teacher- HECS band two	8.46	7.73	6.94

For all occupations, except for an economist/financier (at the 80 percent level), the PRR for males who defer their HECS repayments increased in 2005. For example, the PRR for a male who defers their HECS repayments to become a nurse increased 0.18 percentage points to 9.09 percent in 2005 (at the 80 percent level). Not only has the PRR for males who deferred their HECS repayments increased in 2005, but the gap has also increased between males who defer their HECS repayments and males who pay their HECS fees up-front. For example, in 2004 the gap between males who deferred their HECS repayments and males who paid their HECS fees up-front to become an economist /financier was 1.04 percentage points. In 2005 the difference was 1.43 percentage points.

The results in Table 4.35 also show that in 2005 the gap between the PRR for an economist/financier and secondary teacher who specialises in economics is greater for males who defer their HECS repayments than those who pay their HECS fees up-front. In 2005 the gap between an economist/financer and a secondary teacher who specialies in economics was 7.73 percentage points for males who paid their HECS fees up-front. For males who deferred their HECS repayments the difference in 2005 was 8.59 percentage points.

4.3.4.2.2 Female

The Private Rates of Return to different occupations for females who defer their HECS repayments are shown in Table 4.36. Like the situation for females who pay their HECS fees

up-front, economist/financiers who defer their HECS repayments have the highest PRR at 20.77 percent and the lowest PRR is for a band two secondary teacher at 11.73 percent (at the 80 percent level for 2005). For all four occupations, the PRR is greater for a female who defers their HECS repayments than for a female who pays their HECS fees up-front. For example, the PRR for a female nurse who pays her HECS fees up-front is 13.08 percent, whereas the PRR for a female nurse who defers her HECS repayments is 14.25 percent (at the 80 percent level for 2005).

Table 4.36 The PRR to different occupations for females who defer their HECS repayments for 2004 and 2005

	Private Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Economist/financier	24.43	22.65	20.80
Nurse	16.63	15.42	14.16
Secondary teacher- HECS band one	14.01	12.99	11.93
Secondary teacher- HECS band two	13.70	12.71	11.67
2005			
Economics/finance	24.35	22.59	20.77
Nurse	16.70	15.50	14.25
Secondary teacher- HECS band one	14.05	13.05	11.99
Secondary teacher- HECS band two	13.74	12.76	11.73

For all occupations the rates of return for females who defer their HECS repayments are greater than the PRR for males. For example, the PRR for females who defer their HECS repayments to become a secondary teacher who specialises in humanities is 4.83 percentage points higher than the PRR for males in the same occupation (at the 80 percent level for 2005). Meanwhile, the PRR for females who defer their HECS repayments to become an economist/financer is 5.24 percentage points higher than the PRR for males in the same occupation.

The results in Table 4.36 show that the impact of the 2005 increases in HECS varies for females who defer their HECS repayments depending on the occupation. For example, the PRR for both females who defer their HECS repayments to become a secondary teacher and females who defer their HECS repayments to become a nurse has increased in 2005 at 0.06 percentage points and 0.09 percentage points, respectively. Meanwhile the PRR for females

who defer their HECS repayments to become an economist/financier decreased 0.03 percentage points in 2005. The results in both Table 4.32 and Table 4.36 suggest that the 2005 budgetary changes in HECS have had a mixed effect on females who defer their HECS repayments, depending on the type of qualification and type of occupation. For example, for the qualifications, education and engineering and the occupations, teaching and nursing the PRR's increased in 2005, but for all other qualifications and occupations, the rates of return declined in 2005.

The results in Table 4.35 and Table 4.36 suggest that the PRR to a nurse for both males and females has improved when compared to estimates by the Productivity Commission (1997). The Productivity Commission (1997) calculated that the PRR to a nurse for 1996-97 was 6.5 percent for a male and 13.0 percent for a female (at the 100 percent level). The results in this study suggest that the PRR to a nurse has increased 4.43 percentage points for a male and 3.70 percentage points for a female (at the 100 percent level). This is a result of the increase in relative wages nurses have received over time.

Like this study, the Productivity Commission (1997) also found that the PRR to a secondary teacher would be greater for those who specialised in humanities than those who specialised in maths, science or economics. The Productivity Commission (1997) found that the PRR for a secondary teacher who specialises in maths, science or economics was 6.1 percent for a male and 13.0 percent for a female. Meanwhile, the PRR for a secondary teacher who specialises in humanities was 6.5 percent for a male and 13.2 percent for a female. Although the Productivity Commission's (1997) estimates suggest that it is more worthwhile for an individual to become a secondary teacher rather than a nurse, the results in this study suggest the opposite. This is partly because the salary increases that nurses have received overtime have been much greater than the return teachers have received. According to Macken (2006 p. 21) between 1986 and 2005 the salary of nurses have increased 244 percent compared to 205 percent for secondary teachers.

4.4 Conclusion

The findings in this study suggest that for both males and females a university degree is a worthwhile investment. For both males and females the PRR to an average degree is greater than the real interest rate at three percent.

This study found that for all fee payment options the PRR to a university degree is higher for single females with no dependent children than for single males with no dependent children. For example, the PRR for single females with no dependent children who pay their HECS fees up-front is 3.61 percentage points higher than the PRR for single males with no dependent children who pay their HECS fees up-front (at the 80 percent level for 2005). Meanwhile, the difference is even greater between females and males who defer their HECS repayments with the PRR for single females with no dependent children 5.67 percentage points higher than the rate of return for single males with no dependent children (at the 80 percent level for 2005). For both males and females, the rate of return is greater for individuals who defer their HECS repayments than for those who pay their HECS fees up-front. For example, in 2005 the PRR to a university degree for a single female with no dependent children is 14.63 percent, if she defers her HECS repayments, and 12.69 percent, if she chooses to pay her HECS fees up-front (at the 80 percent level).

The findings of the sensitivity analysis show that the 2005 budgetary changes in HECS has had a mixed effect on the PRR to a university degree for different groups of graduates. For both single males with no dependent children and single females with no dependent children who pay their HECS fees up-front, the PRR to a university degree decreased in 2005. For example, the PRR to a university degree for single males with no dependent children decreased 0.29 percentage points to 9.08 percent in 2005 (at the 80 percent level). Meanwhile the impact was even more detrimental to single females with no dependent children with the PRR to a university degree decreasing 0.69 percentage points to 12.69 percent in 2005 (at the 80 percent level). The fall in the rates of return in 2005 for students who paid their HECS fees up-front was a result of both the 25 percent increase in HECS fees and the decrease in the up-front payment discount from 25 percent in 2004 to 20 percent in 2005.

The findings of the sensitivity analysis show that the PRR to a university degree decreased in 2005 not only for females who paid their HECS fees up-front, but also for females who deferred their HECS repayments in 2005. The PRR to a university degree for single females with no dependent children who deferred their HECS repayments decreased from 14.68 percent in 2004 to 14.63 percent in 2005 (at the 80 percent level). However, the PRR for single males with no dependent children who deferred their HECS repayments increased from 9.92 percent in 2004 to 9.96 percent in 2005 (at the 80 percent level). These results suggest that the 2005 budgetary changes in HECS had no impact on the PRR for single males with no dependent children who deferred their HECS repayments. However, for both single females with no dependent children who paid their HECS fees up-front and for single females with no dependent children who deferred their HECS repayments the 2005 budgetary changes in HECS were detrimental.

The findings in this study also suggest that the 2005 budgetary changes in HECS had a positive effect on the PRR for those enrolled in full fee paying positions. For example, the PRR to a university degree increased 0.25 percentage points to 5.79 percent for males who paid their full fees up-front and 0.24 percentage points to 7.97 percent for females who paid their full fees up-front (at the 80 percent level for 2005). The rates of return were even higher for those who enrolled in a FEE-HELP position in 2005 at 7.97 percent for males and 12.08 percent for females (at the 80 percent level). However, these results suggest that if CSP positions were replaced by up-front full fee paying positions the PRR to the average degree for males would decrease by between 36 percent and 41 percent and for females by between 37 percent and 46 percent.

The impact of moving towards a user pays system is also seen by comparing the estimates of the PRR to a university degree for the 2005 HECS system with the PRR to a university degree for an environment of no HECS fees. For example, the PRR for the average degree for males is 9.08 percent under the 2005 HECS system, but if there were no HECS fees in 2005, this PRR would increase 2.37 percentage points to 11.45 percent (at the 80 percent level). For females the PRR to the average degree would increase 4.12 percentage points to 16.18

percent, if the 2005 HECS system was replaced by no HECS fees (at the 80 percent level). If there were no HECS fees in 2005, the PRR to an average degree would be nearly 4 times the real interest rate for males and more than five times for females. However, when the results in this study are compared to estimates in previous studies, such as Miller (1982), the findings suggest that the PRR to a university degree is decreasing not only because students are paying more to study at university but also because the wage premium of a university degree is falling.

A significant limitation of previous Australian studies was that they only measured the PRR for the average male and average female. This study measured the PRR to an average degree for different types of marital status. The findings of this study found that the PRR for a female is only higher than the PRR for a male for the martial status, lone person with no dependents. For instance, for all males who pay their HECS fees up-front, except for single males with no dependents, the PRR is greater for males than females. For example, in 2005 the PRR for a married male with dependent children who pays their HECS fees up-front is 12.30 percent, whereas the PRR for a married female with dependent children who pays their HECS fees up-front is 8.87 percent (at the 80 percent level). In 2005 the highest PRR for both males who defer their HECS repayments and for those who pay their HECS fees up-front is for the marital status, married with no dependent children at 12.36 percent and 13.59 percent respectively (at the 80 percent level). Meanwhile, the highest PRR for females is for a lone person with no dependent children at 12.69 percent and 14.63 percent respectively (at the 80 percent level for 2005). These results suggest that studies that measure the PRR to a university degree for single males and single females with no dependent children underestimate the PRR for most male graduates and overestimate the PRR of female graduates.

For all males and all females who paid their HECS fees up-front the PRR to an average degree decreased in 2005. In 2005 the lowest PRR to a university degree was for single females with dependent children at 8.09 percent or 4.60 percentage points lower than the PRR for single females with no dependent children (at the 80 percent level). In 2005, the PRR for a single female with dependent children, enrolled in a Commonwealth Supported Place and who paid her HECS fees up-front, was 3.99 percentage points lower than the PRR for a single female

with no dependents in a FEE-HELP position. This suggests that certain socially disadvantaged groups are gaining the least from the HECS system. Despite the 2005 increases in HECS, the PRR for single females with dependent children who paid their HECS fees up-front is still higher than the real interest rate and could be considered a worthwhile investment.

For all males, who deferred their HECS repayments, the 2005 budgetary changes in HECS appeared to have no affect on the PRR to an average degree, whereas for all females who deferred their HECS repayments the PRR decreased in 2005. For example, the PRR to an average degree for single males with no dependents increased from 9.92 percent in 2004 to 9.96 percent in 2005 (at the 80 percent level). Meanwhile, the PRR for single females with no dependents decreased from 14.68 percent in 2004 to 14.63 percent in 2005 (at the 80 percent level). This suggests that the gap between the PRR between males and females who defer their HECS fees has closed as a result of the 2005 changes in HECS. The results also suggest that the 2005 higher education changes had a more detrimental effect on females than males, although, this was partly a result of reforms in the taxation system that favoured higher income earners.

This study found that not only do the rates of return vary for different types of marital status they also vary for different types of qualifications. In 2005, for both males, who deferred their HECS repayments, and for males who paid their HECS fees up-front, the highest PRR was for the qualification, IT at 11.30 percent and 10.29 percent respectively (at the 80 percent level). In 2005, all qualifications other than, creative arts had a PRR for males greater than the real rate of interest. However, the findings show that for males who pay their HECS fees up-front, the rates of return tended to be higher for shorter degrees. For example, the PRR for males who pay their HECS fees up-front was 9.53 percent for the qualification science, compared to 7.76 percent for the qualification education (at the 80 percent level for 2005). For all qualifications for males who pay their HECS fees up-front, the PRR decreased in 2005. However, for all qualifications for males who defer their HECS repayments, except for the qualification, creative arts, the PRR increased in 2005 due to changes in the HECS repayment thresholds and real income growth. For example, in 2005 the PRR to the qualification, engineering decreased 0.23 percentage points for males who paid their HECS fees up-front.

Meanwhile, the PRR to the qualification, engineering for males who deferred their HECS repayments increased 0.07 percentage points. Therefore, a consequence of the 2005 budgetary changes in HECS is the widening of the benefit gained from the PRR for males who defer their HECS fees compared to those who pay their HECS fees up-front.

The results of the sensitivity analysis also show significant variations in the PRR between qualifications for females. In 2005 for all qualifications for both students who pay their HECS fees up-front and for those who defer their HECS repayments the PRR is higher for single females with no dependent children than single males with no dependent children. For example, in 2005 the PRR for the qualification, commerce for students who deferred their HECS repayments was 13.76 percent for females and 9.39 percent for males (at the 80 percent level). The results of the sensitivity analysis also show that for females the highest PRR is for the qualification, society and culture and not the qualification, IT, as is the case for males. The PRR is 14.49 percent for females who studied society and culture and who paid their HECS fees up-front and 15.94 percent for females who defer their HECS repayments (at the 80 percent level for 2005). For all female qualifications in 2005, the PRR is greater than the real interest rate. This suggests that in 2005 a university education is a worthwhile investment for females irrespective of the degree they choose to study. However, depending on the qualification, for females who defer their HECS repayments in 2005, their return can vary between nearly three times the real interest rate for the qualification, creative arts, to more than five times the real interest rate for the qualification, society and culture.

The findings of the sensitivity analysis also show that the 2005 budgetary changes in HECS have had a more detrimental impact on the rates of return for qualifications for females than males. For all qualifications for females who pay their HECS fees up-front or defer their HECS repayments other than the qualifications, education and engineering, the PRR decreased in 2005. For males who deferred their HECS repayments, the PRR for all qualifications other than the qualification, creative arts increased in 2005.

In addition to measuring the PRR to qualifications, this study measured the PRR to a number of occupations. For both males and females, who paid their HECS fees up-front and for those

who deferred their HECS repayments the highest PRR was for an economist/financier. In 2005, for individuals who paid their HECS fees up-front, the PRR for an economist/financer was 14.10 percent for males and 17.85 percent for females (at the 80 percent level). The study found that for all occupations, for those who paid their HECS fees up-front and for those who deferred their HECS repayments single females with no dependent children had a higher PRR than single males with no dependent children. The study also found that for all occupations the PRR decreased in 2005 for those who paid their HECS fees up-front with the only exception being a single male with no dependents studying to become a nurse. For both males and females the PRR decreased the most in 2005 for an economist/financier. The PRR decreased 0.40 percentage points to 14.10 percent for males and 0.90 percentage points to 17.85 for females (at the 80 percent level). Even though the PRR fell in 2005 for individuals who paid their HECS fees up-front to become an economist/financier, the rate of return is nearly five times the real interest rate for males, and nearly six times the real interest rate for females. The return for a degree may vary considerably depending on the occupation. While teaching is a national priority area for the Government it does not provide a high PRR. In 2005 the PRR for a female economist/financier was 7.54 percentage points higher than the PRR for an economics teacher (at the 80 percent level). The difference was even greater for males, with the PRR for a male economist/financier more than twice the PRR for an economics teacher. These results not only show vertical inequity but also suggest why there are shortages in band two qualifications in teaching (Stokes, 2005). The results of this study also show that the 2005 HECS system suffers from horizontal inequity. For example, for both males and females the PRR is higher for secondary teachers who teach band one subjects, than for secondary teachers who teach band two subjects. For example, in 2005 for males who paid their HECS fees up-front, the PRR for secondary teachers who teach band one subjects was 6.75 percent, whereas the PRR for secondary teachers who teach band two subjects was 6.37 percent (at the 80 percent level).

The findings of the sensitivity analysis also show that the impact of the 2005 budgetary changes in HECS on the PRR for students who defer their HECS repayments varies depending on the occupation. For both males and females the PRR increased in 2005 for the occupations, nursing and teaching but decreased for the occupation economist/financier. Despite the

increases in the rates of return for the occupations, nursing and teaching, for females only the PRR for nursing is above the PRR for an average degree for females. Meanwhile, for males neither, the PRR for teaching nor the PRR for nursing, is above the PRR to an average degree for males. This would discourage males from pursuing such careers.

These results also suggest that for individuals who are likely to earn a low income or work part-time they would benefit most if they deferred their HECS repayments, rather than pay their HECS fees up-front.

The following chapter will consider the Social Rate of Return. It will discuss the methodology and the estimates of previous Australian studies of the Social Rate of Return to higher education.

Chapter 5: The Social Rate of Return to higher education

The benefits to society from higher education extend beyond the private benefits the individual receives to include the externalities or spillover benefits of higher education. These include the non-pecuniary benefits to the individual (greater job security, consumption benefits and better health) and the non-pecuniary benefits to society (lower crime rates, higher productivity and democratisation). McMahon (2004 p. 211) states 'the size of these externalities which include education's impacts on development goals are the main rationale on efficiency grounds for Government support of education'. However, most conventional estimates of the Social Rate of Return (SRR) do not take into account these non-monetary externalities as they are difficult to measure. This Chapter will consider measurements of the SRR for Australia and some of the externalities of higher education.

In Chapter Three, the decision making process of deciding whether an individual should pursue or not pursue higher education was discussed. The Human Capital Model suggests that an individual will invest in higher education when the Net Present Value (NPV) is greater than zero. However, an individual not only considers whether higher education is profitable but also considers the Private Rate of Return to higher education with alternative investments such as the rate of interest (Section 3.1). Investing in human capital is only worthwhile for an individual when the Private Rate of Return 'r' is greater than the rate of interest 'i'. Even though studies measuring the Private Rate of Return to higher education are valuable to individuals when making decisions, the Private Rate of Return to higher education alone does not provide efficient information concerning the contribution of the Government in higher education funding. In addition to the Private Rate of Return, it is equally important to measure the Social Rate of Return to higher education. The Social Rate of Return to higher education measures the return that society receives from investing in higher education. Australian studies measuring the Social Rate of Return to higher education are of use to policy makers who are then able to compare the Social Rate of Return to higher education with the returns on other investments.

Psacharopoulos (1995 p. 2) states:

> The Social Rate of Return summarises the costs and benefits of the educational investment from the state's point of view i.e., it includes the full resource cost of education, rather than only the portion that is paid by the recipient of education.

Psacharopoulos (1995 p. 4) states that the formula used to calculate the SRR to education is the exact formula that is used the calculate the PRR to education (3.1) except 'the main computational difference between Private and Social Rates of Return is that, for a Social Rate of Return calculation, the costs include the state's or society's at large spending on education'. According to Psacharopoulos (1995), the other computational difference between the two rates of return is gross earnings are used to calculate the SRR to education, whereas net earnings are used to calculate the PRR to education.

However, unlike the literature on the Private Rate of Return to higher education, there are only a small number of Australian studies that measure the Social Rate of Return to higher education and like the existing Australian literature measuring the Private Rate of Return to higher education, no Australian study has measured the Social Rate of Return to higher education for the 2005 HECS system. This Chapter will consider these studies and the methodologies for measuring the Social Rate of Return.

5.1 Studies measuring the Social Rate of Return to higher education in Australia

Prior to Borland et al. (2000), Miller (1982) was the only Australian study to measure both the Private Rate of Return (PRR) and Social Rate of Return (SRR) to higher education. Since the study by Borland et al. (2000) there have been two Australian studies measuring the SRR to higher education, Larkins (2001), and Junankar and Liu (2003), and an international study measuring the SRR to higher education for Australia by the Organisation for Economic Co-operation and Development (OECD, 2004).

5.1.1 Miller (1982)

As outlined in Chapter Three, the study by Miller (1982) was not only the first Australian study to measure the PRR for Australia's population as a whole, it was also the first Australian study to compare the PRR to higher education with the SRR to higher education. Miller (1982) measured both the PRR and SRR to higher education for different levels of educational attainment for both males and females, born overseas, and born in Australia using *1976 ABS Census data*. However, Miller (1982 p. 28) states the SRR to higher education measured in the study are 'social rates in a limited sense'. Miller (1982) makes this statement as the methodology employed by Miller in calculating the SRR to higher education is the same methodology as calculating the PRR to higher education with two adjustments. The first adjustment is made to the cost of education, where the cost to society of providing higher education is added to the costs facing the individual. The second adjustment is removing the subsidies and taxes on both the benefits and opportunity cost of higher education. Other than these two adjustments made to the PRR to higher education, no other variables are considered by Miller (1982) when measuring the SRR to higher education. Miller (1982) calculated the cost to society of providing higher education from the study by Smith (1975). The study by Smith (1975) measured the cost to society for providing different university courses, per student for 1969. However, because Miller (1982) was calculating the SRR to higher education for Australia's population as a whole, Miller weighted the cost of each discipline to determine the average costs to society for providing different levels of education attainment. Miller (1982) adjusted these costs to 1976 values using the composite index of consumer prices and average weekly earnings. The costs to society for providing higher education for each level of educational attainment are shown in Table 5.1.

Table 5.1 The average cost to society for providing higher education based on educational attainment

Level of educational attainment	Average cost to society
Diploma	$2022
Bachelor degree/graduate diploma	$2412
Higher degree	$4824

Source: Modified from Miller 1982

Miller (1982) argues that from the view point of society higher education is a profitable investment. This is supported by the findings in Table 5.2 that show the SRR is positive for all levels of education. The highest return for society is the return on graduate diplomas, except in the case of Australian born females, ranging from 14.45 percent for Australian born females to 20.00 percent for overseas born males. This differs from the PRR to different levels of higher education, as discussed in Chapter Three. The PRR to a graduate diploma was lower than the PRR to a bachelor degree for both males and females born overseas and in Australia (Table 5.2). This is possibly the result of a graduate with a graduate diploma earning on average more than a graduate with a bachelor degree, therefore paying a higher amount of tax. A higher amount of tax would reduce the PRR to a graduate diploma but at the same time increase the SRR to a graduate diploma (based on Miller's (1982) methodology). The SRR would also be higher for a graduate diploma than a bachelor degree, as not only is the graduate with a graduate diploma more likely to pay a higher amount of tax than a graduate with a bachelor degree, but also according to Miller (1982) the cost to society for an individual studying a graduate diploma is the same as the cost of an individual studying a bachelor degree. This suggests that it is more profitable for society for an individual to choose to study a graduate diploma, rather than a bachelor degree. In addition, Miller (1982) found that the SRR is greater for men than it is for women for all levels of higher education.

Table 5.2 The SRR for different levels of educational attainment

	Australian born male (%)	Overseas born male (%)	Australian born female (%)	Overseas born female (%)
Diploma	12.15	13.25	11.80	11.75
Bachelor degree	16.25	16.30	15.05	15.00
Graduate diploma	17.65	20.00	14.45	16.85
Higher degree	9.85	9.35	9.20	8.05

Source: Modified from Miller 1982

Miller's study (1982) showed that the PRR was higher than the SRR for all levels of educational attainment. As shown in Table 5.3, the SRR to a bachelor degree for an Australian born male is 4.85 percentage points lower than the PRR for the same degree. The difference between the PRR and SRR is even larger for Australian born females studying a bachelor degree with the SRR 6.15 percentage points lower than the PRR.

Table 5.3 The PRR and SRR for different levels of educational attainment

	Australian born male			Australian born female		
	PRR (%)	SRR (%)	diff (%)	PRR (%)	SRR (%)	diff (%)
Diploma	16.10	12.15	3.95	16.85	11.80	5.05
Bachelor degree	21.10	16.25	4.85	21.20	15.05	6.15
Graduate diploma	21.10	17.65	3.45	19.10	14.45	4.65
Higher degree	12.70	9.85	2.85	12.85	9.20	3.65

Source: Modified from Miller 1982

According to Miller (1982), these findings suggest that the education subsidies received by university students exceed the taxes that they pay. A PRR greater than a SRR suggests that the individual was gaining more from investing in human capital than society was. According to Borland et al. (2000 p. 2), Miller's (1982) findings:

> provided a rationale for cutting back on public expenditure per student on higher education and requiring individual's to make a greater personal contribution to the investment.

5.1.2 Borland, Dawkins, Johnson and Williams (2000)

The use of these estimates of the PRR and SRR in the current higher education environment is limited, since the study by Miller (1982) was conducted during the period of free higher education. No study previous to Borland et al. (2000) aimed to measure the impact of HECS on both the PRR and SRR to higher education. In order to measure the SRR to higher education Borland et al. (2000) drew upon the framework of Miller (1982), except the study by Borland et al. (2000) included the value of HECS receipts to the Government for the years 1995 to 1997 and the average weekly earnings for graduates and non-graduates were derived from *ABS Training and Education Experience Survey (TEES) 1997*. Borland et al. (2000) assume that students pay up-front band two level HECS to the value of $4215.80. Also differing from the study by Miller (1982), Borland et al. (2000) estimate the cost to the Government for providing a three year bachelor degree is $10,881. This cost to the Government is derived by dividing the operating grant by the total student funded load as estimated by DETYA, 1999. The benefit to the individual is the increase in earnings, whereas the benefit to society is the value of output minus the displacement effect (adjustment for

aggregate employment). Borland et al. (2000) found the SRR to a bachelor degree for a male was 16.5 percent for a three year degree, but if the individual undertakes a four year degree the SRR to a bachelor degree falls to 14.5 percent. These estimates of the SRR to a bachelor degree are consistent with the estimates in the study by Miller (1982). However, unlike the study by Miller (1982) who found the PRR to a bachelor degree for a male was 4.85 percent greater than the SRR for a bachelor degree for a male, Table 5.4 shows that the PRR to a bachelor degree for a male has not only fallen but is less than the SRR to a bachelor degree for a male. The SRR is 1.5 percentage points greater for a three year degree and 2.5 percentage points greater for a four year degree.

Table 5.4 The PRR and SRR for a three year and four year degree

	Australian born male		
	PRR (%)	SRR (%)	diff (%)
Three year bachelor degree	15.0	16.5	1.5
Four year bachelor degree	12.0	14.5	2.5

Source: Modified from Borland et al. 2000

Borland et al. (2000) argue the primary reason for the PRR falling below the SRR is the introduction of HECS. HECS not only increased the cost of study for university students, therefore reducing the PRR to higher education, but it also increased Government revenue therefore raising the SRR to higher education. These estimates by Borland et al. (2000) provide evidence to suggest that since the introduction of HECS, society is gaining more from their investment in higher education than university students. However, the estimates of the SRR to higher education in Table 5.4 are arguably the minimum rates of return to higher education. For example, the displacement effect is assumed to be 100 percent. According to Borland et al. (2000) if the displacement effect is assumed to be 100 percent, it assumes that the effect on employment is solely a source of private benefit. This assumes a university degree only benefits the individual by improving the probability that they will be employed. It does not consider that there may be a benefit to society whereby a person with a university degree can affect the overall level of employment for a nation. Borland et al. (2000 p. 14) argue:

> For example, the higher proportion of persons with a degree might allow the economy to shift away from production of goods that compete with low-wage labour countries

to production of goods that are intensive in high-skill labour with less product market competition.

Borland et al. (2000 p. 2) found that when the SRR to a bachelor degree is calculated with a displacement effect of 90 percent, that is, 'aggregate employment expands by one for every 10 persons who acquire a university degree', the SRR increases from 16.5 percent to 20.5 percent. If the displacement effect is 75 percent, then the SRR is even higher at 25.5 percent. This suggests considerable benefits to society in excess of those to the individual.

Apart from this, both studies assume all other external benefits to society from investing in higher education are zero. If other external benefits to society were measured, then the SRR to higher education would be even higher. Additional external benefits to society are considered in Section 5.3.

Another caveat of the study by Borland et al. (2000) is the time period for calculating the PRR and SRR of higher education. The aim of the study was to compare the impact of HECS on the PRR and SRR to higher education. However, the study by Borland et al. (2000) does not fall into a given time period, as the years 1995 to 1997 chosen by Borland et al. (2000) lie in between two time frames of higher education. In 1995 there was a flat rate of HECS and in 1996-97 a differential HECS system. A more useful approach to measuring the impact of HECS on the SRR and PRR to higher education would have been to calculate both the PRR and SRR to higher education for the two separate time frames. The transition period between the time frames would therefore impose difficulties when measuring the level of HECS a student would pay up-front. Borland et al. (2000) assume that the student pays band two level of HECS up-front, as estimated for the year 1996. This then makes it difficult to interpret whether the finding by Borland et al. (2000) that the PRR to higher education has fallen below the SRR to higher education, is the outcome of the Government introducing HECS to higher education or the higher charges students faced from the 1996-97 differential HECS system. Furthermore, as Borland et al. (2000) assumed the student started university in 1995 and entered the workforce in 1998, it is unrealistic to assume the student would pay band two level of HECS. Although the time frame chosen by Borland et al. (2000) is between 1995 and 1997,

those students who were enrolled in university prior to 1997 paid uniform HECS fees and were not affected by the differential HECS system introduced in 1997.

Another shortcoming of this study by Borland et al. (2000) is the SRR is calculated for a hypothetical individual using male income. Therefore, the estimates calculated by Borland et al. (2000) can only be compared to the estimates for a male calculated in the study by Miller (1982). Unlike Miller (1982), Borland et al. (2000) did not calculate the PRR and SRR for both males and females, nor calculate the rates of return for different levels of educational attainment. Therefore, this study does not provide a true picture of the impact of HECS on the SRR to higher education.

These limitations of the study are recognised by Borland et al. (2000). Borland et al. (2000 p. 2) state:

> In a future study we recommend looking at disaggregating graduates for example in discipline areas and by degree types [and] exploring more advanced methodologies for obtaining estimates.

Although the study by Borland (2002) follows these recommendations in providing new estimates for the PRR to higher education, including estimates for different levels of educational attainment and different fields of study, Borland (2002) does not measure the SRR to higher education.

5.1.3 Larkins (2001)

A more recent study that measures the SRR for disaggregated groups is the study by Larkins (2001). Larkins (2001) follows the framework of Borland et al. (2000) to measure the rates of return to higher education including following the same assumptions, that an individual will study at university for the years 1995 to 1997 and enter the workforce in 1998. However, unlike the study by Borland et al. (2000) that measures the SRR for a base case of assumptions, Larkins (2001) calculates the SRR for two broad categories of degrees, Science

and Technology degrees (S&T) and Humanities and Social Science degrees (H&SS)[43]. Following the approach of Miller (1982), Larkins (2001) also measures the SRR for different levels of educational attainment, including masters degrees and doctorates (PhD's). The study also claims to be different from both Borland et al. (2000) and Miller (1982) for it considers the differing costs of education and the variability of income earned by disciplines.

Larkins (2001) found the SRR for a three year S&T degree to be 12.1 percent and for a three year H&SS degree to be 11.7 percent. Although these estimates, shown in Table 5.5, suggest that it is still worthwhile for society to invest in higher education (as it is higher than the real rate of return on interest as discussed in Chapter Four), these estimates are significantly lower than the estimates by both Miller (1982) and Borland et al. (2000) at 16.25 percent and 16.50 percent respectively.

Table 5.5 The SRR for a three year S&T and H&SS degree

	Three year degree		Four year degree	
	S&T	H&SS	S&T	H&SS
Social Rate of Return	12.1	11.7	8.9	8.7
Private Rate of Return	20.1	13.7	15.0	10.3

Source: Modified from Larkins 2001

Also differing from the study by Borland et al. (2000) which found the SRR to a four year bachelor degree to be two percentage points lower than the SRR to a three year bachelor degree, Larkins (2001) found that the SRR would decline between 3.2 percentage points and three percentage points for a four year bachelor degree depending on whether it was a S&T degree or a H&SS degree. These estimates suggest that there is a greater gap between the return on society's investment in a three year degree compared to a four degree, than the study by Borland et al. (2000) indicated. The findings in Table 5.5 also suggest that it is more profitable for society to invest in S&T degrees rather than H&SS degrees.

The most contrasting results between the study by Borland et al. (2000) and the study by Larkins (2001) are the comparison between the PRR and SRR to higher education. Despite

[43] The S&T degrees include agriculture, engineering, surveying, health science and veterinary science and H&SS degrees include arts, humanities, social sciences, business, administration, economics, education, law and legal studies.

both studies measuring the rates of return for the same time period, Larkins (2001) found that for all four scenarios, shown in Table 5.5, the PRR was greater than the SRR to higher education. This differs from the study by Borland et al. (2000) who argued that the reason for the fall in the PRR to a level below the SRR was the introduction of HECS. The study by Larkins (2001) suggests that the introduction of HECS has had minimal impact on the PRR to higher education. Larkins (2001) findings suggest that the PRR to a bachelor degree has fallen since the study by Miller (1982), but the PRR has not declined that greatly to be lower than the SRR.

Not only did the study by Larkins (2001) find that the SRR to a bachelor degree was significantly lower than the estimates by both Miller (1982) and Borland et al. (2000), Larkins (2001) also found that the SRR to higher degrees was lower than the estimates by Miller (1982). Miller (1982) found that the SRR to higher degrees for males was 9.85 percent and for females 9.20 percent. Larkins (2001) found that the SRR for higher degrees was between 5.2 percent and 7.2 percent, as shown in Table 5.6. Larkins (2001) also found that the SRR was larger for H&SS higher degrees than S&T higher degrees. This differs to the SRR to bachelor degrees.

Table 5.6 The SRR for masters and PhD degrees

	Masters degree		PhD	
	S&T	H&SS	S&T	H&SS
Social Rate of Return excluding spillover	5.2	7.2	5.2	6.2
Social Rate of Return with spillover	9.0	9.9	11.1	10.7

Source: Modified from Larkins 2001

The study by Larkins (2001) is unique for it is the first Australian study to measure the SRR for higher research degrees allowing for the spillover effect of research and development on Gross Domestic Product. Larkins (2001) found that if the spillover effect is included when calculating the SRR for higher degrees then the SRR increases for both masters degrees and PhD's. For example, Table 5.6 shows that the SRR would increase from 5.2 percent to 11.1 percent for S&T PhD's and from 6.2 percent to 10.7 percent for H&SS PhD's. Larkins (2001)

found that these estimates for a PhD are not only higher than the SRR for a masters degree but are also higher than the SRR for a four year bachelor degree.

Despite the attempt by Larkins (2001) to assess the rates of return for disaggregated groups, the findings in the study by Larkins (2001) are both difficult to interpret and difficult to compare to previous studies as they measure the SRR for two broad categories of degrees, S&T and H&SS degrees. Firstly, Larkins (2001) findings suggest that it is more worthwhile for both an individual and society to invest in a S&T bachelor degree rather than a H&SS bachelor degree. However, these results are not conclusive, as later findings, such as Borland (2002), suggest that the PRR is the lowest for science. The categories S&T and H&SS are so broad, as graduates can study a range of degrees and graduates can be employed in a range of fields, that it is misleading to provide a single PRR and SRR for each broad category of degree. Furthermore, Larkins (2001) assumes that the individual studying either a science or technology degree will earn for 1998 the starting salary of a Chemist at $53,000, estimated by the Royal Australian Chemical Institute (RACI) (1999). It cannot be assumed that a graduate who studies a science or technology degree will on average earn $53,000, and it is also inaccurate to assume that a graduate who has undertaken a H&SS degree will earn 10 percent less than a graduate with a S&T degree. Larkins (2001 p. 407) does not derive the income of a graduate who studied a H&SS degree from any statistical source, rather 'for this study H&SS graduate salaries are assumed to be 10 percent less than S&T graduate salaries'. These estimates are not only inconclusive but could also explain why the rates of return are higher for S&T degrees than H&SS degrees. It could also explain why Larkins's (2001) estimate for the PRR to a three year S&T bachelor degree is 5.1 percentage points higher than the Borland et al. (2000) estimate of the PRR to a bachelor degree.

Another caveat of this study is the claim by Larkins (2001) that this study is different to previous studies in that it considers the differing costs of education when measuring the SRR for the two broad categories of degrees. Although Larkins (2001) assumes that the student will study at university between 1995 and 1997, unlike Borland et al. (2000) who assumed students paid band two level of HECS, Larkins (2001) did not measure the effects of the 1996-97 differential HECS system on the rates of return. Larkins (2001) considers that, because

graduates are enrolled in 1995, the 199697 differential HECS system does not apply to the private cost of study. This means that Larkins's (2001) claim that the study will consider differing costs of education is misleading when the variations in the cost of study are limited to the length of the degree. Larkins (2001) assumes that all students pay $4004 per year regardless of the discipline that they are studying. The only variation in the cost of study is between a three year bachelor degree and four year bachelor degree with the total cost of HECS for the degree at $12,012 and $16,016 respectively. The differences in HECS fees are a valid reason why the rates of return to a bachelor degree are different between the two studies. It could then be argued that the differential HECS system is a possible reason for the SRR to a bachelor degree to be 4.4 percentage points higher in the study by Borland et al. (2000) than the study by Larkins (2001).

In addition, Larkins (2001) assumes that students forgo an income to the value of $6000 per annum not $8421 per annum, assumed by Borland et al. (2000). The reason for the difference in the level of forgone earnings is Larkins adjusts forgone earnings for Austudy, scholarship awards, part-time earnings and the probability of a high school graduate being employed (Cabalu, Kenyon and Koshy, 2000). Therefore, Larkins (2001) assumes that both the income a student forgoes and the HECS fees they pay are lower than that estimated by Borland et al. (2000). This in turn lowers the opportunity cost for the individual while studying, consequently raising the PRR to higher education, while at the same time lowering the SRR to higher education.

5.1.4 Junankar and Liu (2003)

In addition to these three studies suggesting that it is worthwhile for society to invest in higher education, Junankar and Liu (2003) measured the SRR to higher education for both Indigenous Australians and non-Indigenous Australians. Junankar and Liu (2003) measure the SRR to a three year bachelor degree and four year bachelor degree for both Indigenous Australians and non-Indigenous Australians for 1991. Although the study by Junankar and Liu (2003) follows the framework of Borland et al. (2000), the study differs from all previous Australian studies measuring the SRR to higher education as it calculates external benefits

other than the value of output when measuring the return to society. Previous Australian studies do not measure other external benefits to society, such as greater life expectancy and lower crime that result from individuals investing in human capital. Junankar and Liu's (2003) measurement of the SRR to higher education for Indigenous Australians includes calculating the life expectancy, employment probability and the cost of imprisonment for Indigenous Australians, when calculating the benefits to society from investing in higher education. Junankar and Liu (2003) estimate the income a graduate receives with varying levels of education from the *ABS Census of Population and Housing 1991*.

Table 5.7 shows that there is no real difference in the SRR to a three year bachelor degree and four year bachelor degree for both Indigenous males and non-Indigenous males in the basic model. However, this is not the case for females where the SRR to both a three year bachelor degree and four year bachelor degree is higher for Indigenous females than it is for non-Indigenous females. The SRR for Indigenous females is 4.6 percentage points higher than the return for non-Indigenous females for a three year bachelor degree and 4.1 percentage points higher than the return for non-Indigenous females for a four year bachelor degree.

Table 5.7 The SRR to a three year and four year bachelor degree for both Indigenous and non-Indigenous Australians

	Male		Female	
	Three year bachelor degree	Four year bachelor degree	Three year bachelor degree	Four year bachelor degree
Non-Indigenous Australians	18.1	18.9	8.9	10.9
Indigenous Australians	18.2	18.8	13.5	15.0
Indigenous Australians[a]	19.1	21.0	15.5	17.6

a The Social Rate of Return is adjusted for employment probability, life expectancy and the cost of crime.

Source: Modified from Junankar and Liu 2003

A limitation of comparing these estimates is the assumption that both Indigenous Australians and non-Indigenous Australians have the same opportunities in life. Junankar and Liu (2003) argue Indigenous Australians suffer severe disadvantages in society such as lower employment, lower incomes, poorer housing and higher mortality rates. Therefore, Junankar

and Liu (2003) suggest that the true benefits to society from educating Indigenous Australians are masked, if the SRR to higher education is calculated using the same basic principles as for an average non-Indigenous Australian. According to Junankar and Liu (2003) when the SRR to a three year bachelor degree for Indigenous Australians is adjusted for employment probability, a life expectancy of 44 years of age, and the cost of imprisonment, the SRR for Indigenous males is 19.1 percent and for Indigenous females it is 15.5 percent. If Indigenous Australians study a four year bachelor degree, the return to society increases by 1.9 percentage points for males and 2.1 percentage points for females. The return to society from educating Indigenous males is no longer the same as the return for non-Indigenous males, with the return to society between 1.0 to 2.1 percentage points higher, than the return for non-Indigenous males. The return to society for educating Indigenous females is also higher with the return up to 74 percent greater than the return to society from educating non-Indigenous Australians.

These findings by Junankar and Liu (2003) provide evidence to suggest that it is not only worthwhile for society to invest in higher education but it is also worthwhile for society to particularly invest in the education of Indigenous Australians. Junankar and Liu (2003 p. 170) state that investing in the education of Indigenous Australians will 'lead to better nutrition, better living conditions, access to health services and hence a longer and healthier life (increased life expectancy)'.

Even though the findings by Junankar and Liu (2003) support the findings of all previous Australian studies that SRR to higher education is positive, a positive rate of return for society is not sufficient evidence to suggest that the Government should invest more in higher education. Human Capital Theory states that unless the SRR to higher education is greater than the return on alternative investments it is not worthwhile for society to invest in higher education. However, Junankar and Liu (2003) argue that the return to society was not only positive but greater than the return on alternative investments. At the time of the study, 1991, the return on public projects was eight percent. Junankar and Liu (2003) argue that this is lower than the lowest return to society for investing in highest education at 8.9 percent for non-Indigenous females studying a three year bachelor degree. Junankar and Liu (2003) argue the return on public projects is less than half the return that society would have received from

investing in a four year bachelor degree for Indigenous Australians. Despite these findings that suggest that society, in 1991, was already gaining higher returns from their investment in higher education, the Government continued to raise the level of HECS fees and shift the cost of higher education away from the Government to students.

5.1.5 The OECD (2004)

A more recent study, that calculates both the SRR and PRR to higher education in Australia based on gender, is the international study by the OECD (2004). The aim of the study is to assess whether it was worthwhile for an individual to have a mid-life career change. The OECD (2004 p. 168) argue these 'calculations are relevant to current policy concerns regarding the encouragement of lifelong learning in many OECD member countries'. The OECD use the same formula as Borland et al. (2000) (Formula 3.1) to calculate the Private Rates of Return to higher education, except the OECD (2004) measure the rates of return for 2001 not 1998 and assume the hypothetical individual undertakes a university degree at 40 years of age not 18 years of age. The Social Rates of Return calculated by the OECD (2004) and Borland et al. (2000) are based on the formula in Figure 5.1.

The OECD (2004) found that the PRR to higher education in Australia for males was 3.3 percent and for females -0.8 percent, while the SRR to higher education in Australia was 5.5 percent for males and 1.7 percent for females (Table 5.8). These estimates not only suggest that it is more beneficial for society than for an individual in Australia to have a mid-life career change but they also suggest that for a female there is a negative return for investing in a mid-life career change. Table 5.8 shows that females in Australia are the only individuals, out of the eight countries studied by the OECD (2004), to experience a negative return on their investment in higher education.

Figure 5.1 The OECD method of calculating the social costs and social benefits of education

Private costs =	Forgone earnings + direct private expenditures + increased future taxes
Public costs =	Lost tax receipts during the training + public expenditures
Social costs =	Private costs + public costs
Private benefits =	Increases in earnings + higher probability of being employed
Public benefits =	Additional tax receipts
Social benefits =	Private benefits + public benefits

Source: Modified from the OECD 2004

Table 5.8 The PRR and SRR for both males and females for eight OECD countries

Country	Private Rate of Return		Social Rate of Return	
	Male	Female	Male	Female
Australia	3.3	-0.8	5.5	1.7
Denmark	4.9	3.0	2.7	0.2
Finland	10.6	8.1	8.6	5.4
Hungary	16.4	8.7	13.4	6.6
Spain	11.2	8.2	10.2	6.2
Sweden	6.9	4.5	6.5	3.9
United Kingdom	4.0	9.9	6.2	10.3
United States	7.4	2.7	8.0	3.2

Source: Modified from the OECD 2004

Table 5.8 also shows that the PRR for males in Australia is the lowest out of the eight countries and the SRR for both males and females in Australia is the second lowest. One possible reason for the low rates of returns to education for Australia is the relatively higher contribution made by the individual compared to the Government towards the cost of higher education (refer to Table 1.8). According to the OECD (2004), Australia was ranked fourth out of all OECD nations for private expenditure as a proportion of total expenditure on tertiary

education for 2001. However, in comparison to all other OECD nations, Australia experienced the greatest increase in private expenditure as a proportion of total expenditure on tertiary education between the years 1995 and 2001. Private expenditure as a proportion of total expenditure on tertiary education in Australia increased 13.5 percentage points from 35.2 percent in 1995 to 48.7 percent in 2001.

The OECD (2004) estimates of the PRR and SRR to higher education in Australia are so low that the rates of return to higher education would be lower than the returns on other investments. This suggests that it is neither a worthwhile investment for an individual or for society for a person of 40 years of age or older to choose to invest in a university education. However, caution needs to be taken with interpreting these estimates as they are for a hypothetical individual investing in a university education at 40 years of age. An individual investing in their human capital at 40 years of age will have a shorter working life to benefit from their investment compared to for example, an individual of 18 years of age. Therefore, these estimates of the PRR and SRR are significantly lower than those of previous Australian studies. In addition the hypothetical individual was assumed to enter university at 40 years of age and as result the PRR and SRR for women are atypically lower than the PRR and SRR for men.

A significant caveat of these five studies above is the approach they use to measure the return that society receives from their investment in higher education. To derive the SRR to higher education they had combined both the costs and benefits of higher education for the individual with the costs of benefits of higher education for society.

If the benefits and costs to the individual are included when calculating the SRR, that is the PRR forms the basis of calculating the SRR to higher education, then this approach does not precisely measure the rate of return that taxpayers' receive from investing in higher education. Psacharopoulos (1975) argues that the PRR will be higher than the SRR when calculating the SRR this way, as the subsidies by the Government towards the cost of higher education are so large that they reduce the SRR. However, the estimates in the study by Borland et al. (2000) show that this is no longer the case for higher education in Australia. Borland et al. (2000) found that the PRR has fallen below the SRR to higher education since HECS was introduced.

The findings in the studies by Borland et al. (2000) and the OECD (2004) suggest that any study that uses this approach to measure the return to society for the time periods, 1996-97 differential HECS system or 2005 HECS fee increases is likely to find the SRR is greater than the PRR.

The overall results of the five studies (Table 5.9) show that the PRR and SRR vary with the assumptions made and the level of university fees. They do suggest that if common assumptions, similar to Borland et al. (2000), were followed that the PRR has fallen with the increase in HECS fees and changes in the Government contribution to higher education and the SRR had increased.

5.9 Summary table of the SRR and PRR for higher education in Australia

Features of the study	Data source	Assumptions	PRR	SRR
Miller (1982) - Measured for 1976 - Male and female - Born overseas and in Australia - Different levels of educational attainment	ABS Census 1976	- Individual commences university at 18 years of age - Direct costs to the student $275 p.a. - Cost to society for a bachelor degree $2412 p.a.	Australian born male 21.10% Australian born female 21.20%	Australian born male 16.25% Australian born female 15.05%
Borland et al. (2000) - Measured for 1997 - Male - Three year and four year bachelor degree	ABS TEES 1997	- Band two level of HECS up-front - Male income - Individual commences university at 18 years of age - Retire at 60 years of age - Total cost to the Government for a bachelor degree is $10,881 p.a. - Direct costs to the student $1100 p.a. - Students forgo $8421 p.a. while studying	Three year bachelor degree 15.0% Four year bachelor degree 12.0%	Three year bachelor degree 16.5% Four year bachelor degree 14.5%
Larkins (2001) - Measured for 1997 - Male - Different levels of educational attainment	Royal Australian Chemical Institute (RACI) 1999	- Two broad fields of qualifications (S&T and H&SS) - S&T yearly salary assumed to be $53,000 - H&SS graduates earn 10% less per year than S&T graduates	S&T three year bachelor degree 20.1% H&SS three year bachelor degree 13.7% S&T four year bachelor degree 15.0%	S&T three year bachelor degree 12.2% H&SS three year bachelor degree 11.7% S&T four year bachelor degree 8.9%

5.9 Summary table of the SRR and PRR for higher education in Australia (contd.)

Features of the study	Data source	Assumptions	PRR	SRR
		-Flat rate of HECS at $4004 p.a. -Students forgo $6000 p.a. while studying	H&SS four year bachelor degree 10.3%	H&SS four year bachelor degree 8.7%
Junankar and Liu (2003) - Measured for 1991 - Male and female - Indigenous and non-Indigenous Australians - Different levels of educational attainment	ABS Census of Population and Housing 1991.	- Individual commences university at 18 years of age - Adjustments for employment probability, life expectancy and the cost of crime	Non-Indigenous male three year bachelor degree 19.6% Indigenous male three year bachelor degree (adjusted) 20.9% Non-Indigenous female three year bachelor degree 12.4% Indigenous female three year bachelor degree (adjusted) 16.7%	Non-Indigenous male three year bachelor degree 18.1% Indigenous male three year bachelor degree (adjusted) 19.1% Non-Indigenous female three year bachelor degree 8.9% Indigenous female three year bachelor degree (adjusted) 15.5%
The OECD (2004) - Measured for 2001 - Male and Female - Eight OECD countries - Bachelor degree	ABS Survey of Education and Training 1997	- Individual is assumed to start university at 40 years of age	Male 3.3% Female -0.8%	Male 5.5% Female 1.7%

5.2 Studies measuring the real net benefit to the Government and the Government Rate of Return (GRR) to higher education in Australia

The studies discussed in Section 5.1 measure the SRR to higher education. These studies measure the net benefit to society from both private and public investments in higher education. In addition to these studies are studies that measure the real net benefit to the Government and Government Rate of Return (GRR) to higher education. These studies differ to those measuring the SRR to higher education in that they calculate the costs and benefits of higher education from public investment only. That is, they do not combine the costs and benefits of higher education accumulating to the individual with the costs and benefits of higher education for society, when measuring the return on higher education to the Government.

5.2.1 Borland, Dawkins, Johnson and Williams (2000)

In addition to measuring the SRR to higher education, Borland et al. (2000) measure both the real net benefit of higher education to the Government and the Government Rate of Return (GRR) to higher education. Borland et al. (2000 p. 30) argue:

> One of the goals of Government is to enact and pursue policy on behalf of society to maximise the social return. Consequently the social return might be seen as the Government's policy goal. However Government is also conscious of the need to balance its budget so a shorter term concern is the implications of Government spending on education for its balance sheet.

Therefore, Borland et al. (2000) suggest that it is important to measure the return on the Government's investment in higher education, in order to suggest policy recommendations on higher education funding. The first approach that measures the Government's return on their investment in higher education is the balance sheet approach, which calculates the real net benefit. Borland et al. (2000) construct a time series of Government expenditure and revenue for the years 1981-82 to 1996-97 and then make projections for the years 2001-02 and 2010-

11. The real net benefit to the Government measures the difference between the Government's outlays and receipts from higher education. Borland et al. (2000) calculate total Government outlays for higher education as Government expenditure on teaching plus the cost to the Government for providing social support payments, such as youth allowance. Government expenditure on teaching is calculated as current spending plus capital spending (total spending) minus the research expenditure of universities, derived from *ABS Research and Experimental Development, Higher Education Organisations, Australia 2002*. Borland et al. (2000) argue that Government expenditure on higher education should only refer to the cost of teaching and not the cost of both teaching and research, as it is unknown what value the expenditure on research has upon the return on a bachelor degree. For the projected years 2001-02 and 2010-11 expenditure was assumed to be the same as for the years 1996-97. It can be seen in Table 5.10 that total expenditure on higher education has increased in every time period, except for the year 1996-97 when the differential HECS system was introduced. During 1996-97 both Government expenditure on teaching and social support payments decreased.

Table 5.10 Government expenditure on higher education for selected years ($ millions)

Year	Total spending [a]	Research expenditure	Spending on teaching	Social support payments	Total expenditure
1981-82	1984.0	443.5	1540.5	166.0	1706.5
1989-90	4130.0	1204.8	2925.2	488.0	3413.2
1990-91	4619.0	1332.8	3286.2	625.0	3911.2
1995-96	6785.0	2068.6	4716.4	910.0	5626.4
1996-97	6874.0	2307.6	4566.4	892.0	5458.4
2001-02	6874.0	2307.6	4566.4	892.0	5458.4
2010-11	6874.0	2307.6	4566.4	892.0	5458.4

a Total spending equals current spending plus capital spending

Source: Modified from Borland et al. 2000

Borland et al. (2000) calculate the total revenue to the Government as the sum of increased personal income tax, increased indirect tax and HECS repayments. Borland et al. (2000) calculate the increased personal income tax the Government receives as the wage premium for a given year multiplied by the marginal rate of tax for that year, multiplied by the number of graduates in the workforce in a given year (Table 5.11). Borland et al. (2000) measure the

wage premium as the difference between average weekly earnings for persons with a bachelor degree, with the average weekly earnings for persons without a bachelor degree.

Table 5.11 Government revenue from investing in higher education for selected years ($ millions)

Year	Increased personal income tax	Increased expenditure tax	HECS repayments	Total revenue
1981-82	1231	173	0	1404
1989-90	2995	419	28	3442
1990-91	3430	450	61	3941
1995-96	5574	811	300	6685
1996-97	6298	879	356	7533
1997-98	6630	927	425	7983
2001-02	6630	927	715	8273
2010-11	6630	927	1500	9058

Source: Modified from Borland et al. 2000

In addition to the higher personal income tax revenue the Government receives from workers with a bachelor degree, the Government receives revenue from taxes on expenditure. Borland et al. (2000) estimate that the extra revenue the Government receives from the expenditure of workers with a bachelor degree is equal to 10 percent of the difference in disposable income. Since HECS was introduced in 1990 the Government has also received additional revenue from their investment in higher education in the form of HECS repayments. Borland et al. (2000) derive the revenue the Government receives from HECS repayments from the study by DETYA (2000), who calculate the Government's income each year from students, who paid their HECS fees up-front, with the repayments the Government receives from those students who deferred their HECS loan. Table 5.12 shows that HECS repayments as a proportion of Government expenditure on teaching will increase over time, to 33 percent for 2010-11. However, the percentage of HECS repayments as a proportion of Government expenditure on teaching for the year 2010-11 is most likely to be higher than 33 percent, as since 2005 most universities in Australia increased HECS fees by an additional 25 percent.

Table 5.12 HECS repayments as a proportion of Government expenditure on teaching for selected years

Year	HECS repayments $ (millions)	Spending on teaching $ (millions)	HECS repayments as proportion of Government expenditure on teaching (%)
1981-82	0	1540.5	0
1989-90	28.0	2925.2	1
1990-91	61.0	3286.2	2
1995-96	300.0	4716.4	6
1996-97	356.0	4566.4	8
2001-02	715.0	4566.4	16
2010-11	1500.0	4566.4	33

Source: Modified from Borland et al. 2000

However, HECS repayments are only one source of Government revenue from higher education. Table 5.13 shows the real net benefit to the Government's investment in higher education. The real net benefit is the net benefit to the Government deflated by the Consumer Price Index (CPI).

Table 5.13 Real net benefit to the Government for selected years ($ millions)

Year	Total expenditure	Total revenue	Net benefit	CPI	Real net benefit
1981-82	1404	1707	-302	0.454	-666
1989-90	3442	3413	29	0.831	34
1990-91	3914	3911	29	0.875	34
1995-96	6685	5626	1058	0.987	1073
1996-97	7533	5458	2074	1.000	2074
1997-98	7983	5249	2734	1.012	2701
2001-02	8273	5249	3024	1.012	2988
2010-11	9058	5249	3809	1.012	3764

Source: Modified from Borland et al. 2000

Borland's et al. (2000) findings suggest that the real net benefit to the Government for 1997-98 is in excess of $2.7 billion. For the year 1997-98, the benefit to the Government was 1.5 times the cost of investing in higher education. The findings by Borland et al. (2000) indicate that the Government is profiting from their investment in higher education. This would be of importance to policy makers, if according to Borland et al. (2000) the Government is conscious of the need to balance its budget. Even though Borland et al. (2000) estimate that this figure will grow to $3.8 billion in the year 2010-11, they argue that this figure is most likely underestimated. Borland et al. (2000 pp. 39-40) state:

> It is likely that the value of higher education will have flow-on benefits for non-graduates and that their incomes will rise as a consequence leading to further sources of tax revenue for the Government.

The second approach that Borland et al. (2000) used to calculate the Government's return on their investment in higher education is the Government Rate of Return (GRR). Borland et al. (2000) calculate the PRR and GRR using Formula 3.1 except the rates of return are calculated for a new cohort of students who commence in 1999. The assumptions for the base case are:

- the wage premium for individuals with a bachelor degree is 54 percent;
- 80 percent of higher earnings are attributed to a university education;
- 85 percent of graduates undertake full-time employment;
- indirect tax equals 10 percent of disposable income;
- the cost to the Government for providing higher education is the Government expenditure on teaching.

Borland et al. (2000) found that for the base case of assumptions the GRR to higher education is greater than the PRR to higher education at 13 percent and 12 percent respectively (Table 5.14).

Borland's et al. (2000) findings suggest that even if policy makers preferred the GRR to the SRR, the return to the Government's investment in higher education is still greater than the return the individual receives. These findings by Borland et al. (2000) also suggest that the 2005 increases in HECS will both increase the real net benefit the Government receives from investing in higher education and will broaden the gap further between the GRR and PRR. The estimates in Table 5.14 suggest that the Government is not only profiting from their investment in higher education but also under allocating resources to higher education.

Table 5.14 The GRR and PRR for various scenarios

Assumption	Private (%)	Government (%)
Base case	12	13
Base case except:		
- peak graduate markup is 27 percent[a]	6	8
- peak graduate markup is 80 percent[b]	16	17
- the cost to the Government includes the cost of research	12	8
- there are zero indirect taxes	12	13
- 70 percent of graduates are in full-time employment	12	11

a University graduates receive average weekly earnings 27 percent higher than non-university graduates

b University graduates receive average weekly earnings 80 percent higher than non-university graduates

Source: Modified from Borland et al. 2000

However, a shortcoming of these calculations is the assumption that the cost to the Government of providing higher education is the cost of expenditure on teaching only. Table 5.14 shows that when the total cost to the Government of providing higher education is used to calculate the GRR, the GRR falls five percentage points, from 13 percent to eight percent. On the contrary, it is difficult to measure the return on a bachelor degree from Government expenditure on research, as universities conduct numerous activities within research, such as debate on public policy and spend a considerable amount of their research income on higher education students. The inability to measure the return on research for a bachelor degree would then underestimate the return the Government receives.

The findings of Borland et al. (2000) also show that, unlike the balance sheet approach which measures the real net benefit to the Government by subtracting total Government expenditure on higher education from total Government revenue from higher education, the rates of return are not affected by indirect taxes. Table 5.14 shows that even when indirect taxes are assumed to be zero the rates of return are the same.

5.2.2 Larkins (2001)

The study by Larkins (2001) also measures the real net benefit to the Government's investment in higher education using the balance sheet approach. However, Larkins does not conduct a time series study but rather measures the real net benefit to the Government of investing in higher education in 1997. The study by Larkins (2001) also differs from the study by Borland et al. (2000) as Larkins measures the real net benefit to the Government for two broad categories of degrees, S&T and H&SS degrees.

Larkins (2001) calculates the cost to the Government of providing higher education by, firstly calculating the relative teaching cost for both three year and four year S&T and H&SS degrees (Table 5.15). The relative teaching costs for each of the broad categories of degrees are calculated as the sum of the weighted relative cost for each course within the broad category of degree, derived from the Relative Funding Model (Baldwin, 1990). These relative teaching weights are then multiplied by the course lengths to give the Weighted Course Costs (WCU) for each of the broad categories of degrees. Larkins (2001) estimates that the cost per WCU is $11,515, derived from DETYA (1999). Unlike Borland et al. (2000), Larkins (2001) does not include Government expenditure on social support payments to students.

Table 5.15 Government expenditure on higher education for 1997

Award course	Relative teaching cost (weight)	Course length (years)	Weighted Course Costs (WCU)	Cost to Government ($)
H&SS	1.15	3	3.45	75,996
S&T	2.20	3	6.60	39,725
H&SS	1.15	4	4.60	101,328
S&T	2.20	4	8.80	52,967

Source: Modified from Larkins 2001

Larkins (2001) considers the same sources of revenue to the Government as Borland et al. (2000), except the value of HECS repayments are calculated differently. Larkins (2001) assumes that students, regardless of which course they study, will pay the same HECS fees at $4004 per annum. The cost of studying at university changes only by the length of the degree.

Therefore, the total HECS repayments for a three year degree are $12,013 and for a four year degree are $16,018.

Table 5.16 Government revenue from higher education for 1997 ($)

	Three year degree		Four year degree	
Revenue	S&T	H&SS	S&T	H&SS
HECS repayments	12,013	12,013	16,018	16,018
Annual gross income differential	14,954	9654	15,372	10,030
NPV of income differential (5% discount rate)	256,597	165,654	261,586	170,681
NPV of income tax on income differential	102,639	66,262	104,634	68,272
NPV to individual of income differential after tax and costs[a]	120,945	66,379	112,934	58,391
Increased tax on expenditure[b]	12,094	6637	11,293	5839
Total Government revenue[c]	126,747	84,912[d]	131,946	90,129

a Equal to NPV income differential minus income tax and private degree costs at $33,013 for a three year degree and $44,018 for a four year degree

b Equal to 10 percent of NPV to individual of income differential after tax and costs

c Equal to the sum of the value of HECS repayments with the NPV of income tax on the income differential with the value of increased tax of expenditure

d This is a rounding adjustment for the total Government revenue is $84,913 not $84,912

Source: Modified from Larkins 2001

This differs from the study by Borland et al. (2000), as Borland did not assume that the Government would receive the total amount of HECS fees that students were charged. Borland et al. (2000) referred to the study by DETYA (2000) which considers the lag time involved with HECS repayments. Larkins (2001) also calculates the net present value of personal income tax differently to the study by Borland et al. (2000). Larkins (2001) measures the additional personal income tax revenue the Government receives from workers with a bachelor degree as 40 percent of the net present value of the income differential, whereas Borland et al. (2000) measures the additional personal income tax revenue the Government receives from workers with a bachelor degree as the wage premium, multiplied by the marginal rate of tax, multiplied by the number of graduates in the workforce for 1996-97.

However, consistent with Borland et al. (2000), Larkins (2001) also assumes that increased tax on expenditure is equal to 10 percent of the net present value of the income differential.

Larkins (2001) found that the real net benefit to the Government for 1997 ranged between $30,617 for a four year S&T degree to $50,750 for a three year S&T degree. These estimates by Larkins (2001), shown in Table 5.17, support the finding by Borland et al. (2000) that the Government profited from investing in higher education in 1997.

Table 5.17 The real net benefit to the Government's investment in higher education for 1997 ($)

	Three year degree		Four year degree	
	S&T	H&SS	S&T	H&SS
Total Government revenue	126,747	84,912	131,946	90,129
Total Government expenditure	75,996	39,725	101,328	52,967
Real net benefit (5% discount rate)	50,750	45,188	30,617	37,162
Real net benefit (4% discount rate)	68,867	56,884	48,773	49,008

Source: Modified Larkins 2001

Larkins (2001) findings suggest that, the Government's return from investing in higher education ranges from 1.3 times the cost of providing higher education for a four year S&T degree to 2.1 times the cost of providing higher education for a three year H&SS degree. However, when the real net benefit is discounted by four percent to be consistent with the study by Borland et al. (2000), then the Government's return from investing in higher education ranges from 1.5 times to 2.4 times the cost of providing higher education. Larkins (2001 p. 409) states that 'these results are broadly consistent with the undifferentiated finding obtained by Borland et al. (2000)'. However, Borland et al. (2000) did not disaggregate their findings, instead the real net benefit for 1997-98 is the overall return the Government received from investing in higher education, estimated to be 1.5 times the cost of providing higher education. Larkins's (2001) results suggest that this is the minimum return the Government received on their investment in higher education. A possible reason for the differences in returns between these two studies is that Borland et al. (2000) had calculated social support payments when calculating total Government outlays. Nevertheless, both studies suggest that

the Government's investment in higher education in 1997 returned considerably more than the minimum return required to break-even.

5.2.3 Johnson and Wilkins (2002)

Johnson and Wilkins (2002) also aimed to establish the fiscal position of the Government in regards to higher education. However, the study by Johnson and Wilkins (2002) differs from those of Borland et al. (2000) and Larkins (2001) for they measure both the real net benefit to the Government and the Government Rate of Return (GRR) for eight different fields of study[44]. Even though the study by Borland et al. (2000) measured both the real net benefit and GRR for higher education, this was for higher education as a whole. The study by Larkins (2001) measured the real net benefit to the Government for two broad categories of degrees but did not calculate the rate of return to the Government for various disciplines.

Similar to the study by Borland et al. (2000), Johnson and Wilkins (2002) also conduct a time series study to measure the real net benefit to the Government from investing in higher education. In order to measure the real net benefit to the Government for the years 1989-90 to 2010-11, Johnson and Wilkins (2002) build upon the framework of Borland et al. (2000). However, unlike Borland et al. (2000) who made predictions for the years 2001-02 and 2010-11 based on data for the year 1996-97, Johnson and Wilkins (2002) make predictions for the years 2000-01, 2001-02, and 2010-11 based on data for the year 1999-2000. Also differing from Borland et al. (2000), Johnson and Wilkins (2002) measure the real net benefit to the Government for the following eight fields of study:

- Administration, Business and Law
- Education
- Health

[44] Johnson and Wilkins (2002) name the real net benefit to the Government and GRR as the current net benefit and cohort net benefit. They make these distinctions as the current net benefit refers to the contemporaneous cost and revenue to the Government for higher education for a given year, whereas the cohort net benefit refers to the cost and lifetime benefits attached to a particular cohort of students.

- Science
- Agriculture and related fields
- Engineering
- Architecture and related fields
- Social Sciences, Arts, Humanities

Johnson and Wilkins (2002) follow Borland's et al. (2000) method for calculating the cost of higher education, that being, total Government spending on universities minus expenditure on research plus Government outlays on social support payments. Johnson and Wilkins (2002) calculate the cost to the Government per discipline based on both the number of students enrolled in each field of study and the student to staff ratio. That is, Johnson and Wilkins (2002) assume that the cost of higher education per student to the Government is directly proportional to the student to staff ratio.

Johnson and Wilkins (2002) also follow Borland et al. (2000) by measuring the total revenue the Government receives from investing in higher education (the sum of increased personal income tax, increased tax on expenditure and HECS repayments), except Johnson and Wilkins (2002) calculate that the wage premium for university graduates is 60 percent, derived from the *1993 ABS Survey of Training and Education (STE).* Also differing from Borland et al. (2000) who referred to the study by DETYA (2000) to calculate the revenue the Government received from HECS repayments, Johnson and Wilkins (2002) calculate that the Government will receive 15 percent of student's HECS debts up-front and receive 70 percent of the remainder of their HECS debt over the next 10 years, with 10 percent of this paid per year. The outstanding HECS debt, equal to 15 percent, is assumed to never be repaid to the Government.

As can be seen in Table 5.18, Johnson and Wilkins (2002) found that the Government has been profiting from their investment in all fields of higher education since 1989-90. The real net benefit to the Government for all fields is expected to be $12.125 billion for the year 2010-

11, nearly six times the real net benefit they received from investing in higher education in 1989-90, and more than three times the real net benefit estimated by Borland et al. (2000).

Table 5.18 The real net benefit to the Government for selected years based on field of study ($millions)

Field of study	1989-90	1990-91	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2010-11
Administration, Business, Law	1266	1451	2456	2773	3152	3457	3701	3858	4623
Education	370	514	1117	1309	1506	1658	1786	1868	2311
Health	-64	60	326	354	457	536	622	665	896
Science	268	380	390	600	784	952	1099	1173	1560
Agriculture and related fields	11	23	92	126	148	129	146	155	201
Engineering	393	502	961	1132	1306	1412	1508	1572	1886
Architecture and related fields	55	71	128	162	193	218	238	250	311
Social Sciences, Arts and Humanities	-224	-116	-312	-251	-142	-88	37	82	337
All fields	2075	2886	5158	6204	7404	8274	9136	9622	12125

Source: Modified from Johnson and Wilkins 2002

Table 5.18 also shows that the most profitable field of study for the Government is administration, business and law, whereas the most costly investment for the Government is the field, social science, arts and humanities. Johnson and Wilkins (2002) predict that the Government will start to profit from their investment in social science, arts and humanities in the year 2000-01.

Johnson and Wilkins (2002) argue that, while measuring the real net benefit is useful for a current budget situation, it is limited in providing information to policy makers about a particular group of students or generation. The preferred method used to measure the real net benefit to the Government for a cohort of students is the GRR. Johnson and Wilkins (2002) measure the GRR for each of the eight fields of study for an individual who commences university in 1999. Johnson and Wilkins (2002), like Borland et al. (2000), measure the GRR using a formula, similar to Formula 3.1.

Johnson and Wilkins (2002) derive the cost to the Government for each of the fields of study by dividing the cost to the Government for each discipline in 1999 by the number of enrolments. Johnson and Wilkins (2002) then multiply the cost to the Government in 1999 by the length of the degree. The cost of study is assumed to be constant throughout the length of the degree, and the length of the degree varies depending on the field of study.

In order to measure the extra personal income tax revenue the Government receives from workers with a bachelor degree, Johnson and Wilkins (2002) construct an earnings equation based on *ABS Income Distribution Survey's (IDS) for 1982 and 1997-98* using dummy variables for education and work experience. Johnson and Wilkins (2002) assume that the individual will enter the workforce in 2004 and retire in 2046 and 80 percent of higher earnings are attributed to higher education.

In addition to the revenue from personal income tax, the Government receives revenue in the form of indirect taxes and HECS repayments. Consistent with Borland et al. (2000), Johnson and Wilkins (2002) calculate indirect taxes as 10 percent of disposable income. Johnson and Wilkins (2002) also assume that all students pay band two level of HECS for 2001 at $5015 per annum, except for students studying the fields, education and social science, where they pay band one level of HECS at $3521 per annum. Johnson and Wilkins (2002) calculate that the Government will receive 15 percent of these HECS repayments immediately from up-front payments and the remainder according to income repayment rates for 2001.

Table 5.19 The GRR for each field of study

Field of study	GRR (%)
Administration, Business, Law	18.42
Education	6.71
Health	8.49
Science	7.95
Agriculture and related fields	7.82
Engineering	10.82
Architecture and related fields	11.32
Social Sciences, Arts and Humanities	3.63
All fields	10.86

Source: Modified from Johnson and Wilkins 2002

The findings in Table 5.19 suggest that the overall return to the Government's investment in higher education is 10.86 percent. Although lower than the return estimated by Borland et al. (2000) at 13 percent, the return on higher education is still greater than the return the Government would receive on other investments, such as the long term bond rate, which at the time of the study was 5.5 percent. Johnson and Wilkins's (2002) findings suggest that the Government will more than double their return if they were to invest in higher education, as opposed to other forms of investment. In addition, these findings suggest that measuring the return to the Government's investment in higher education can show the areas where the Government is maximising their return. Johnson and Wilkins (2002) found that the return to the Government's investment in the field administration, business and law was 18.42 percent, more than five times the return the Government received from investing in the field, social sciences, arts and humanities. Johnson and Wilkins's (2002) findings also suggest that the return to the Government's investment in social sciences, arts and humanities is the lowest, with the return lower than the return on long term bond rates. The Human Capital Model would suggest that this is not a worthwhile investment for the Government.

However, caution is needed when interpreting these findings by Johnson and Wilkins (2002) as there are shortcomings to measuring the GRR to broad fields of study. For example, one of the limitations of this study is that for four of the eight fields of study (engineering, architecture, agriculture and health sciences) the length of the degree is assumed to be four years, while all other fields of study are assumed to be 3.5 years in length. This assumption alone would affect the cost to the Government for providing higher education and

consequently the rate of return. For example, assuming that law students study for 3.5 years is unrealistic, as most law degrees are a minimum five years in length. Likewise, education is assumed to be 3.5 years in length when most teaching degrees are four years in length. There is also scope for error, when HECS fees vary within the broad fields of study. Johnson and Wilkins (2002) assume that the Government will either receive band one or band two level of HECS repayments, never band three level of HECS repayments, as would apply to law. Furthermore, the income of a graduate is based on projected male earnings. This is also unrealistic as female graduates on average earn 85 percent of male income. Nevertheless, this study provides an insight into the value of measuring the GRR for various fields of study. Johnson and Wilkins (2002) add that it would be valuable to undertake a separate analysis for males and females and change key assumptions, such as the level of HECS. It would also be informative if a study was to compare the rate of return to the Government with the PRR to different disciplines or occupations. This would then provide more information to policy makers about the particular areas of higher education that need greater financial support.

5.2.4 Johnson and Lloyd (2000)

Johnson and Lloyd (2000) use a different approach to measure the return to the Government from investing in higher education. This study, however, differs from all other Australian studies as it uses a microsimulation model, known as the NATSEM RED model. As discussed in Chapter Three, this model does not measure the aggregate rate of return to a level of study but rather the rate of return for individuals or groups of individuals with similar characteristics. The study measures the PRR and GRR to higher education for a male who undertakes a three year science degree.

Johnson and Lloyd (2000) calculate that the cost to the Government for investing in higher education is the sum of expenditure on teaching, the cost of student assistance, while the student undertakes the degree, the tax the student would pay, if they chose not to study at university, and one year of Government assistance when the individual is 64 years of age. Johnson and Lloyd (2000) calculate that the net cost to the Government for providing education in undiscounted terms is $74,000.

The revenue the Government receives from investing in higher education is the sum of indirect and direct taxes and the difference in tax on superannuation between a worker with a degree and a worker without a degree. The difference in tax the Government receives through a worker having a degree compared to a worker without a degree equals $521,000 and the difference in tax on annuity is $103,000.

Johnson and Lloyd (2000) found that the GRR to a bachelor degree was 9.9 percent, higher than the estimate by Johnson and Wilkins (2002) at 7.95 percent. Johnson and Lloyd (2000 p. 19) state:

> This return shows that it pays the Government to educate people, as the taxes, including HECS, income tax, indirect tax and tax on superannuation, paid during the working life of a university graduate more than cover the costs of student assistance and the education costs borne by the Government.

The return of 9.9 percent not only suggests that the Government has profited from investing in a three year science degree but the return also suggests that the investment was worthwhile, as the return would have been greater than the return on alternative investments.

5.3 Other net benefits of higher education to society

Although the studies discussed in Section 5.1 suggest that the SRR to higher education in Australia is both positive and sizeable, according to Rizzo (2004) these social returns represent the lower bound return for society's investment in higher education. Rizzo (2004) points out that the SRR does not account for all the benefits that accrue to society from public spending on higher education. Rizzo (2004) argues one of the reasons for this is the difficulty with identifying some of the benefits that are derived from public investment in higher education. Rizzo (2004) refers to the same point made by Marshall (1890) in *Principles of Economics*. Marshall (1890 p. 216) states:

> All that is spent during many years in opening the means of higher education to the masses would be well paid for if it called out one more Newton or Darwin, Shakespeare or Beethoven.

Rizzo (2004) also argues that another reason, why the SRR measures only the minimum return to society, is the difficulty with quantifying the non-pecuniary benefits of higher education. A significant non-pecuniary benefit to both the individual and society, that is ignored when measuring the SRR to higher education, is consumption. For example, university students enjoy both classes and the social activities available on the campus and society enjoys participating in special lectures, athletics programs and using campus facilities. Villiers an Nieuwoudt (2005) suggest that the non-pecuniary benefits to individuals with university degrees extend further to include better communication, more law abiding behaviour, and a greater contribution to the intellectual and cultural well being of the community. These benefits are non-excludible and suggest that to some degree higher education is a public good.

Baum and Payea (2004) suggest there are other non-pecuniary benefits that accrue to society from graduates with university degrees. These include:

- lower levels of unemployment and poverty;
- greater job security;
- a lower dependence on welfare and social programs;
- lower smoking rates;
- lower incarceration rates.

Baum and Payea (2004) also argue that university graduates are more likely to vote, donate blood and carry out volunteer work and are more likely to have children with higher cognitive skill levels. This is supported by the study of Haveman and Wolfe (1984) that found a child's level of education and cognitive ability were positively related to their mother's and father's level of education.

Two further benefits that the individual receives from a university education, which are increasingly important today, are referred to as the 'opportunity option' and 'technology hedge'. The 'opportunity option' refers to the wider employment opportunities that avail to a university graduate compared to a high school graduate. Rizzo (2004) argues this benefit is of increasing value to university graduates, given the ability for labour markets to change and jobs to relocate overseas. The 'technology hedge' refers to the ability of an individual to adapt to technological changes. Rizzo (2004) argues the more educated a worker is, the more likely they are to adapt to technological changes in the workplace. However, an individual's ability to adapt to new technology is not only a benefit to the individual but also a benefit to society. Society benefits from a person's ability to both adapt, discover, and use new ideas and technology.

It could, therefore, be argued that the SRR to education measures only the pecuniary benefits to society. However, according to Weisbrod (1962) there is a significant pecuniary benefit that is ignored in the SRR to education, named by Weisbrod as the 'financial option'. Weisbrod (1962 p. 108) states that the financial option is 'the value of the opportunity to obtain still further education'. Weisbrod (1962) argues that a high achieving student is not only more likely to receive a higher income but a higher achieving student has the option of further education. Weisbrod (1962) argues that students are unaware of these options at the time of making their decisions, therefore the Government should invest in higher education to avoid systematic under-investments. According to Rizzo (2004), the 'financial option' is more prevalent in the 21st Century, given rapid technological and economic conditions. Rizzo (2004 p. 20) states:

> I am confident that you have overheard someone complaining that it now takes a college education to land the same job that a high school graduate could have landed 20 years ago.

Rizzo (2004) argues that, if the financing of higher education was left to private individuals, there is the likelihood that they would choose suboptimal levels of education from the viewpoint of society. Rizzo (2004 p. 38) states:

> Even if the entire Social Rate of Return is comprised of the private return, if private agents systematically under-invest due to their inability to recognise the private benefits, some Government investment is justified.

Furthermore, studies measuring the effects of human capital on economic growth suggest there are positive externalities of higher education that are generally ignored in measuring the SRR to higher education. According to the study by Mingat and Tan (1996), increasing investment in higher education in high income countries by one percentage point delivers a return to society of 20 percent. This return is twice as great as conventional estimates, therefore suggesting that conventional measurements of SRR measure only the lower bound returns to society.

According to the Treasury (2006a), if the level of education of Australia's workforce increased 0.15 years, then Australia's productivity would increase 0.62 percent, Australia's workforce participation would increase 0.48 percent and Australia's economic growth 1.1 percent by the year 2040.

Access Economics (2005) argues that not only do university graduates have higher workforce participation rates compared to non-university graduates, they also tend to stay longer in the workforce. This is supported by the ABS *2001 Census* that found females with no post-school qualifications work a total of 27 years and males with no post-school qualifications work a total of 35 years, whereas, females with a university degree work for a total of 39 years and males with a university degree work for a total of 43 years (ABS, 2001).

While most economists agree that there are public benefits from higher education, economists disagree on the size of these externalities. While researches have attempted to measure some non-market effects of education, only McMahon (2004) has attempted to measure the total value of education externalities from education. The total Social Rates of Return to education are based on cross country data from 78 countries over 40 years. McMahon (2004) considers the following externalities in his study:

- better public health and lower net population rates;
- democratization, human rights and political stability;
- lower crime rates;
- deforestation;
- water pollution and air pollution;
- poverty reduction and inequality reduction;
- geographic spillovers;
- informal knowledge dissemination.

Table 5.20 shows the total Social Rates of Return to higher education for different regions of the world. The total Social Rate of Return is the sum of the monetary Social Rate of Return, non market private returns and non market education externalities. The non market private returns are the benefits that both the individual and their family receive from higher education, which are separate to the above listed externalities. These include better individual and family health, longevity, cognitive development of children and consumption benefits. The non market education externalities refer to the above list of externalities.

Table 5.20 The total Social Rates of Return to higher education

Region of the world	Monetary Social Rate of Return	Non market private returns	Non market education externalities	Total Social Rate of Return
Africa	11.3	9.0	4.0	24.3
Latin America	12.3	9.8	4.0	26.1
Asia	11.0	8.8	3.4	23.2
The OECD	8.5	6.8	2.5	17.8

Source: Modified from McMahon (2004)

The results show that monetary or conventional Social Rates of Return underestimate the benefits society receives from higher education. For example, the monetary Social Rate of Return is less than half the total Social Rate of Return for OECD nations. The gap is even wider in less developed regions, suggesting a greater benefit of education to society in these regions.

5.4 Conclusion

All of these studies have suggested that not only is it worthwhile for the Government to invest in higher education but also the return that the Government receives from investing in higher education is greater than the return they would have received on alternative investments, such as long term bond rates. The findings of Borland et al. (2000) also suggest that the Government was profiting from higher education as early as the year 1989-90 and the study by Larkins (2001) confirmed that the Government was profiting at least 1.5 times their investment in higher education in 1996-97. Despite this, the Government not only reduced expenditure on higher education in 1996-97 but they increased the fees students would pay by approximately 40 percent with the introduction of the differential HECS system. Estimates of Borland et al. (2000) suggest graduates' HECS repayments in the year 2010-11 would equal 33 percent of Government expenditure on higher education and according to Johnson and Wilkins (2002) the Government would make in excess of $12 billion from their investment in higher education in the year 2010-11. The findings by Borland et al. (2000) and the OECD (2004) indicate, that since the 1996-97 differential HECS system was introduced, the Government has underallocated resources to higher education, with the SRR to higher education greater than the PRR to higher education. The study by Johnson and Lloyd (2001) suggested that if the Government was to assist students while undertaking a three year science degree, the Government would receive a return of 9.9 percent on their investment. Moreover, the findings in the study by Johnson and Wilkins (2002) suggest that the return to the Government is greater than this when investing in fields such as administration, business and law at 18.42 percent. These findings suggest that the Government is under-funding university education overall and in most fields of study. In addition, McMahon (2004) estimates the additional benefits to society of higher education is more than double the conventional measurements when externalities are included. This further emphasises the underfunding of universities in Australia by the Government relative to the benefits that it brings to society overall.

The following chapter will consider the SRR to higher education as a result of the HECS changes in 2005, and its implications for males and females, and across fields of study and

occupations. It will also compare the SRR to the PRR, from Chapter Four, to examine the relative returns to higher education in Australia.

Chapter 6: Measuring the Social Rate of Return to higher education in Australia

6.1 Methodology

As discussed in Chapter Five, the Social Rate of Return (SRR) to higher education is a measurement of the return society receives from investing in higher education. The aim of this study is to measure the return society receives from investing in higher education and the effect the 25 percent increase in HECS in 2005 has upon the rate of return to various categories of university graduates. The specific rates of return in this study are calculated following the OECD (2004) approach in Figure 5.1. The Social Rate of Return measures the return to society from both private and public investment in higher education. The monetary return is the gross wage premium, while the costs to society include both the opportunity cost to the individual and the cost to the Government. Psacharopoulos (1975) argues that the PRR will be higher than the SRR when the SRR is calculated this way, as the subsidies by the Government towards the cost of higher education are so large that they reduce the SRR[45]. However, estimates by Borland et al. (2000) and the results in this study show that this is not always the case for higher education in Australia. The measurement of costs and benefits to society in this study follow the methodology in Chapter Four and uses predicted earnings based on the data from the ABS *Household Expenditure Survey (HES) and Survey of Income and Housing (SIH) 2003-04 CURF*.

6.1.1 Measuring the costs of higher education for society

The cost to society for investing in higher education is equal to the opportunity cost of studying at university borne by the student (refer to Section 4.1.1) plus the Government's

[45] Psacharopoulos, G. and Patrinos, H. (2002) measured the PRR and SRR for 98 countries between 1960 and 1997 and found that the PRR for higher education was higher than the SRR for higher education on average at 19.0 percent and 10.8 percent respectively.

contribution to higher education. Table 6.1 shows that the annual contribution by students and the Government towards higher education for 2004 and 2005 for each funding cluster. The findings show that the annual contribution by students and the Government vary depending on the funding cluster. For example, the annual total contribution by both students and the Government for the funding cluster, dentistry and medicine was $21,021 for 2004 and $23,065 for 2005. Meanwhile, the total annual contribution for the funding cluster, accounting and economics was $7738 for 2004 and $9269 for 2005.

Table 6.1 The annual contribution of the Commonwealth Government and students towards the cost of higher education in 2004 and 2005 based on funding clusters

Funding cluster	Commonwealth Government contribution ($)		Student contribution (HECS) ($)		Total annual contribution ($)	
	2004	2005	2004	2005	2004	2005
Law	1442	1472	6283	8018	7725	9490
Accounting, Economics	2371	2420	5367	6849	7738	9269
Humanities	3995	4078	3768	4808	7763	8886
Mathematics, Statistics	4718	4817	5367	6849	10,085	11,666
Behavioural Science	6342	6475	3768	4808	10,110	11,283
Computing, Built Environment	7064	7212	5367	6849	12,431	14,061
Foreign Languages, Performing Arts	8687	8869	3768	4808	12,455	13,677
Engineering, Science, Surveying	11,757	12,003	5367	6849	17,124	18,852
Dentistry, Medicine	14,738	15,047	6283	8018	21,021	23,065
Agriculture	15,667	15,996	5367	6849	21,034	22,845
Education	6970	7116	3768	3847	10,738	10,963
Nursing	9316	9511	3768	3847	13,084	13,358
Average	**7756**	**7918**	**4853**	**6033**	**12,609**	**13,951**

Source: Modified from Commonwealth Government 2003

The findings also show that there is no relationship between the level of Government funding and the level of student contribution. For example, the highest annual contribution by the Government is for the funding cluster, agriculture at $15,667 in 2004 and $15,996 in 2005, yet the student contribution is band two level of HECS at $5367 in 2004 and $6849 in 2005. Students studying economics and accounting also pay band two level of HECS, however the Government contributes only $2371 in 2004 and $2420 in 2005. For the funding cluster, law the students pay band three level of HECS at $6283 in 2004 and $8018 in 2005, while the Government contributes $1442 in 2004 and $1472 in 2005.

It can also be seen in Table 6.1 that after the 25 percent increase in HECS fees in 2005 a larger proportion of the total higher education funding is derived from the students. This has caused greater variations in the cost to society of investing in a university degree. For example, in 2004 the total annual funding for humanities was $25 more than the economics cluster. In 2005 the economics cluster was $383 greater than the humanities cluster, as a result of the 25 percent increase in student fees.

Table 6.2 shows the contributions made by both students and the Government towards higher education for various lengths of degrees. The results show that in 2004 the total costs range from $37,827 for an average three year bachelor degree to $63,045 for a five year postgraduate degree. The cost of the average degree was based on the average in Table 6.1. In 2005 the total fees and charges increased ranging from $41,853 for a bachelor degree to $69,755 for a postgraduate degree[46].

Table 6.2 The contribution of the Commonwealth Government and students towards the cost of higher education for 2004 and 2005 based on the length of the degree

Length of degree	Total contribution ($)	
	2004	2005
Three year degree	37,827	41,853
Four year degree	50,436	55,804
Postgraduate degree (five years)	63,045	69,755

6.1.2 Measuring the return of higher education for society

As discussed in Chapter Five, the only computational difference between measuring the return on a university degree for society compared to the return on a university degree for an individual, is that gross earnings are used instead of net earnings. Youth allowances and scholarships are not included as they are transfer payments that will balance out. The monetary return on a university degree for society is equal to the gross earnings of a university graduate (minus the gross income forgone while studying) minus the gross income of a year 12 graduate.

[46] See methodology in Section 4.2.

6.2 The Social Rates of Return to higher education

This section provides new estimates of the Social Rates of Return to higher education for the years 2004 and 2005. In order to measure the impact of the 2005 budgetary changes in HECS, sensitivity analysis is used. This includes measuring the rates of return for different fee payment types, lengths of degrees, forms of marital status, qualifications and occupations at the 80 percent, 90 percent and 100 percent levels.

6.2.1 Fee payment types

The Social Rate of Return to a university degree is calculated for both males and females enrolled in both full fee paying and HECS positions for the years 2004 and 2005. Following the methodology in Chapter Four it is assumed that the graduate is single with no dependent children. It is also assumed that these HECS students are studying an average degree and students paying full fees are studying a commerce degree, which is the approximate average cost for a full fee paying student (refer to Section 4.3.1.3). Although few Australian studies have measured the return to society, it could be expected that the SRR would be lower in this study compared to the estimates in previous studies due to both the narrowing of the earnings gap in the last 30 years, and the increase in the cost of a university degree for society as a result of higher HECS charges.

The Social Rates of Return calculated in this study are also the minimum return to society from investing in higher education and do not consider the effect of higher education on productivity growth. Dolman, Parham and Zheng (2007 p. 50) state a '1.1 year increase in schooling in Australia will raise productivity 8.4 per cent'. This suggests that if the extra productivity growth from individuals holding a university degree was included when measuring the SRR to higher education, the SRR would be higher than the estimates in Table 6.3 and most likely higher than the PRR to higher education.

6.2.1.1 Male

Table 6.3 shows the SRR for single males with no dependent children who pay HECS and those who pay full fees, to study a three year bachelor degree. The results show that for both years, 2004 and 2005, the SRR is higher for males who pay HECS fees, than for males who pay full fees. The SRR for a male who pays HECS was 9.03 percent in 2004 and 8.76 percent in 2005, whereas the SRR for a male who pays full fees was 7.83 percent in 2004 and 7.86 percent in 2005 (at the 80 percent level). The difference in the SRR between a male who pays HECS and a male who pays full fees is the result of differences in the cost to society for studying the same degree. The annual cost to society for a HECS student to study a three year bachelor degree was $12,609 in 2004 and $13,951 in 2005, whereas the cost to society for a full fee paying student to study the same degree was $18,720 for both 2004 and 2005[47].

Table 6.3 The SRR for males for a three year bachelor degree for HECS and full fees

	Social Rate of Return		
Year	100 percent	90 percent	80 percent
HECS			
2004	10.92	10.00	9.03
2005	10.62	9.71	8.76
Full fees			
2004	9.56	8.72	7.83
2005	9.59	8.75	7.86

The results also show that the 25 percent increase in HECS fees in 2005 has impacted upon the SRR for males paying HECS to study at university. The SRR decreased 0.27 percentage points to 8.76 percent in 2005 (at the 80 percent level). This suggests that any increases in HECS fees in the future will further reduce the return to society. This is supported by the change in the SRR for males paying full fees between 2004 and 2005. By holding the cost of study constant between the two years, the SRR for full fee paying positions rose by 0.03 percentage points, as a result of real income growth.

[47] It is assumed that the full fee student pays the fees charged by the UNSW for a commerce degree. If the SRR for a HECS student was calculated for a commerce degree rather than an average degree the rates of return for a HECS position would be even higher.

The estimates in this study are lower than the estimates by Miller (1982) and Borland et al. (2000) at 16.5 percent and 15 percent respectively. However, this is largely the product of two factors. Firstly, the wage premium of a university degree has fallen since both studies were conducted, and the cost of a university degree has risen. Secondly, both studies measure the SRR for an average male, whereas the estimate in Table 6.3 is for a single male with no dependent children. It will be discussed later in Section 6.2.3 that the SRR for males varies depending on the type of marital status and is for example, significantly higher for married males with no dependent children.

6.2.1.2 Female

Table 6.4 shows the SRR for single females with no dependent children who pay HECS and those who pay full fees to study a three year bachelor degree. The findings show that on average society receives a higher rate of return for single females studying at university than single males. For example, in 2005 the SRR to a three year bachelor degree for females who pay full fees is 10.16 percent, 2.3 percentage points higher than males paying full fees to study the same degree (at the 80 percent level). Meanwhile the difference is even greater between females and males paying HECS to study a three year bachelor degree. The SRR for females paying HECS in 2005 was 11.47 percent, 2.71 percentage points higher than males paying HECS to study the same degree.

Table 6.4 The SRR for females for a three year bachelor degree for HECS and full fees

	Social Rate of Return		
Year	100 percent	90 percent	80 percent
HECS			
2004	14.16	13.04	11.88
2005	13.69	12.60	11.47
Full fees			
2004	12.14	11.16	10.13
2005	12.18	11.19	10.16

The results in Table 6.4 show that, as was the case for males, the SRR is higher for females who pay HECS to study at university than for those who pay full fees. The SRR for a female who pays HECS was 11.88 percent in 2004 and 11.47 percent in 2005, compared to 10.13

percent in 2004 and 10.16 percent in 2005 for a female who pays full fees (at the 80 percent level). The results also show that, like males, the SRR decreased in 2005 for females who pay HECS. However, the results in Table 6.4 show that the impact of the 25 percent increase in HECS in 2005 on the SRR was larger for females than males. For example, the SRR for males decreased 0.27 percentage points in 2005, whereas the SRR for females decreased 0.41 percentage points, at the 80 percent level.

6.2.2 Length of degree

6.2.2.1 Male

The Social Rate of Return to higher education for differing lengths of degrees for 2004 and 2005 for single males with no dependent children are shown in Table 6.5. The findings show that the greatest return for society is for males studying a bachelor degree at 9.03 percent in 2004 and 8.76 percent in 2005 (at the 80 percent level). However, the results also show that if males take an extra year to complete a three year bachelor degree, the return to society falls more than two percentage points.

Table 6.5 The SRR for males for 2004 and 2005 for various lengths of degrees

	Social Rate of Return		
Year	100 percent	90 percent	80 percent
2004 HECS			
Three year degree	10.92	10.00	9.03
Four year degree	8.29	7.53	6.73
Postgraduate degree (five years)	9.23	8.45	7.61
2005 HECS			
Three year degree	10.62	9.71	8.76
Four year degree	8.04	7.30	6.51
Postgraduate degree (five years)	8.98	8.20	7.38

The results in Table 6.5 also show that it is more beneficial to society if males study a postgraduate degree, than if they took four years to complete a three year bachelor degree. This is because the gross income of males with a postgraduate degree is on average 11.74 percent higher than males with only a bachelor degree. In all cases the SRR is lower in 2005 (at the 80 percent level).

6.2.2.2 Female

The Social Rate of Return to higher education for the years 2004 and 2005 for single females with no dependent children are shown in Table 6.6. The results show that the return to society is higher for females than males for a bachelor degree and a four year degree but not for a postgraduate degree. For example, in 2005 the SRR to a postgraduate degree for females is 7.28 percent, 0.10 percentage points lower than the return society receives from males studying the same degree (at the 80 percent level).

Table 6.6 The SRR for females for 2004 and 2005 for various lengths of degrees

	Social Rate of Return		
Year	100 percent	90 percent	80 percent
2004 HECS			
Three year degree	14.16	13.04	11.88
Four year degree	10.91	10.03	9.09
Postgraduate degree (five years)	9.18	8.40	7.57
2005 HECS			
Three year degree	13.69	12.60	11.47
Four year degree	10.54	9.68	8.77
Postgraduate degree (five years)	8.86	8.10	7.28

Unlike the situation for males, the return to society does not rise when females acquire additional levels of educational attainment. For example, in 2005 the return society received for females with a postgraduate degree was 1.49 percentage points lower than the SRR for females who took four years to complete a three year bachelor degree (at the 80 percent level). This is a result of the lower relative incomes females receive for postgraduate qualifications, as discussed in Chapter Four.

Similar to males, the SRR for females decreased in 2005 after the 25 percent increases in HECS. However, the impact was more adverse on the SRR for females. For example, the SRR decreased 0.32 percentage points for females who took four years to complete a three year bachelor degree, compared to 0.22 percentage points for males.

6.2.3 Marital status

The Social Rates of Return to higher education in Section 6.2.1 and Section 6.2.2 were for a single person with no dependent children. Section 6.2.3 provides estimates of the SRR to a university degree for both males and females for different types of marital status. Prior to this study, no known Australia study has calculated the SRR for different types of marital status.

6.2.3.1 Male

The Social Rates of Return to a university degree for males of different marital status for 2004 and 2005 are shown in Table 6.7. The results show that the highest SRR to a university degree for males in 2004 is for males married with no dependent children at 12.26 percent (at the 80 percent level). The lowest return in 2004 is for a single male with dependent children at 8.78 percent or 3.48 percentage points lower than the return for a married male with no dependent children (at the 80 percent level).

Table 6.7 The SRR to a university degree for males for 2004 and 2005 based on marital status

	Social Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Lone person with no dependent children	10.92	10.00	9.03
Lone person with dependent children	10.64	9.73	8.78
Married with no dependent children	14.64	13.47	12.26
Married with dependent children	14.57	13.41	12.20
2005			
Lone person with no dependent children	10.62	9.71	8.76
Lone person with dependent children	10.33	9.45	8.51
Married with no dependent children	14.25	13.11	11.93
Married with dependent children	14.18	13.05	11.87

The results also show that for all males the SRR to a university degree decreased in 2005 after the 25 percent increase in HECS fees. For example, the SRR for a male married with dependent children decreased from 12.20 percent in 2004 to 11.87 percent in 2005.

6.2.3.2 Female

This study also measures the SRR to a university degree for females of different marital status for 2004 and 2005. The findings in Table 6.8 show that the SRR varies depending on the type of marital status. In 2004 the highest SRR to a university degree for females is for single females with no dependent children at 11.88 percent (at the 80 percent level). The lowest return is for single females with dependent children at 6.20 percent (at the 80 percent level). These findings suggest that marital status has a larger impact on the SRR for females than males. For instance, in 2004 the SRR for single males decreases 0.25 percentage points when dependent children are included, whereas, for females the SRR decreases 5.68 percentage points (at the 80 percent level).

Table 6.8 The SRR to a university degree for females for 2004 and 2005 based on marital status

	Social Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Lone person with no dependent children	14.16	13.04	11.88
Lone person with dependent children	7.62	6.93	6.20
Married with no dependent children	12.21	11.24	10.22
Married with dependent children	8.49	7.76	6.98
2005			
Lone person with no dependent children	13.69	12.60	11.47
Lone person with dependent children	7.33	6.66	5.94
Married with no dependent children	11.81	10.86	9.87
Married with dependent children	8.19	7.47	6.70

The results in Table 6.8 also show that the SRR for females is only higher than the SRR for males for the marital status type, single person with no dependent children. For all other types of marital status the SRR is higher for males than females. The findings also show that the Social Rates of Return for all types of marital status for females (other than a single female with no dependent children) in 2005 are lower than the return for a single female with no dependent children paying full fees at 10.16 percent (Table 6.4) (at the 80 percent level).

Similar to males, the SRR to a university degree for females decreased in 2005. The results show that the impact of the 25 percent HECS increase on the SRR to a university degree was similar for both males and females. For example, the SRR to a university degree for married females with no dependent children decreased 0.35 percentage points in 2005 compared to 0.33 percentage points for married males with no dependent children (at the 80 percent level).

6.2.4 Qualifications

This study also differs from previous Australian studies measuring the SRR as it measures the impact of the 2005 higher education changes on the SRR for different qualifications for males and females.

6.2.4.1 Male

The Social Rates of Return to different qualifications for single males with no dependent children for the years 2004 and 2005 are shown in Table 6.9. The findings show that there are significant variations in the SRR between qualifications.

Out of the seven qualifications measured in this study, six have a positive return to society. The highest SRR for males in 2005 is for the qualification, IT at 9.90 percent (at the 80 percent level). The lowest return to society is for the qualification, creative arts at minus 0.77 percent in 2005 (at the 80 percent level).

Table 6.9 The SRR to different qualifications for males for 2004 and 2005

	Social Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Creative Arts	0.29	-0.16	-0.64
Commerce	11.69	10.71	9.70
IT	12.34	11.32	10.27
Education	9.89	9.04	8.16
Engineering	9.12	8.32	7.47
Science	10.36	9.47	8.54
Society and Culture	10.52	9.62	8.67
2005			
Creative Arts	0.15	-0.29	-0.77
Commerce	11.25	10.30	9.31
IT	11.92	10.94	9.90
Education	9.66	8.83	7.96
Engineering	8.82	8.04	7.21
Science	10.03	9.16	8.24
Society and Culture	10.22	9.34	8.41

The findings show that the SRR is higher for shorter and less expensive degrees than longer more costly degrees. For example, the SRR to a commerce degree in 2005 is 2.1 percentage points higher than the SRR to an engineering degree, due to the lower total course costs and the loss of income and tax revenue of an additional year of study (at the 80 percent level). The annual tuition cost to society in 2005 for a three year commerce degree was $9269 per year, compared to $18,852 per year for a four year engineering degree. The variation in the SRR between qualifications is also a consequence of differences in the gross wage premium of qualifications. For example, while the annual tuition cost to society in 2005 for a three year IT degree was $14,061 per year ($4792 higher than commerce), the SRR to the qualification IT is 0.59 percentage points higher than the SRR to the qualification, commerce. This is because the wage premium of an IT degree is significantly higher than the wage premium of a commerce degree. These results suggest that the return to society will be lower for those qualifications that are expensive to run and where graduates earn a relatively low income. This would be the case for some qualifications not included in this study due to small sample sizes, such as agriculture and environmental science.

The results also show that for males for all qualifications the SRR decreased in 2005, ranging from 0.13 percentage points for the qualification, creative arts to 0.39 percentage points for the qualification, IT.

6.2.4.2 Female

The Social Rates of Return to different qualifications for single females with no dependent children for 2004 and 2005 are shown in Table 6.10. The findings show that there is significant variation in the SRR between qualifications between males and females. For all qualifications females have a higher SRR than males. For example, the SRR to the qualification, education is 14.02 percent for females compared to 7.96 percent for males (at the 80 percent level) for 2005. The largest difference between the SRR between males and females is for the qualification, creative arts with the SRR for females 10.81 percentage points higher than the return for males (at the 80 percent level) for 2005.

Table 6.10 The SRR to different qualifications for females for 2004 and 2005

	Social Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Creative Arts	12.38	11.39	10.37
Commerce	20.08	18.56	16.99
IT	17.63	16.28	14.88
Education	16.97	15.72	14.41
Engineering	11.87	10.92	9.93
Science	15.72	14.50	13.23
Society and Culture	21.98	20.33	18.62
2005			
Creative Arts	12.00	11.04	10.04
Commerce	19.18	17.73	16.22
IT	16.94	15.64	14.28
Education	16.53	15.30	14.02
Engineering	11.44	10.52	9.55
Science	15.16	13.98	12.75
Society and Culture	21.26	19.66	18.00

The results in Table 6.10 also show that, unlike males, the highest SRR for females in 2005 is for the qualification, society and culture at 18 percent (at the 80 percent level). The lowest SRR for females is for the qualification, engineering at 9.55 percent (at the 80 percent level for

2005). The findings also show that the SRR for females for the average degree is lower than the SRR for four of the qualifications in Table 6.10. The SRR for the qualifications, commerce, IT, education and society and culture are all higher than the SRR for the average three year bachelor degree at 13.14 percent (at the 80 percent level) for 2005. Meanwhile, the SRR for females for the qualifications, creative arts, engineering and science are all below the SRR for females for the average degree.

Similar to the case for males, the SRR decreased in 2005 for females for all qualifications. However, the 2005 changes in HECS had a larger impact on the SRR for females than males. For example, the SRR for the qualification, commerce decreased in 2005 by 0.77 percentage points for females compared to 0.39 percentage points for males (at the 80 percent level).

6.2.5 Occupations

This section will discuss the rates of return to society for different occupations for both males and females for 2004 and 2005. It is interesting to note that the SRR for school teachers varies depending on the course that they studied. This study will compare the SRR of one of the highest returns, that of an economist, to the SRR of the two national priority areas, teaching and nursing.

6.2.5.1 Male

The Social Rates of Return to different occupations for single males with no dependent children for the years 2004 and 2005 are shown in Table 6.11. The results show that the return to society varies depending on the occupation of the graduate. The highest SRR for males in 2005 is for an economist/financier at 15.13 percent (at the 80 percent level). The lowest SRR for males is for a secondary science teacher at 5.61 percent (at the 80 percent level).

The results in Table 6.11 suggest that the return to society for male economists/financiers is nearly twice as great as the return of male nurses, and nearly three times as great as the return of male secondary science teachers. This is a consequence of both the higher income male

economists/financiers earn compared to nurses and high school teachers and the lower cost to society for providing an economics degree compared to that for nursing or teaching.

Table 6.11 The SRR to different occupations for males for 2004 and 2005

	Social Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Economist/financier	18.63	17.18	15.69
Nurse	9.38	8.55	7.68
Secondary teacher- humanities	8.74	7.96	7.13
Secondary teacher- economics	8.74	7.96	7.13
Secondary teacher- science	7.26	6.55	5.80
2005			
Economics/finance	17.97	16.57	15.13
Nurse	9.28	8.45	7.58
Secondary teacher- humanities	8.53	7.76	6.95
Secondary teacher- economics	8.46	7.70	6.89
Secondary teacher- science	7.04	6.35	5.61

The findings also show that the SRR varies for secondary teachers depending on the area of specialisation. In 2005 the SRR to a secondary humanities teacher is 0.06 percentage points higher than the return to a secondary economics teacher and 1.34 percentage points higher than the return to a secondary science teacher (at the 80 percent level). The differences in SRR in 2005 are the consequence of the different HECS bands and Government contributions, and the 25 percent increase in HECS fees. In 2004 the SRR was the same for both secondary humanities teachers and secondary economics teachers and only different for secondary science teachers. However, since the 2005 budgetary changes in HECS there are differences between secondary humanities teachers (band one), secondary economics teachers (band two) and secondary science teachers (band three). This has meant that the cost for providing a teaching degree varies depending on the area of specialisation.

6.2.5.2 Female

The Social Rates of Return to different occupations for single females with no dependent children for 2004 and 2005 are shown in Table 6.12. For all occupations females have a higher SRR than males. For example, in 2005 the SRR for a nurse was 10.64 percent for females and

7.58 percent for males (at the 80 percent level). The difference was even greater for economists/financiers with the SRR for females 7.38 percentage points higher than the SRR for males.

Table 6.12 The SRR to different occupations for females for 2004 and 2005

	Social Rate of Return		
Year	100 percent	90 percent	80 percent
2004			
Economist/financier	27.74	25.69	23.56
Nurse	12.89	11.86	10.78
Secondary teacher- humanities	12.76	11.76	10.72
Secondary teacher- economics	12.76	11.76	10.72
Secondary teacher- science	10.37	9.52	8.62
2005			
Economics/finance	26.52	24.55	22.51
Nurse	12.72	11.71	10.64
Secondary teacher- humanities	12.41	11.44	10.41
Secondary teacher- economics	12.30	11.33	10.32
Secondary teacher- science	10.05	9.21	8.33

As with the case for males, the lowest return to society in 2005 is for female secondary science teachers at 8.33 percent, or 14.18 percentage points lower than the return for female economists/financiers. However, the findings in Table 6.12 show that there are greater differences in the SRR between occupations for females than for males. For example, the difference in the SRR between a male economist/financier and secondary science teacher is 9.52 percentage points, whereas the difference for females is 14.18 percentage points.

The results show that for all occupations for females the SRR decreased in 2005. The findings also show, that out of all occupations for both males and females, the most adversely affected was a female economist/financier. The SRR for a female economist/financier decreased 1.05 percentage points. This fall in the SRR is 0.49 percentage points greater than the fall in the SRR for male economist/financiers and 0.97 percentage points greater than the fall in the SRR for female nurses.

6.3 Discussion of results

Rizzo (2005) states that there is a three point economic criterion for justifying extra Government funding in higher education. Firstly, the SRR to higher education must be positive. Secondly, the SRR to higher education must be larger than the return on alternative public investments. Thirdly, 'individuals must be restricted from investing in the socially optimal level'. Rizzo (2005) argues that this can occur if the PRR is extremely high, or if the individual does not consider all the public benefits, when choosing to invest in a university education. According to Topel (2005), if the SRR is greater than the PRR, then there is an underinvestment of Government funding. Topel (2005 p. 47) states:

> To an economist, a positive case for Government subsidies to education, or public provision of education (or anything else), requires the social benefits of schooling to be larger than the private ones.

Table 6.13 shows the PRR and SRR for both single males with no dependent children and single females with no dependent children studying a three year bachelor degree. The results show that, for both males and females for 2004 and 2005, the PRR is higher than the SRR for the 'average degree'. For example, in 2005 the PRR to a university degree for a male was 0.32 percentage points higher than the SRR to a university degree at 9.08 and 8.76 percent respectively. For a female the PRR was 1.22 percentage points higher than the SRR to a university degree at 12.69 percent and 11.47 percent respectively.

Table 6.13 The PRR and SRR for males and females for 2004 and 2005

	PRR (80 percent)	SRR (80 percent)
Male		
2004	9.37	9.03
2005	9.08	8.76
Female		
2004	13.38	11.88
2005	12.69	11.47

The results in Table 6.13 also show that for both males and females the PRR and SRR to higher education decreased in 2005, after the 25 percent increase in HECS fees. This suggests

that any further increases in the cost of higher education for students will affect the return society receives. The findings also show that through increasing the level of HECS fees in 2005, the PRR to higher education has not only fallen but the gap between the PRR and SRR has closed. For example, in 2004 the PRR for an average degree for females was 1.5 percentage points higher than the SRR. In 2005 this gap was reduced to 1.22 percentage points.

According to Psacharopoulos and Patrinos (2002) the PRR to higher education is higher than the SRR to higher education for the latter is measured as the private benefits over the total cost of a university degree. Psacharopoulos and Patrinos (2002) argue that this is a result of both the Government subsidisation of higher education and the fact that not all externalities of higher education can be measured.

The results in Table 6.13 show that the return to society from investing in higher education is not only positive but far greater than the return on alternative investments. According to the RBA (2006) in 2004-05 the average real return on a 10 year Commonwealth Government bond was 3.0 percent. Therefore, the SRR to a university degree for males is 5.76 percentage points higher than the return on a 10 year Commonwealth Government bond. Meanwhile, the SRR to a university degree for females is more than triple the return on a 10 year Commonwealth Government bond.

Table 6.14 shows the real return on assets and equity for various Government Trading Enterprises (GTE's) for 2004-05. The findings show that the return to society from investing in higher education is far greater than the return on these alternative investments. For example, the largest return, the real return on assets for electricity, was 2.25 percentage points lower than the SRR on the average degree for males and 5.17 percentage points lower than the SRR for the average degree for females.

The Social Rates of Return in Table 6.13 are for a single person with no dependent children. Therefore the return to society would be even higher for married males. For single females with dependent children, where the SRR is the lowest at 5.94, the rate of return is still greater

than the return on most alternative investments (at the 80 percent level) for 2005. This suggests that even though the SRR is not greater than the PRR for an average university degree, higher education is still a worthwhile investment for society.

Table 6.14 The real return on assets and equity for various Government Trading Enterprises for 2004-05

Sector	Real return on assets	Real return on equity
Electricity	6.3	4.9
Water	3	0.8
Urban transport	-0.8	-2.2
Railways	-0.2	-0.7

Source: Modified from Productivity Commission (2006)

The SRR would be higher than the estimates in Table 6.13, and most likely higher than the PRR to higher education, if the extra tax on goods and services paid by university graduates was considered in this model. In addition, the PRR for an average degree in this study would tend to overestimate the rate compared to the estimates found in previous studies, as the income tax rates were lowered by the Government to counter the effects of the GST on disposable income in 2000. Borland et al. (2000) measured the PRR and SRR for a graduate entering the workforce in 1998. Since the study by Borland et al. (2000), the Government has lowered income tax rates and replaced it with indirect tax revenue through the GST, equivalent to approximately two percent of GDP (Treasury 2006b). If the additional indirect taxes paid by graduates (due to their higher incomes and subsequent expenditure) was included in the SRR model, the SRR to an average degree would be even higher than that estimated in this study and the gap between the PRR and SRR would be, at least, reduced and possibly would exceed the PRR.

The findings in this study also show that the gap between the PRR and SRR for an average degree in Australia is smaller than the gap found in other countries. Psacharopoulos and Patrinos (2002) calculated the rates of return in different regions of the world. Psacharopoulos and Patrinos (2002) found the PRR and SRR for the world averaged 19 percent and 10.3 percent respectively. For OECD countries the PRR was 11.6 percent and the SRR 8.5 percent. Australia's level of subsidisation of higher education is much less that the average of OECD nations. According to the OECD (2006) Australia was the only country to experience a

decrease in public expenditure on higher education as a proportion of GDP between the years 1995 and 2003. While Australia's public expenditure decreased seven percent, Japan's public expenditure on higher education, as a proportion of GDP between the years 1995 and 2003, increased 32 percent and the USA 67 percent. Meanwhile, the OECD average was an increase of 48 percent. The OECD (2006) data also shows that in 2003 Australia had the third lowest public share of total expenditure on higher education at 46 percent, below the OECD average of 76.4 percent. This would suggest that the Australian Government should support greater funding of higher education.

The estimates of the Private and Social Rates of Return in Table 6.13 are for an average degree. The Private and Social Rates of Return to different qualifications for single males with no dependent children for 2004 and 2005 are shown in Table 6.15. The findings show that for males, all qualifications except creative arts have a SRR that is both positive and greater than the return on alternative investments. For example, in 2005 the return to society for a male studying IT was 6.90 percentage points higher than the real return on a Commonwealth Government bond. The results also show that with the exception of creative arts, the return to society from investing in higher education is at least twice the real return on assets for investments in water.

Table 6.15 The PRR and SRR to different qualifications for males for 2004 and 2005

	PRR (80 percent)	SRR (80 percent)
Year		
2004		
Creative Arts	-0.46	-0.64
Commerce	8.85	9.70
IT	10.62	10.27
Education	7.81	8.16
Engineering	8.45	7.47
Science	9.84	8.54
Society and Culture	8.30	8.67
2005		
Creative Arts	-0.50	-0.77
Commerce	8.57	9.31
IT	10.29	9.90
Education	7.76	7.96
Engineering	8.22	7.21
Science	9.53	8.24
Society and Culture	8.15	8.41

The Private and Social Rates of Return to different qualifications for single females with no dependent children for 2004 and 2005 are shown in Table 6.16. For females the SRR is both positive and greater than the return for the listed alternative investments for all qualifications. For example, in 2005 the return to society for females studying engineering was 6.55 percentage points higher than the real return on a Commonwealth Government bond. Meanwhile, the return was even greater for females studying society and culture, at six times the real return on a Commonwealth Government bond. For all qualifications the return to society from investing in higher education was at least three times the real return on assets for water.

Table 6.16 The PRR and SRR to different qualifications for females for 2004 and 2005

	PRR (80 percent)	SRR (80 percent)
Year		
2004		
Creative Arts	8.27	10.37
Commerce	12.62	16.99
IT	12.73	14.88
Education	11.84	14.41
Engineering	12.41	9.93
Science	12.76	13.23
Society and Culture	15.06	18.62
2005		
Creative Arts	7.93	10.04
Commerce	11.96	16.22
IT	12.07	14.28
Education	11.55	14.02
Engineering	11.68	9.55
Science	12.10	12.75
Society and Culture	14.49	18.00

The findings also show that, unlike males, the SRR is higher than the PRR for all qualifications except for engineering. For example, in 2005 the SRR for the qualification, science was 0.65 percentage points higher than the PRR. The difference was even greater for the qualifications, society and culture and commerce, where the SRR was 3.51 percentage points and 4.26 percentage points respectively higher than the PRR (at the 80 percent level) for 2005. Given that the SRR is higher than the PRR for females for all qualifications, except engineering, and given that there is a national shortage of engineers in certain fields such as mining, these findings suggest that the Government has under invested in areas of higher

education. There is also evidence to suggest that particular attention is needed in the areas; commerce, education and society and culture, where the SRR is higher than the PRR for both males and females.

These findings suggest that studies comparing the PRR and SRR for an average degree do not provide sufficient information for policy makers on areas deserving extra Government funding.

According to Topel (2005), in these areas of higher education, where the SRR is greater than the PRR, there is an underinvestment of Government funding. A study by Nonneman and Cortens (1997) on the rates of return to education in Belgium also found that the SRR was higher than the PRR for higher education. Nonneman and Cortens (1997) argue that this is not only contrary to the literature but shows there is a net tax on education investment rather than a net subsidy.

For the qualifications where the PRR is higher than the SRR, when compared to other countries, the gap is relatively small. For example, even for the qualification, engineering where the PRR is 1.11 percentage points higher than the SRR, the gap is significantly smaller than the gap between the PRR and SRR for engineering in the Caribbean. Bourne and Dass (2003) found that the PRR for engineering was 7.2 percentage points higher than the SRR.

These findings also suggest that there is an inefficient allocation of resources in higher education, with the Government overfunding and underfunding different courses at university. For example, the SRR for males for the qualification, education is higher than the PRR to the qualification, education. This suggests that the Government is underfunding courses in education, despite the current teacher shortage (MCEETYA 2003, 2004) and teaching being a national priority.

The results in Table 6.15 would also suggest that the Government is overfunding courses in engineering relative to other courses. However, in some areas of engineering there is a national shortage, and in other areas, high rates of unemployment. For example, in 2005 the

percentage of graduates seeking full-time employment and not working was 1.2 percent for mining engineering and 3.0 percent for civil engineering, compared to 9.6 percent for chemical engineering and 11.7 percent for electronic/computer engineering (Graduate Careers, 2005). This suggests that the Government not only needs to allocate more funding to specific areas of engineering but also effectively communicate to future students the areas with shortages. According to Koch (1972), the shortages in engineering and education are a result of the low Private Rates of Return. Koch argues that students choose their undergraduate major at university based on the PRR to education. This would suggest that not only is there a need for greater Government funding but also changes to the opportunity cost faced by engineering and education students.

This study found that not only were there variations in the PRR and SRR for qualifications but there were also variations in the rates of return for occupations. The Private and Social Rates of Return to different occupations for single males with no dependent children for 2004 and 2005 are shown in Table 6.17.

Table 6.17 The PRR and SRR to different occupations for males for 2004 and 2005

	PRR (80 percent)	SRR (80 percent)
Year		
2004		
Economist/financier	14.50	15.69
Nurse	8.58	7.68
Secondary teacher- humanities	6.79	7.13
Secondary teacher- economics	6.49	7.13
Secondary teacher- science	6.49	5.80
2005		
Economist/financier	14.20	15.13
Nurse	8.62	7.58
Secondary teacher- humanities	6.75	6.95
Secondary teacher- economics	6.37	6.89
Secondary teacher- science	6.37	5.61

For the occupations, an economist/financier, a secondary teacher in humanities and a secondary teacher in economics, the SRR was higher than the PRR. For example, in 2005 the SRR to a male economist/financier was 0.93 percentage points higher than the PRR. However, the SRR for both male nurses and male secondary science teachers, were lower than the PRR.

The findings suggest that, like nursing, other areas of higher education where the courses are expensive for society to run, and where the income of the graduates are relatively low (for example, agriculture and environmental science) the SRR will not only be low but lower than the PRR. The findings also suggest that there is substantial underfunding in areas of teaching, despite teaching being a national priority. Some possible solutions to this issue will be discussed in Chapter Seven.

The Private and Social Rates of Return to different occupations for single females with no dependent children for the years 2004 and 2005 are shown in Table 6.18. The results show that for all occupations the return to society is higher than the return on the listed alternative investments. For example, the highest real return on Government investments was the real return on assets for electricity at 6.3 percent. This is 2.03 percentage points lower than the SRR for a female secondary science teacher and 16.21 percentage points lower than the SRR for a female economist/financier.

Table 6.18 The PRR and SRR to different occupations for females for 2004 and 2005

	PRR (80 percent)	SRR (80 percent)
Year		
2004		
Economist/financier	18.75	23.56
Nurse	13.25	10.78
Secondary teacher- humanities	11.24	10.72
Secondary teacher- economics	10.71	10.72
Secondary teacher- science	10.71	8.62
2005		
Economist/financier	17.85	22.51
Nurse	13.08	10.64
Secondary teacher- humanities	10.96	10.41
Secondary teacher- economics	10.31	10.32
Secondary teacher- science	10.31	8.33

The results also show that not only are there variations in the rates of return between occupations for females but there are variations in the rates of return between occupations between males and females. For example, in 2005 the SRR was 0.55 percentage points lower than the PRR for female humanities teachers. However, the SRR was 0.20 percentage points higher than the PRR for male humanities teachers.

For both males and females, the occupation, an economist/financier has a SRR higher than the PRR. However for a female economist/financier, the SRR is 4.66 percentage points higher than the PRR, whereas for a male economist/financier the difference is 0.93 percentage points. While the earnings of an economist are high, there is still a shortage of economists. According to Graduate Careers (2006a) in 2006, 24.3 percent of employers were not able to find sufficient accounting and economics graduates. This supports the hypothesis that there is both an underfunding by the Government, and a lack of information for students which is distorting the selection of courses (Productivity Commission, 2007).

6.3.1 A monopsonist model of the SRR to a secondary economics teacher

It is important to note the nature of the labour market of the two areas of national priority i.e. teaching and nursing. These two areas have monopsonistic labour markets. The earnings of teachers and nurses do not reflect the competitive market value of their qualifications. If the monopsonistic nature of the labour market for nurses (Nowak, 2000, Nowak and Preston, 2000) and teachers (Stokes, 2005) are taken into consideration, then the findings in Tables 6.17 and 6.18 underestimate the return society receives from teachers and nurses. A limitation of the PRR model, discussed in Chapter Four, was that the PRR model measures the market value of the return on education. Psacharopoulos and Patrinos (2002 p. 2) argue that the PRR model cannot measure the return for public sector employment, as public sector wages do not reflect market wages. Hence, the earnings do not reflect the social benefits or the private economic efficient outcomes.

For example, in Australia the teacher labour market is not a properly functioning competitive market. The Government is a near monopolistic supplier of schooling and a near monopsonistic buyer of teachers (Zabalza, Turnbull and Williams,1979 and Stokes, 2005).

According to Stokes (2005), there is a monopsonist labour market for school teachers in Australia. Stokes (2005) argues that the New South Wales Department of Education and Training (DET) employs 62.7 percent of all secondary teachers in New South Wales. Stokes (2005 p. 45) states that while the Catholic Education Offices are the second largest purchaser

of secondary teachers (employing 21.6 percent of all secondary teachers in NSW) the 'Catholic Education Offices model their wage policies closely on that of DET'. Stokes argues that non-Governmental schools that employ 15.7 percent of all secondary teachers in NSW are still influenced by DET wages and reliant on Government funding. They have similar wage structures but offer allowances to both attract higher quality staff and reward teachers for their involvement in extra-curricular activities. Figure 6.1 shows how the salary and supply of teachers is determined in a monopsonist market.

Figure 6.1 The monopsonist market for teachers

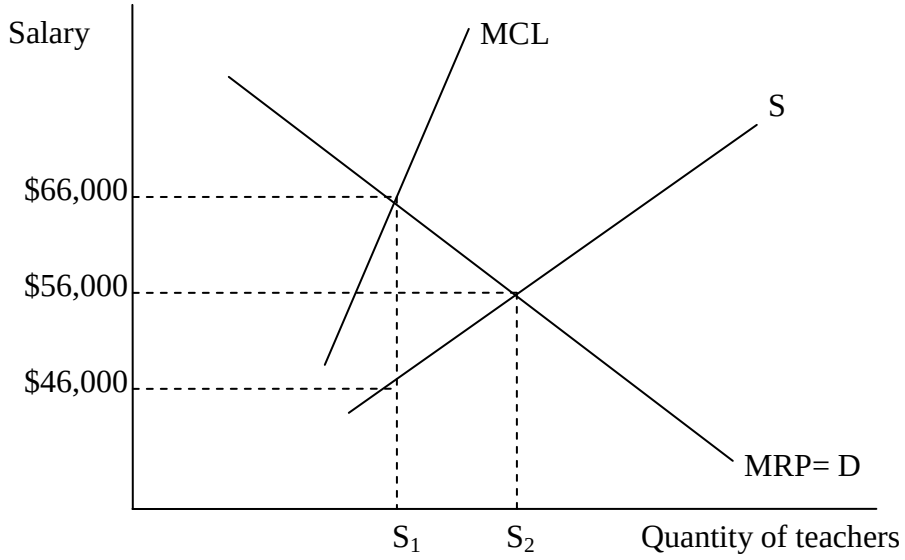


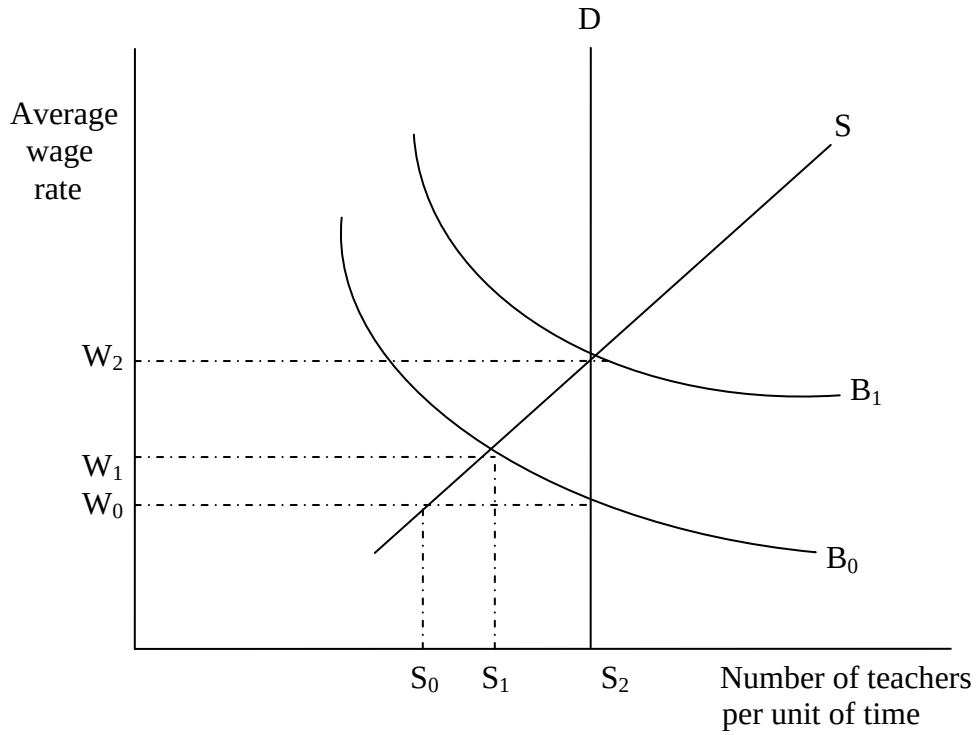
Figure 6.1 shows that, if the market for teachers was a competitive market, the supply of teachers would be S_2 and the wage rate $56,000. The point of hiring for a firm is where the Marginal Revenue Product equals the Marginal Cost of Labour (MRP= MCL). In this case the point of hiring for the monopsonist is S_1. However, instead of paying a salary of $66,000 which is equal to the MRP, the monopsonist pays $46,000, $20,000 less than the MRP. This suggests that estimates of the SRR for secondary teachers, in Tables 6.17 and 6.18, underestimate the real return society receives from teachers.

In order to address the current and emerging need for teachers the Government announced teaching was a national priority. According to Stokes (2005) and the Productivity Commission

(2007) there is already a shortage of maths and science teachers and in the next few years this shortage will extend to other areas of teaching. Stokes (2005), Cull (2007) and the Productivity Commission (2007) have supported wider claims that the shortage of teachers is partly a result of the inflexible nature of teachers pay structures that prevent 'price signals' from communicating the shortage in the teaching profession.

The relationship between the shortage of teachers and the salary of teachers is shown in Figure 6.2. The curves B_0 and B_1 represent the demand for teachers under a financial budget constraint. D represents the monopsonist demand for teachers, while S represents the supply of teachers.

Figure 6.2 The monopsonist market and teacher shortage



Source: Adapted from Zabalza, Turnbull and Williams (1979)

Figure 6.2 shows that the quantity of teachers demanded is $S_{2,}$ and with a budget B_0 the Government will pay teachers a salary of $W_{0.}$ However, at W_0 the supply of teachers is at $S_{0,}$ leaving a shortage of teachers equal to $S_2 - S_{0.}$ If the Government spent their entire budget, $B_{0,}$ and paid W_1, the supply of teachers would reach $S_{1,}$ still leaving a shortage equal to $S_2 - S_{1.}$ Only by increasing the budget to B_1 and the wage rate to W_2 will the quantity of teachers supplied and the quantity demanded be at equilibrium.

Therefore, the monopsonist is able to set a salary significantly lower than that the competitive market would pay teachers. The following SRR models consider the return society receives from secondary economics teachers by considering the market value of an economist who becomes a teacher.

Table 6.19 compares the return to society for both male and female economics teachers for the years 2004 and 2005 using different SRR models. Model 1 is the original SRR for an economics teacher (Tables 6.17 and 6.18). Models 2 and 3 assume that the economics teacher is paid the gross income of the economist (as determined in the competitive market) minus the loss of tax revenue as a result of being a teacher, i.e. the difference in the tax paid by an economist and the tax paid by the teacher. Model 2 assumes that the economics teacher forgoes the income of a year 12 graduate for the four years of study, while Model 3 assumes that in the fourth year of study the graduate had forgone the income of an economist.

Table 6.19 A comparison of SRR models for male and female economics teachers

	Model 1 SRR (80 percent)	Model 2 SRR (80 percent)	Model 3 SRR (80 percent)
Male			
2004	7.13	10.10	9.10
2005	6.89	10.00	9.02
Female			
2004	10.72	15.09	12.63
2005	10.32	14.92	12.55

The findings show that the original SRR to society for an economics teacher underestimates the return society receives. If it is assumed that the economics teacher had forgone the income of a year 12 graduate while at university, then the SRR for 2005 would increase 3.11

percentage points for males and 4.6 percentage points for females. If, however, it is assumed that the economics teacher forgoes in their fourth year of study the income of an economist, then the SRR for 2005 would increase 2.13 percentage points for males and 2.23 percentage points for females.

This not only suggests that the competitive market values the economist and the skill of the economics teacher greater than the monopsonist employer but that the economics teacher is underfunded in the Government's allocation towards higher education. It also helps to explain why there is a shortage of economics teachers in schools (Correy, 2007 and Stokes and Wright, 2007). Similar comparisons could be made to other teachers eg. IT, maths, science, and for nurses compared to similar professions eg. scientists. This will be discussed further in the policy implications in Chapter Seven.

Overall university education in Australia is underfunded compared to other OECD nations. The gap between the PRR and SRR in Australia is much narrower, compared to most other OECD nations. This suggests that Australian students have a lower incentive to pursue university qualifications and that the Government is providing a lower incentive and support for study. The effect of this is likely to be a less qualified workforce and relatively lower productivity levels in Australia. This will be discussed further in the findings of this study and policy recommendations in Chapter Seven.

6.3.2 The allocation of funds and returns to higher education

It is argued by the Government that the level of HECS students pay is according to the cost of the course and the future income they will receive (as discussed in Section 1.3). Table 6.20 shows that this claim is flawed, as there are only a small number of courses where the student contributions accurately reflect both the cost of the course and the future income the graduate receives.

Table 6.20 The student contribution, Government contribution, salary and unemployment rate for various university graduates for 2006

HECS	Student contribution (HECS) ($)	Commonwealth Government contribution ($)	Median starting salary[a] ($)	Average annual cash earnings[b] ($)	Unemployment rate[c]
Band three					
Dentistry	8170	15,332	68,000	97,365	0.7
Law	8170	1499	42,000	69,597	4.0
Medicine	8170	15,332	48,000	111,634	1.0
Veterinary science	8170	15,332	38,000	57,762	0.6
Band two					
Accounting	6979	2466	37,000	61,490	5.9
Agriculture	6979	16,299	38,700	64,854	7.9
Business studies					
Human resources	6979	2466	40,000	61,672	5.9
Marketing	6979	2466	40,000	59,904	5.9
Computing	6979	7349	42,000	74,308	8.8
Economics	6979	2466	40,000	65,057	3.8
Engineering					
Mining	6979	12,232	46,000	104,794	0.0
Electrical	6979	12,232	46,000	79,123	8.0
Civil	6979	12,232	46,000	76,024	4.6
Mathematics	6979	4908	42,500	66,284	6.2
Physical science	6979	12,232	40,000	79,274	13.6
Surveying	6979	12,232	45,000	62,816	1.7
Band one					
Humanities					
Journalist	4899	4156	37,000	64,532	8.6
Librarian	4899	4156	37,000	59,675	8.6
Urban and regional planner	4899	4156	37,000	55,879	8.6
Social studies	4899	6598	42,000	54,865	5.3
Visual and performing arts	4899	9037	33,200	44,195	12.0
National priorities					
Education	3920	7251	43,400	62,088	2.6-2.9
Nursing (registered)	3920	9692	41,000	64,740	0.7

(a) The median starting salary for full-time graduates aged less than 25 (Grad stats, 2006b).
(b) Average annual cash earnings for full-time non managerial employees for persons (ABS, 2006a cat. No. 6306.0)
(c) The percentage of graduates seeking full-time employment who are not working aged less than 25 (Grad stats, 2006b).

Note: The income data in Table 6.20 are derived from a combination of sources. This is because no single source had the income data for all occupations.
Source: Commonwealth Government 2003, ABS (2006a), Gradstats (2006b) and Macken (2006).

In the case of students becoming dentists or lawyers they pay band three level of HECS. The dental student receives $15,332 in Government funding annually to study the course and as a graduate earns one of the highest average salaries at $97,365 per year. Students studying law pay the same level of HECS, as students becoming dentists, yet the cost to the Government is one tenth of the cost of providing dentistry (receive one tenth of the level of Government funding), while the average income lawyers receive is $27,768 per year less than the average income dentists receive.

Table 6.20 also shows that students studying economics pay the same level of HECS fees as students studying engineering, despite earning on average an income between $10,967 and $39,737 less per year and receiving one fifth of the Government funding allocated to engineering. A student studying humanities, who can potentially earn an income of $64,532 as a journalist, receives $4156 per year in government funding and pays band one level of HECS. Whereas, a student studying accountancy receives $2466 per year in government funding and earns on average $61,490 per year, yet pays band two level of HECS.

The results in Table 6.20 demonstrate that the contributions by the Government do not match the needs of society (allocative efficiency). Chapman (2005 p. 4) states allocative efficiency will exist when the price of higher education is given by:

$$Px = Mx - Ex$$

where Px is the price of good or service x;
Mx is the marginal cost of producing x;
and Ex is the marginal value of the externalities associated with the production or consumption of x.

Chapman (2005) argues that the Government, when determining the level of HECS fees, needs to consider not only the cost of the course and the potential income of the graduate but other factors such as the unemployment rate.

For example, the Government contributes relatively more funding to courses in visual and performing arts than to the national priority area teaching, yet the initial graduate full-time unemployment rate for visual and performance arts graduates is 12 percent compared to teaching graduates at between 2.6 percent and 2.9 percent. Likewise, the Government allocates more funding to agriculture and physical science than to the national priority area nursing, despite the initial graduate full-time unemployment rate for agriculturalists being more than 11 times as great as the unemployment rate for nurses, and the unemployment rate for physicists 19 times as great as the unemployment rate for nurses. This suggests that the Government is encouraging agriculture, science and visual and performance arts graduates (with relatively high unemployment rates) by encouraging universities to offer places in these fields, which receive greater Government funding. The marginal costs of these courses are higher and the marginal revenue of the graduates are lower, demonstrating an inefficient allocation of resources.

The AVCC (2006b) states 79 percent of all eligible applicants for teaching and 83 percent of all eligible applicants for nursing received an offer at university in 2006. However, there was a surplus of 185 places in agriculture and 2265 extra places in physical science that were not offered to applicants. This suggests that there were excessive places offered in agriculture and physical science and a shortage of places offered in both teaching and nursing. The Government could have alleviated the shortage of places in nursing, given 2408 eligible applicants missed out on a place in nursing in 2006, and could have reduced the shortage in teaching with 5074 eligible applicants missing out on a place in teaching in 2006, if funding was allocated more efficiently to match demand. In 2006 not only were there shortages of places offered in teaching and nursing but there were also a shortage of places offered in law and economics, at 3838 places and 3462 places respectively (AVCC, 2006b). This suggests that in 2006 the Government could have provided a place for all eligible applicants wishing to study either law or economics, if funds were transferred from some of the lower demand but higher funded courses. This would have been beneficial to society for economists and lawyers are more likely to receive full-time employment than agriculturalists or physicists and would have paid a greater amount of tax over their lifetime.

It was pointed out in Section 4.3.4.1.2 that the PRR to occupations was useful for students who consider career options when choosing a degree. For example, it was shown in Table 4.34 that the PRR to a secondary teacher is lower than the PRR to the qualification, education at 11.55 percent (at the 80 percent level) for 2005. The differences in the rates of return suggest that female graduates with an education degree have higher rates of return, if they work in areas other than teaching. The salaries for new graduates in Table 6.20 are median salaries and therefore do not show the differences in salaries between areas of employment. For example, a person with a visual and performing arts qualification earns a median salary of $33,200. However, this median starting salary is the median starting salary for all occupations for a person with a visual and performing arts qualification and does not reflect the income of a person working as an artist. According to Gradstats (2006b), the median starting salary for a person working in industry as an artist is $32,000. The median starting salary of an artist is lower than the median starting salary for persons with a visual and performing arts qualification, as artists often take up other careers. For example, 13.7 percent of all artists work as school teachers. The median starting salary of a school teacher with a visual and performing arts qualification is $42,500. This suggests why a relatively high number of persons with a visual arts qualification become teachers. Furthermore, Table 6.20 only shows the percentage of persons seeking full-time employment who are not working. When persons seeking full-time work, but are working part-time or on a casual basis, are included in the unemployment rate, the unemployment rate for visual and performing arts for 2006 increases from 12 percent to 25.7 percent. Despite the high unemployment rate for artists the Government contributes a relatively high amount of funding to visual and performing arts courses and there remains a high demand to study courses in visual and performing arts. In 2007, the second highest number of eligible students missing out on a place in university was applicants wishing to study creative arts (Gradstats, 2007). This suggests that there is a lack of information available to those wishing to study at university or they are making the decision for reasons other than future income and employment.

According to Gradstats (2006b), the average starting salary for university graduates for 2006 is $800 higher than the average starting salary of an economist at $40,000. Table 6.20 suggests

that a person with an economics degree will at first earn a salary of $40,000 but over their working life time they will earn $65,057. A serious shortcoming of these statistics is the assumption that a person with an economics degree will work as an economist. For instance, Gradstats (2006b) found that the average starting salary for an economics graduate was $40,000, if the economics graduate worked in a professional practice or a school. However, if they worked in the industry as an economist the average starting salary was $38,000. Meanwhile, if the economics graduate worked for the Australian Government they would earn a starting salary of $43,000. Gradstats (2006b) found that 81.5 percent of all economics graduates in 2006 found employment in the private sector, while 8.1 percent worked for the Government and 2.3 percent worked in schools. However, Gradstats (2006b) also found that economics graduates work in a range of fields within the private sector, suggesting that not all economics graduates will earn an average salary of $65,057. For example, Gradstats (2006b) found that 26 percent of all economics graduates work in clerical, sales and services. Meanwhile, the most popular occupation for an economics graduate was working as a computer or business professional, at 39.7 percent of all economics graduates. This suggests that Australia's higher education system is characterised by both asymmetric information and vertical inequity in regards to the HECS system. Students choosing to study a major in economics are often unaware of the number of professions economics graduates occupy and the range of salaries tied to these professions, yet all students choosing to study a major in economics will pay the same level of HECS fees despite their destination of employment.

The lack of information available to future university students can also partly explain why there are shortages of mining engineers, and science and mathematics teachers. However, another reason for the shortage of mining engineers, and science and mathematics teachers is the allocation of funding by the Government based on courses, rather than occupations. While the Government contributes a considerable amount of funding to the areas of engineering, science and mathematics, there are no shortages in these areas across the board. Gradstats (2006b) shows that while there was a zero unemployment rate for mining engineering in 2006, there was an unemployment rate of 7.4 percent for electronic and computer engineering. Four out of the eight fields of engineering had an unemployment rate for 2006 greater than the average initial graduate full-time unemployment rate at 5.5 percent (Gradstats, 2006b).

Therefore, the Government firstly, needs to allocate more funding to specific areas of engineering, such as mining engineering rather than allocate more places to engineering as a whole, and secondly, they need to respond to cyclical changes. The Government will fund 510 more places in engineering in 2007 and an extra 500 more places in 2008. However, unless these places are allocated to fields such as mining engineering, there will be a number of these university graduates unemployed and the shortage of mining engineers may continue. It was discussed in Section 3.2.3 that the salary of engineers varies with cyclical changes. The 'cobweb' model (Figure 3.7) showed that a shortage of engineers will lead to a relatively high salary for engineers but eventually the high salary enjoyed by engineers will lead to more students studying engineering and as a result a greater number of engineering graduates in the future entering the labour force. This suggests that the nature and direction of Government funding needs to respond to changing labour market trends (dynamic efficiency). Therefore, while there is, at present, a need for extra Government funding in the area of mining engineering, in the future, this may not be the case. The Productivity Commission (2007) argues that while the shortage of mining engineers is largely a response to cyclical conditions, the shortage of science and mathematics teachers is a response to structural conditions. The Productivity Commission argues that while there is a widespread shortage of mathematics and science teachers, there are no shortage of scientists and mathematicians. Table 6.20 shows that the initial graduate full-time unemployment rate for 2006 for mathematicians was 6.2 percent and physicists, 13.6 percent. This suggests that the Government needs to support university students studying teaching who choose science and mathematics majors, and not simply allocate more funding to science and mathematics courses. In addition to allocating extra funding to these areas, the Government also needs to provide future university students information on the areas of national shortage. This point is also raised by the Productivity Commission (2007 p. 252) who states that the Government needs to play a role in 'signaling to students areas where there are shortages and where there is likely to be oversupply'. The current market of higher education is characterised by asymmetric information. The Government needs to be an active player in informing future university students where there are areas of low unemployment, otherwise students may enrol in courses that already have an oversupply of university graduates. For example, if the aim is to provide more mining

engineers then there should be more places in that field and information on the benefits of that degree made readily available to the public.

6.4 Conclusion

It is argued by Rizzo (2005) that in the market for higher education there is a need for Government funding to ensure that a socially optimal level of higher education is consumed. Under a user pays system individuals will underinvest in higher education, as they will not recognise the externalities society receive from workers with a university education. It is also argued by Rizzo (2005) that extra Government funding is justified, if the Social Rate of Return (SRR) to higher education is both positive and greater than the return on alternative public investments. The results in this Chapter show that the SRR to a university degree for both males and females are not only positive but greater than the real return on a 10 year Commonwealth Government bond for 2005, at three percent. For example, in 2005 the SRR for males was 5.76 percentage points higher than the return on a 10 year Commonwealth Government bond. Meanwhile, the SRR to a university degree for females was more than triple the return on a 10 year Commonwealth Government. It was also shown in this study that the SRR to a university degree was greater than the real return on any Government Trading Enterprises listed in Table 6.14. For example, the largest return, the real return on assets for electricity, was 2.25 percentage points lower than the SRR on an average degree for males and 5.17 percentage points lower than the SRR for an average degree for females. These findings suggest that not only is there a need for the Government to subsidise higher education but there is evidence showing a need for greater Government funding. Despite this, OECD (2006) statistics show that Australia was the only country to experience a decrease in public expenditure on higher education, as a proportion of GDP between the years 1995 and 2003.

Psacharopoulos and Patrinos (2002) argue that the Private Rate of Return (PRR) to higher education is greater than the SRR to higher education as a result of both the Government subsidisation of higher education and the fact that not all externalities of higher education can be measured. It is therefore argued by Topel (2005) that, if the SRR is greater than the PRR to a university degree, than there is an underinvestment of Government funding. The results in

this study show that, for both males and females for 2004 and 2005, the PRR is higher than the SRR for an 'average degree'. In 2005 the PRR to a university degree for a male was 0.32 percentage points higher than the SRR to a university degree, at 9.08 and 8.76 percent respectively. For a female the PRR was 1.22 percentage points higher than the SRR to a university degree, at 12.69 percent and 11.47 percent respectively.

This study measures the minimum return to society from investing in higher education and does not consider for example, the effect of higher education on productivity growth or the extra tax on goods and services paid by university graduates. If the methodology of McMahon (2004) in Chapter Five was applied, the SRR in Australia would be considerably higher than the PRR for higher education. This study also found that the gap between the PRR and SRR for an average degree in Australia is smaller than the gap found in other countries. Psacharopoulos and Patrinos (2002) found for OECD countries the PRR was 11.6 percent and the SRR 8.5 percent. The research shows that through increasing the level of HECS fees in 2005 the PRR to higher education has not only fallen but the gap between the PRR and SRR has closed. For example, in 2004 the PRR for an average degree for females was 1.5 percentage points higher than the SRR. In 2005 this gap was reduced to 1.22 percentage points.

The results in this study suggest studies comparing the PRR and SRR for an average degree do not provide sufficient information for policy makers on areas deserving extra Government funding. A key finding of this study is the PRR is no longer greater than the SRR for all males and for all females. For instance, for males with qualifications in commerce, education and society and culture, the SRR is greater than the PRR for 2005. For females for all qualifications except for engineering, the SRR is greater than the PRR for 2005. For both males and females for the occupations, an economist/financier, and a secondary teacher in economics, the SRR was higher than the PRR for 2005. These results suggest that there is an inefficient allocation of resources in higher education, with the Government overfunding and underfunding different courses at university. For example, the Government is underfunding courses in education despite the current teacher shortage (MCEETYA 2003, 2004) and teaching being a national priority.

A monopsonist model was included in this study to consider the monopsonistic nature of the labour market in the national priority areas and measures the SRR of an economics teacher compared to an economist. The monopsonist model shows that the private sector would value the skills and education of an economics teacher more than the monopsonist employer. The model shows that the SRR to an economics teacher would increase at least between 2.13 percentage points and 3.11 percentage points for males and 2.23 percentage points and 4.6 percentage points for females, if the salary of an economics teacher was determined by the private sector. This in part explains why there are areas of shortages in teaching and nursing, as the incomes they receive do not reflect the real market value of their qualifications and that their value to society warrants additional funding.

This Chapter shows that the contribution by the Government does not match the needs of society (allocative efficiency). For example, the Government allocates more funding to agriculture and physical science than to the national priority area nursing, despite the initial graduate full-time unemployment rate for agriculturalists being more than 11 times as great as the unemployment rate for nurses, and the unemployment rate for physicists 19 times as great as the unemployment rate for nurses. This suggests that the Government is encouraging agriculture, science and visual and performance arts graduates with relatively high unemployment rates by encouraging universities to offer places in these areas by providing higher levels of Government funding.

This Chapter also shows that there are only a small number of courses where the student contribution accurately reflects both the cost of the course and the future income the graduate receives. For example, students becoming dentists or lawyers pay band three level of HECS. The dental student receives $15,332 in Government funding annually to study the course and as a graduate earns $97,365. Students studying law pay the same level of HECS, as students becoming dentists, yet the cost to the Government is one tenth of the cost of providing dentistry, while the average income lawyers receive is $27,768 per year less than the average income dentists receive.

Not only is Australia's higher education system inefficient but it is also characterised by both vertical inequity and asymmetric information. Despite the relatively low cost to the Government for providing economics courses at $2466 per student per annum, students studying economics pay band two level of HECS. This is partly based on the assumption that students studying economics will earn an average salary of $65,057. However, according to Gradstats (2006), graduates with an economics degree occupy a number of professions including teachers and business and computer professionals, and fulfill a number of positions in areas such as clerical, sales and service. A system where students pay the same level of fees despite earning a different income is a system characterised by vertical inequity. Another weakness of the current higher education system is the allocation of funding by the Government based on courses, rather than occupations. This is further supported by the current shortage of mining engineers and science and mathematics teachers. Even though the Government allocates a relatively high amount of Government funding to the areas of engineering, science and mathematics, there are no shortages of university graduates in these areas across the board. This study shows that while there was a zero initial graduate full-time unemployment rate for mining engineers in 2006, for four of the eight fields of engineering the initial graduate full-time unemployment rate was above the average unemployment rate at 5.5 percent (Gradstats, 2006b). Likewise, while there is a national shortage of science and mathematics teachers, the initial graduate full-time unemployment rate for 2006 for mathematicians was 6.2 percent and physicists, 13.6 percent. This suggests that the Government needs to support university students studying mining engineering and those studying teaching who choose science and mathematics majors, and not simply allocate more funding to engineering, science and mathematics courses. In addition to allocating extra funding to these areas, the Government also needs to provide future university students information on the areas of national shortage, so that students have the opportunity to make informed rational decisions. These issues will be discussed further in the policy recommendations in Chapter Seven.

Chapter 7: Conclusions and policy implications of the study

7.1 Conclusions of the study

This thesis examines the impact of changes in higher education policy on equity for students and efficiency in resource allocation. Since the introduction of the Higher Education Contribution Scheme (HECS) in 1989 Australia's higher education system has gradually moved away from a predominately Government funded system towards one where the 'user pays' principle has increasing importance. This transformation was accelerated by the establishment of a three-tier HECS system in 1996-97 by the Coalition Government, consequently increasing the cost of study for students by approximately 40 percent. The 2005 changes in HECS, including the establishment of the Higher Education Loan Programme (HELP) and the introduction of price flexibility, further increased the cost of study for students by 25 percent and limited the length of study in a HECS-liable place to seven years. Under HELP the Government also introduced FEE-HELP places for domestic students with a loan limited to $50,000 plus a loan fee of 20 percent. This is despite Nelson (2004b p. 1) stating that a system where Australian students are required to pay up-front fees to study is 'unfair and works against students with reduced financial means'. According to Doherty (2005 p.1), there are more than 50 undergraduate degrees that cost at least $100,000, while medicine at the University of Melbourne costs $210,000. Not only did the 2005 changes in higher education policy increase the cost of a university degree for students, it also changed both the level and nature of Government funding. Under the 2005 Commonwealth Grant Scheme (CGS) the allocation of funding is based on funding clusters. This has resulted in some students contributing more towards the cost of study than other students. For example, in Chapter One it was shown that the contribution by students studying law was 84 percent of total course costs in 2005, while the contribution of students studying dentistry and medicine was 35 percent of total course costs. Despite claims (Chapman and Ryan, 2003) that HECS did not deter students from low socio-economic backgrounds, the Government made changes to the Higher Education Equity Programme (HEEP) and established the Commonwealth Learning Scholarships Programme, after the report *Analysis of Equity Groups in Higher Education 1991 to 2002* (Centre for the Study of Higher Education (CSHE), 2004) showed the

participation of some equity groups had not improved. The *2005-06 Annual Report* (DEST, 2006a) found that the number of students from low SES declined from 102,598 in 2001 to 102,394 in 2005 and the proportion of students of low SES declined 0.6 percentage points to 14.5 percent in 2005. The Report's findings also show that the number of students receiving youth allowance has fallen from 458,053 in 2003-04 to 435,661 in 2005-06.

Changes to the distribution of HEEP funding in 2005 has resulted in greater funding for universities that have a higher number of students of low socio-economic status and students from rural and isolated areas, such as University of Southern Queensland and University of Tasmania. However, the Commonwealth Learning Scholarship Programme does not provide sufficient scholarships to remove the barriers to entry for students of low socio-economic status. According to DEST (2003c), there is a one in seven chance that an eligible student will receive a Commonwealth Education Costs Scholarship (CECS) and a one in fourteen chance an eligible student will receive a Commonwealth Accommodation Scholarship (CAS). Not only is there a shortfall in the number of scholarships but there is an inequitable distribution of scholarships between universities. This is a result of the formula calculating the absolute number of disadvantaged students enrolled in each institution and considering the demographics of the population surrounding each institution. Therefore, smaller regional universities with a relatively high proportion of disadvantaged students, as a percentage of their student population, receive fewer scholarships as they have a lower absolute number of students enrolled from disadvantaged backgrounds, when compared to more established universities.

Chapter Two shows that while HECS has raised the contribution from students towards the cost of higher education, it has not ensured greater access and equity. Increases in HECS have caused the quantity of higher education demanded to fall, as shown by a decline in the level of applications. The economic model of demand and supply by Wright (2005) shows that, while the supply of university places is unresponsive to changes in the level of HECS, the quantity of higher education demanded falls as HECS charges increased. It is, therefore, argued that the decline in the number of students missing out on a university place is not predominately a

result of the Government providing more university places but rather fewer students applying to study at university.

Chapter Two shows that, over time, not only have the increases in HECS reduced the quantity of higher education demanded from students from low socio-economic areas (as discussed in Chapter One) but they have also reduced the quality of students entering university. This is reflected in an increased percentage of home state year 12 students with a high Interstate Transfer Index (ITI) not accepting university offers. The AVCC (2006b, 2007) states in 2004, 96 percent of home state year 12 students with an ITI of 90.05+ applied for a place at university, 96 percent of those received an offer and 83 percent had accepted their offer. By 2007, 93 percent of home state year 12 students with an ITI of 90.05+ applied for a place at university in 2007 and even though 92 percent of these students received an offer, only 78 percent accepted their offer. Meanwhile, the proportion of home state year 12 students being accepted into university with an ITI of between 50.05 and 60.00 increased. In 2004, 60 percent of home state year 12 students with an ITI of between 50.05 and 60.00 applied for a place at university. Of these students, 17 percent received an offer and 12 percent accepted their offer. In 2007, 63 percent of home state year 12 students with an ITI of between 50.05 and 60.00 applied for a place at university. Of these students, 36 percent received an offer and 25 percent accepted their offer. This suggests that the number of home state year 12 students with an ITI of between 50.05 and 60.00 studying at university has more than doubled in three years. In addition, the proportion of home state year 12 students with an ITI less that 50 receiving and accepting an offer has also increased.

Not only is there a fall in entry conditions, because fewer higher achieving students are accepting university offers, there is, in addition, a lower entry score for full fee paying students. These tend to be up to 10 percentage points lower than CSP. This suggests a greater number of students are both entering and graduating university of a lower standard. McInnis and Hartley (2002) found that there is a positive relationship between a student's grade point average at university and their university entrance score, suggesting that this trend would produce a lower quality of graduates.

It is also argued in this Chapter that Australia's higher education policy has not improved the efficiency and resource allocation in the market for higher education. The market for higher education is characterised by both asymmetric information and prestige universities, where students are unable to make choices as informed rational consumers. In a market characterised by asymmetric information, students assume prestige universities deliver the highest quality education. The Department of Education, Science and Training (DEST) *Student Outcome Indicators of Australian higher education institutions for 2003* showed that two of the Group of Eight (Go8) universities, the University of New South Wales and the University of Adelaide, had the poorest teaching at 72 percent and 74 percent respectively, compared to an average of 81 percent. Table 2.2 also shows that only three universities of the Go8 (the University of Melbourne, the University of Western Australia, and the Australian National University) had a level of overall student satisfaction greater than the average of 90 percent. For these three universities the level of overall student satisfaction equaled 91 percent. These results suggest that 'prestige' does not translate into quality. Akerlof's (1970) *Lemons Principle* suggests a free market will not equip students to demand quality courses but rather it will provide incentives for universities to offer poor quality courses. In a market where there is a lack of information, students will choose courses that are more expensive assuming they will be of higher quality, and universities will offer low quality courses, as it is more profitable. The movement towards a user pays system also raises doubts about improved resource allocation and efficiency as internal cross-subsidisation is prevalent in universities. For example, Tables 2.8 and 2.9 show that revenue received from HECS and full fee paying students for the disciplines within the Faculty of Economics and Commerce at the University of Melbourne have become valuable sources of income to be redistributed to other faculties and other operating expenses. This suggests that some students such as economics and commerce students are paying more than the true cost of the course, while other students are not paying sufficient.

The decision making involved in choosing whether to go or not go to university and to privately invest in human capital is discussed in Chapter Three. The Human Capital Model states that a university education is a worthwhile investment when the opportunity cost to study at university is less than the benefits the individual will receive. While ABS (2006c)

data shows that there is a positive relationship between the level of earnings and the level of education in Australia, this alone does not provide sufficient information as to whether a university degree is a worthwhile investment. In order to determine whether a university education is worthwhile, the future income of graduates needs to be discounted and the Private Rate of Return (PRR) of a university degree compared to the real rate of interest. Only when the Private Rate of Return is both positive and greater than the real rate of interest is a university education considered a worthwhile investment. It is argued in Chapter Three that a shortcoming of the studies measuring the PRR is that the high Private Rates of Return to a university degree in the 1980s became a rationale for the Government to increase the cost of higher education for students without considering the benefits of higher education to society. It was suggested by the Government that the individual is the main beneficiary of a university degree and, therefore, should pay a higher proportion of the cost of a university degree. However, critics of the Human Capital Theory argue that there is no direct link between education, productivity and level of earnings. Spence (1973) and Blaug (1976) argue that education is a 'screening device', a tool used by employers to identify workers of different quality. Alongside the 'screening hypothesis' is the 'ability problem', where critics such as Rivlin (1975) argue that a greater proportion of the higher earnings enjoyed by the university graduate is a result of their ability, not the extra years of schooling they received. Despite these conflicting views, the link between education and earnings and the validity of studies measuring the PRR was supported by the study by Ashenfelter and Krueger (1994) on Monozygotic twins. Ashenfelter and Krueger were able to conclude that higher education leads to higher earnings with 'an additional year of schooling adding 16 percent to wages'. As a result of these conflicting views, several studies have used an alpha coefficient for innate ability when calculating the rates of return. It is demonstrated in this Chapter that while all the Australian studies measuring the PRR were based on the Mincer equation, they each have there own set of assumptions. The Australian studies measuring the PRR fall into four key time frames of higher education policy:

- free higher education;
- the period of uniform HECS fees from 1989 to 1996;
- the differential HECS system from 1997 to 2004; and
- the 2005 HECS system characterised by 25 percent higher HECS fees and FEE-HELP.

The findings in the study by Miller (1982) suggest that the PRR to higher education was at its highest during the period of free higher education. For example, Miller (1982) found the PRR to a bachelor degree for both males and females was above 21 percent. Studies measuring the PRR during the period of uniform HECS fees show that the PRR had fallen after the introduction of HECS. For example, Maglen (1994) found the PRR to a bachelor degree decreased from 13.52 percent to 13.48 percent for males and 13.18 percent to 12.05 percent for females, after the introduction of HECS in 1989. The studies show that the size of the impact of the introduction of HECS would depend on whether the individual had deferred their HECS fees or paid there HECS fees up-front. For example, Chapman and Chia (1989) found that if females deferred their HECS payment, their PRR to a bachelor degree would fall 0.12 percentage points but, if they paid their fees up-front, their PRR would fall 1.49 percentage points. The results in this study indicated that a student would be better off if they deferred their HECS repayments, than if they paid their HECS fees up-front. Miller (1982), Chapman and Chia (1989), Chia (1991), Maglen (1994) and Daly and Jin (1995) all found that while a bachelor degree was worthwhile (greater than the real rate of interest), the PRR to higher education was falling over time, due to a fall in the income differential. These studies also show that a system of uniform HECS fees produced vertical inequity, as all university graduates would pay the same fees regardless of their Private Rates of Return. Most of the Australian studies measuring the impact of HECS on the rates of return to higher education were conducted during the time period of a differential HECS system. The studies by the Productivity Commission (1997), Borland et al. (2000), Borland (2002) and Chapman and Ryan (2003) show that the increase in the cost of higher education after 1997 had significantly affected the PRR. For example, the study by Borland (2002) found the PRR for an average male paying band two level of HECS was 14.5 percent compared to 18.5 percent, if there were no HECS fees. Not only did the results of these studies show that the PRR had fallen, as a consequence of both rising HECS fees and a fall in the income differential, they also suggested that Australia's higher education system was characterised by both vertical inequity and horizontal inequity. For example, the PRR for a high school teacher would change depending on whether they specialised in subjects from band one level of HECS or band two level of HECS. Out of all the previous Australian studies, the study by Chapman and Beer (2004) is the only one to measure the effects of the 2005 budgetary changes in HECS on the

value of a university degree. However, Chapman and Beer did not measure the PRR to a university degree, but instead the present value of HECS repayments. This thesis is the first study to measure the impact of the 2005 changes in HECS on the PRR and SRR to a university degree in Australia.

Chapter Four provides the estimates of the PRR to higher education for the years 2004 and 2005 for various categories of graduates. A university education is considered a worthwhile investment in this study if the Private Rate of Return is greater than the real interest rate of three percent (real 10 year Government bond rate for Australia in 2005). For both males and females for 2004 and 2005, the PRR to an average degree is greater than the real rate of interest. For example, in 2005 the PRR to an average degree for those who deferred their HECS repayments was 9.96 percent for males and 14.63 percent for females (at the 80 percent level) assuming that the alpha coefficient factor, as discussed in Chapter Three, is 20 percent. For those who paid their HECS fees up-front the PRR to an average degree was 9.08 percent for males and 12.69 percent for females.

The results in this study found that for both males and females the PRR to an average degree was lower in 2005 than in 2004, and lower for students who paid their HECS fees up-front than for those who deferred their HECS fees. These outcomes were due to a combination of both the 25 percent higher HECS fees and the reduction in the discount for paying up-front HECS fees from 25 percent to 20 percent. For example, the PRR to a university degree for a single female with no dependent children who paid her HECS fees up-front decreased 0.69 percentage points to 12.69 percent in 2005 (at the 80 percent level). However, the PRR was 14.63 percent, if she deferred her HECS repayments (at the 80 percent level), 0.05 percentage points lower than 2004.

Out of all fee payment systems, the PRR to an average degree was the lowest for students paying full fees. For example, in 2005 the PRR for males, who pay for a full fee paying position up-front, is 5.79 percent. Males enrolled in a Commonwealth Supported Place, have a PRR for the average degree of 9.96 percent, if they defer their HECS repayments, or 9.08 percent, if they pay their HECS fees up-front. This suggests that any movement towards a full

fees system would reduce the PRR to an average degree for males by more than a third. However, this study also shows that, if there were zero HECS fees, the PRR would increase 4.12 percentage points to 16.18 percent for females and 2.37 percentage points to 11.45 percent for males (at the 80 percent level) in 2005. If there were no HECS fees in 2005, the PRR to an average degree would be nearly four times the real interest rate for males and more than five times for females.

This study found that the PRR also varies with gender and marital status. The results in Chapter Four show that marital status significantly affects the PRR for females. For example, in 2005 the PRR to a university degree for a single female with dependent children is 4.60 percentage points lower than the PRR for single females with no dependent children, and 3.99 percentage points lower than the PRR for a single female with no dependent children enrolled in FEE-HELP position (at the 80 percent level). For females, the highest PRR is for single females with no dependent children. Meanwhile, for males the PRR is higher for married males with or without dependent children, than for single males with no dependent children. In addition, the results show that the PRR for females falls with postgraduate study, whereas the PRR for males is higher for a postgraduate degree than a four year degree.

The results in this Chapter also show that the 2005 changes in HECS had a mixed effect on the PRR to a university degree for different groups of graduates. First, the 2005 changes in HECS were more detrimental to females than males. For example, when HECS fees are paid up-front, the PRR to a university degree for single males with no dependent children decreased 0.29 percentage points to 9.08 percent in 2005, whereas the PRR for single females with no dependent children decreased 0.69 percentage points to 12.69 percent (at the 80 percent level). At the same time, the PRR to an average degree decreased for females, who deferred their HECS fees, but increased for males who deferred their HECS fees. For example, the PRR for males who studied an average degree increased from 9.92 to 9.96 percent, whereas the PRR for females fell from 14.68 percent to 14.63 percent. The increase for males is largely due to the changes in the income tax rates, that were introduced at the same time, which tended to favour higher income earners.

In 2005, for all qualifications, for both students who paid their HECS fees up-front and for those who deferred their HECS repayments, the PRR was higher for single females with no dependent children than single males with no dependent children. The PRR, however, varied considerably depending on the field of study. In 2005 for both males who deferred their HECS repayments, and those who paid their HECS fees up-front, the highest PRR was for the qualification, IT at 11.30 percent and 10.29 percent respectively. Whereas, for females the highest PRR was for society and culture at 14.49 percent, for those who paid their HECS fees up-front, and 15.94 percent for females who deferred their HECS repayments (at the 80 percent level).

The PRR for males increased in 2005 for all qualifications who deferred their HECS repayments, except for the qualification creative arts, due to changes in the tax rates and real income growth. Therefore, a consequence of the 2005 budgetary changes in HECS was a widening of the gap between the PRR between males who deferred their HECS repayments, and males who paid their HECS fees up-front, and a closing of the gap between the PRR for females and males.

This study also considered the situation that a particular qualification may not lead to a particular occupation. For both males and females, for those who paid their HECS fees up-front and for those who deferred their HECS repayments, the highest PRR (for categories in this study) was for the occupation, economist/financier. In 2005 for individuals who paid their HECS fees up-front, the PRR for an economist/financer was 14.10 percent for males and 17.85 percent for females (at the 80 percent level). The results also show that both vertical and horizontal inequities exist. The economics graduate who follows a career as an economist/financier was compared to the graduate who becomes an economics teacher. The results show that in 2005 the PRR for a female economist/financier was 7.54 percentage points higher than the PRR for an economics teacher and the PRR for a male economist/financier was more than twice the PRR for an economics teacher (at the 80 percent level). There were also instances of horizontal inequity. In 2005, the PRR for both males and females were higher for secondary teachers who taught band one subjects than for secondary teachers who taught band two subjects. Despite earning the same income and studying the same amount of time,

band one teachers received a higher PRR than band two or band three teachers. This study supported the findings of the Productivity Commission (1997) and Chapman and Salvage (1998) about the inequity when comparing the PRR for teachers.

For both males and females who deferred their HECS fees to become a nurse or teacher, the PRR improved slightly in 2005. However, for those who paid their HECS fees up-front, only the PRR for a male nurse improved. The study also showed that, in comparison to the earlier studies of the Productivity Commission (1997) and Chapman and Salvage (1998), the PRR of male nurses is now higher than that of male teachers. This is a result of the relative increases in the salaries of nurses compared to teachers over the period of time.

There are a limited number of Australian studies that measure the Social Rate of Return to higher education. According to Psacharopoulos (1995), the Social Rate of Return (SRR) differs to the Private Rate of Return (PRR) as it calculates the overall costs and benefits for society, not only for the individual. Higher education is considered a worthwhile investment for society if the SRR is both positive and greater than the return on alternative investments. All the Australian studies discussed in Chapter Five found that the SRR to higher education was not only positive but greater than the return on alternative investments, such as the real return on a Government bond. Miller (1982) was the first Australian study to measure both the SRR and PRR to higher education. Miller (1982) found that during a period of no HECS fees the SRR was 16.25 percent for males and 15.05 percent for females. Miller (1982) also found that the SRR was lower than the PRR for both males and females. For example, the PRR to a bachelor degree for males was 4.85 percentage points higher than the SRR for a bachelor degree for males. The results in Miller's study suggested that the taxes graduates paid were less than the Government subsidies they received. According to Borland et al. (2000), these results were evidence for the Government to shift a greater proportion of the cost of higher education to students. Similar to the findings by Miller (1982), Borland et al. (2000) found the SRR to a bachelor degree for a male was 16.5 percent. However, unlike the study by Miller (1982), Borland et al. (2000) found that the SRR for males studying a bachelor degree was 1.5 percentage points greater than the PRR. The results of the study by Borland et al. (2000) suggest that the introduction of HECS had increased both the opportunity cost for students

studying at university and increased the relative benefit society received from higher education. On the contrary, Larkins (2001) found that the PRR to a bachelor degree had fallen since the study by Miller (1982) but the PRR had not declined that greatly to be lower than the SRR. Nevertheless, Larkins (2001) found that the SRR, at 12.2 percent for a science and technology degree and 11.7 percent for a humanities and social science degree to be greater than the real return the Government would receive on alternative investments. Junankar and Liu (2003) also found that the SRR to higher education in 1991 was greater than the return on public projects at eight percent but also showed that it varied considerably between groups of graduates. For example, Junankar and Liu (2003) found the SRR to a university degree was 18.1 percent for non-Indigenous males and 8.9 percent for non-Indigenous females. The SRR was even higher for Indigenous persons at 19.1 percent for Indigenous males and 15.5 percent for Indigenous females. The study by Junankar and Liu (2003) suggested that it is not only worthwhile for society to invest in higher education but it is also worthwhile for society to particularly invest in the education of Indigenous Australians. A more recent study, that calculates both the SRR and PRR to higher education in Australia based on gender, is the international study by the OECD (2004). The OECD (2004) study supports the findings of Borland et al. (2000), suggesting that, since the 1996-97 differential HECS system was introduced, the Australian Government has underallocated resources to higher education with the SRR to higher education being greater than the PRR to higher education.

An examination of the literature suggests that the Government is under-funding university education overall and in most fields of study. Borland et al. (2000) found that the Government was profiting from higher education as early as the period 1989-90. Larkins (2001) argued that the Government was profiting at least 1.5 times their investment in higher education in 1996-97 and Johnson and Wilkins (2002) calculated that the Government will make in excess of $12 billion from their investment in higher education in the year 2010-11. Johnson and Wilkins's (2002) also found that the Government Rate of Return to higher education was more than double the return they would receive on alternative investments, and Johnson and Lloyd (2001) suggested that, even if the Government provided assistance to students throughout their degree, the return to the Government is 9.9 percent. However, while all these studies suggest there is a need for greater Government funding, none of these studies have measured the

impact of the 2005 increases in HECS on the SRR to higher education. Furthermore, McMahon (2004) argues that these conventional estimates of the SRR to higher education measure the minimum return society receive from higher education. The study by McMahon (2004) found the benefits to society of higher education are more than double the conventional measurements, when externalities are included, and is something that needs to be considered when deciding levels of Government funding of higher education.

Chapter Six provides estimates of the Social Rates of Return to a university degree for the years 2004 and 2005 based on gender. This includes measuring the impact of the 2005 changes in HECS on different fee payment types, lengths of degrees, forms of marital status, qualifications and occupations.

The results in Chapter Six show that the 2005 increases in HECS had not only reduced the PRR to higher education but also the SRR to higher education, suggesting that any future increases in HECS will further reduce the return society receives from higher education. For example, in 2005 the SRR to an average degree decreased 0.27 percentage points to 8.76 percent for males and decreased 0.41 percentage points to 11.47 percent for females (at the 80 percent level). These figures show that the SRR to an average degree is higher for single females with no dependent children than single males with no dependent children. This Chapter also found that the SRR was higher for students enrolled in a Commonwealth Supported Place (CSP) than for those paying full fees (at the 80 percent level). However, the findings in this Chapter also show that marital status adversely impacts upon the SRR for females. For instance, the SRR for single males decreases 0.25 percentage points when dependent children are included, whereas, for females the SRR decreases 5.68 percentage points to 6.70 percent when dependent children are included (at the 80 percent level) in 2005. Even though the SRR is lowest for single females with dependent children, the return to society is more than twice the real return on a Commonwealth Government bond and greater than the real return of any of the listed Government Trading Enterprise (Table 6.14).

For all qualifications, for both males and females, the SRR decreased in 2005 with the greatest impact on the qualification, commerce. For example, in 2005 the SRR to the qualification

commerce decreased 0.39 percentage points to 9.31 for males and 0.77 percentage points to 16.22 percent for females (at the 80 percent level). In 2005 the SRR for both males and females for all qualifications was positive, except for males studying creative arts. For all qualifications the SRR was higher for single females with no dependent children than for single males with no dependent children. In 2005 the highest SRR for males was for qualification, IT at 9.90 percent, whereas the highest SRR for females was for the qualification, society and culture at 18.00 percent (at the 80 percent level). The variation in the returns to society between occupations is a result of both the gross income the graduates earn and the cost to society for providing the course. These results suggest that the return to society will be lower for those qualifications that are expensive to run and where graduates earn a relatively low income. For all occupations for both males and females, the SRR decreased in 2005. In 2005, the highest SRR is for the occupation economist/financier at 15.13 percent for males and 22.51 percent for females. For both males and females, the SRR for an economist/financier was more than double the return for a secondary teacher.

The results showed that, when a comparison was made between the PRR and SRR in 2005, the PRR to an average university degree for a male was 0.32 percentage points higher than the SRR to an average university degree at 9.08, and for a female the PRR was 1.22 percentage points higher than the SRR to an average university degree at 12.69 percent. This would suggest that there is no need for additional Government funding. Psacharopoulos and Patrinos (2002) argue this is a result of both the Government subsidisation of higher education and the fact that not all externalities of higher education can be measured. Not only are these estimates of the SRR to an average degree the minimum return to society, they are also both positive and greater than the real return on a 10 year Commonwealth Government bond. For instance, the SRR to a university degree for males is 5.76 percentage points higher than the real return on a Commonwealth Government bond. Meanwhile, the SRR to a university degree for females is more than triple the return on a 10 year Commonwealth Government bond. Furthermore, the return to society from investing in higher education is greater than the real return on any GTE and the gap between the PRR and SRR for an average degree in Australia is smaller than the gap found in other countries. Psacharopoulos and Patrinos (2002) found the average PRR and SRR for OECD countries were 11.6 percent and the 8.5 percent,

respectively, a gap of 3.1 percentage points. Compared to the OECD, Australia is getting a higher relative social benefit and students a lower private benefit. This suggests that even though the SRR is not greater than the PRR for an average university degree, higher education is still a worthwhile investment for society and when compared to other OECD nations is underfunded in Australia.

Chapter Six shows that depending on the qualification or occupation the SRR can be higher than the PRR. In 2005, the SRR for males is greater than the PRR for the qualifications, commerce, education and society and culture. Meanwhile for females, the SRR is greater than the PRR for all qualifications except engineering. In 2005 for both males and females for the occupations, an economist/financier, and a secondary teacher in economics, the SRR was higher than the PRR. The SRR was also higher than the PRR for male secondary teachers in humanities. According to Topel (2005) this indicates that there is an underinvestment of Government funding and Nonneman and Cortens (1997) argue that this is a net tax on education investment rather than a net subsidy. This suggests that there is both a misallocation of resources and underfunding by the Government in key areas, such as the national priority area of teaching. This is supported by the OECD (2006) statistics that show that Australia was the only country to experience a decrease in public expenditure on higher education as a proportion of GDP between the years 1995 and 2003.

The Government has national priority areas of teaching and nursing. This is due to shortages in these areas and the inflexibility of their labour markets. Chapter Six considered the monopsonistic nature of the labour market of the national priority areas. It considered the SRR of an economics teacher compared to an economist. The monopsonist model shows that the private sector would value the skills and education of an economics teacher more than the monopsonist employer. The monopsonist model in Chapter Six considers the market value of an economist who becomes a teacher. The model shows that the SRR to an economics teacher would increase at least between 2.13 percentage points and 3.11 percentage points for males, and 2.23 percentage points and 4.6 percentage points for females, if the salary of an economics teacher was determined by the private sector. This in part explains why there are areas of shortages in teaching and nursing, as the incomes they receive do not reflect the real market

value of their qualifications and that their value to society warrants additional funding. This is something that will be considered further in the policy recommendations in the next section.

It is also argued in Chapter Six that there are only a small number of courses where the student contribution accurately reflects both the cost of the course and the future income the graduate receives. For example, students becoming dentists or lawyers pay band three level of HECS. The dental student receives $15,332 in Government funding annually to study the course and as a graduate earns $97,365 per year. Students studying law pay the same level of HECS, yet the cost to the Government is one tenth of the cost of providing dentistry, while the average income lawyers receive is $27,768 per year less than the average income dentists receive. Despite the relatively low cost to the Government for providing economics at $2466 per student, students studying economics pay band two level of HECS. This is in part based on the assumption that students studying economics will earn an above average graduate salary of $65,057. However according to Gradstats (2006), graduates with an economics degree occupy a number of professions including teachers and business and computer professionals, and fulfill a number of positions in areas such as clerical, sales and service. A system where students pay the same level of fees despite earning a different income is a system characterised by vertical inequity.

In addition to vertical inequity, Australia's higher education system is characterised by allocative inefficiency. Chapter Six demonstrates that the level of Government funding does not match the needs of society. For example, the Government allocates more funding to agriculture and physical science than to the national priority area nursing, despite the initial graduate full-time unemployment rate for agriculturalists being more than 11 times as great as the unemployment rate for nurses and the unemployment rate for physicists 19 times as great as the unemployment rate for nurses. This suggests that the Government is encouraging agriculture, science and visual and performance arts graduates with relatively high unemployment rates by encouraging universities to offer places in these areas by allocating higher levels of Government funding.

Another weakness of the current system is the allocation of Government funding based on courses not occupations. This weakness is one of the reasons for the shortage of mining engineers, and science and mathematics teachers. Even though the Government allocates a relatively high amount of funding to the areas, engineering, science and mathematics, there are no shortages in these areas across the board. While there was a zero initial graduate full-time unemployment rate for mining engineers in 2006, for four of the eight fields of engineering the initial graduate full-time unemployment rate was above the average unemployment rate at 5.5 percent (Gradstats, 2006b). Likewise, while there is a national shortage of science and mathematics teachers, the initial graduate full-time unemployment rate for 2006 for mathematicians was 6.2 percent and physicists, 13.6 percent. This suggests that the Government needs to support university students studying mining engineering and those studying teaching, who choose science and mathematics majors, and not simply allocate more funding to engineering, science and mathematics courses. However, this is only part of the problem. The Productivity Commission (2007) argues that the Government needs to play an active role in informing university students in regards to the areas where there are shortages of university graduates and where there are surpluses of university graduates. Some policy recommendations for dealing with the problem of asymmetric information will be discussed in the following section.

7.2 Policy implications

According to the Australian Government the HECS fees university students pay are based on both the cost of the course and the future income that the students will receive. However, as discussed in Chapter Six, there are only a few courses where the levels of student contributions reflect both the cost of the course and the future income the graduates will receive. Under the current HECS system some university students, such as law students, are paying fees equal to 84 percent of the total course costs, while students becoming doctors and dentists are paying fees equal to 35 percent of the total course costs. Furthermore, the current higher education system is characterised by both horizontal and vertical inequity. For instance, university graduates earning the same level of income such as high school teachers are repaying different levels of HECS debts depending on their major. Similarly, university

graduates with the same discipline areas such as economics teachers and economists, are repaying the same level of HECS debts for their discipline but are earning substantially different incomes. This is supported by the findings of variations in the PRR to a university degree for different groups of university graduates (Chapter Four).

Policy recommendation 1

Australian higher education students should make a financial contribution to their studies that is based on both the cost of the course and the future income the university graduate will earn.

These contributions would then relate to the Private Rate of Return that the university graduate receives. The Government should introduce a Tertiary Education Levy (TEL), whereby university graduates would have the option to pay a levy based on the course costs and the income that they earn, rather than paying 'up-front'. The findings in Chapter Six suggest that not only is society receiving a relatively high rate of return on individuals investing in a university degree, but the Government is also profiting in some areas of higher education, such as commerce (Tables 6.15 and 6.16). These findings suggest that the contribution made by students should be set at a lower percentage of course costs, for example 30 percent. The university graduate would pay the Tertiary Education Levy on the difference between the income they earn as a graduate and the median income of all employees (20-25 years of age). In this example it is suggested that all students should pay 30 percent of their course costs. By having a set percentage of course costs this would encourage decision making by students that would more accurately reflect the actual cost of their courses.

The formula for calculating the Tertiary Education Levy (TEL) is:

$$\sum_{i=1}^{m} t\frac{Yp_i}{26} = Cs_i\left(\frac{1+r}{26}\right) + \sum_{i=1}^{m-1} RCs_i\left(\frac{r}{26}\right)^{m-1} \qquad (7.1)$$

t = TEL

Yp = income premium. The annual income a graduate earned (up to $100,000) minus $30,000 (threshold), at 2005 prices

Cs = sum of course costs in 2005 prices

r = the real rate of interest of three percent

m = 650 (26 weekly payments for 25 years)

RCs = remaining course costs. This is equal to the residual of the course costs from the previous fortnight plus interest charges from the previous fortnight minus the graduate repayments from the previous fortnight.

The TEL model follows a basic reducible interest rate formula where the costs are repaid fortnightly over a 25 year period.

The TEL model assumes a three percent real rate of interest (real 10 year bond rate) and a maximum of 25 years of earnings to pay the levy. Under the TEL model the more a graduate earns the more the graduate will pay for their education. However, there could be a cap on the levy a graduate pays, for example up to an income of $100,000 in any year. The graduate would pay the levy on a fortnightly basis.

Based on the income profile estimates from the 2003-04 CURF data set, a levy of three percent would equal 31.5 percent of average course costs or $13,900, and a four percent levy would equal 41.5 percent of average course costs or $18,575. Overall university graduates would pay a levy of 0.21534 percent per $1000 of course costs over a 25 year period.

Table 7.1 compares the fortnightly repayments for an average male university graduate who defers their HECS repayments and TEL for 2005. Table 7.1 shows that the fortnightly repayments for an average male university graduate are higher under HECS than under TEL. Under the HECS system the average male university graduate will repay their HECS debt in nine years, whereas under TEL the male university graduate will pay a levy for 25 years. For the first 5 years a male student under TEL would pay an average fortnightly payment of

between $16.30 and $21.73, compared to average fortnightly repayments of $85.16 under HECS.

Table 7.1 The level of repayments for an average male university graduate for both HECS and TEL based on 2005 income levels

Years in the workforce after graduation	Income for an average university graduate	HECS fortnightly repayment	TEL fortnightly repayment (3% levy)	TEL fortnightly repayment (4% levy)
1	$41,521	$71.86	$13.29	$17.72
2	$42,788	$74.06	$14.76	$19.67
3	$44,091	$84.79	$16.26	$21.68
4	$45,428	$96.10	$17.80	$23.74
5	$46,796	$98.99	$19.38	$25.84
6	$48,195	$101.95	$20.99	$27.99
7	$49,622	$114.51	$22.64	$30.19
8	$51,074	$117.86	$24.32	$32.42
9	$52,549	$121.27	$26.02	$34.69
10	$54,043		$27.74	$36.99
11	$55,554		$29.48	$39.31
12	$57,076		$31.24	$41.66
13	$58,607		$33.01	$44.01
14	$60,141		$34.78	$46.37
15	$61,674		$36.55	$48.73
16	$63,200		$38.31	$51.08
17	$64,714		$40.05	$53.41
18	$66,210		$41.78	$55.71
19	$67,682		$43.48	$57.97
20	$69,123		$45.14	$60.19
21	$70,526		$46.76	$62.35
22	$71,885		$48.33	$64.44
23	$73,192		$49.84	$66.45
24	$74,439		$51.28	$68.37
25	$75,619		$52.64	$70.18

The highest fortnightly repayment under TEL is $52.64 at a three percent levy or $70.18 at a four percent levy, compared to $121.27 per fortnight under HECS. The average male university graduate when earning an income of $52,549 will pay $121.27 per fortnight under HECS, whereas under TEL they would pay between $26.02 and $34.69 per fortnight.

Some possible implications of the TEL model include:

a) Encouragement for students from low socio-economic backgrounds

Unlike HECS, TEL students are not faced with a debt. Under the current HECS system students accrue a HECS debt from the time they enrol in university and they must repay their HECS debt when reaching the income threshold. Studies have shown that students from low socio-economic backgrounds are debt averse (Aungles et al., 2002 and James, 2002). As discussed in Chapter Two, increases in HECS have caused the quantity of higher education demanded to fall, in particular from students from low socio-economic backgrounds. This in turn has resulted in a fall in the quality of university graduates, shown by the increase in the percentage of home state year 12 students with a high Interstate Transfer Index (ITI) turning down university offers. Under TEL students from low socio-economic backgrounds will not incur a debt but rather pay a levy (equivalent to 30 percent of the cost of the course) over a 25 year period. Once the 25 years of the levy is completed no further payments are required. This should increase applicants, consequently lifting the standard of university graduates.

b) Embrace vertical and horizontal equity

The TEL model is characterised by both vertical and horizontal equity. Unlike the HECS system, graduates who earn a higher income will pay more for their university education. For example, under HECS both an economist and an economics high school teacher pay the same level of HECS fees for their discipline despite the economist earning a higher income. Under TEL, the economist would pay a levy based on their income and therefore pay more for the extra financial benefits that they gained from their university education. This would restore vertical equity. At the same time, TEL will also encourage horizontal equity. Graduates with the same course costs and the same income will pay the same level of TEL.

c) A lower levy for the national priorities areas

Due to the global shortage of nurses (Nowak, 2000 and Nowak and Preston, 2000) and the growing shortage of high school teachers (Preston, 2003, Stokes, 2005, Stokes and Wright, 2007) teachers and nurses have been made a national priority. However, under the current

higher education system only the units in teaching and nursing are exempt from the 25 percent increase in HECS fees. As discussed in Chapter Two, fees are not based on the type of course but rather the discipline of unit the student studies, therefore teachers and nurses have been affected by the 25 percent increase in HECS fees. In order to encourage individuals to study teaching and nursing the Government needs to lower the repayment levels so that the return on these occupations would increase. Under the TEL model the Government could reduce the true cost of the course by lowering the levy, for example, from three percent to two percent of the income premium for teachers and nurses. This would then provide an extra incentive for individuals to become teachers and nurses. One of the problems the Government faces is encouraging graduates in teaching and nursing to remain in the field. Chapter Six shows that the PRR was higher for an individual with an education degree than for a high school teacher. This suggests that the return is greater for an individual with an education degree working in fields other than teaching. A significant shortcoming of the HECS system is that the cost of the course is tied to the qualification. Overcoming this weakness, the TEL model can have a levy linked to the occupation. Therefore, the Government could encourage graduates to remain in the fields of teaching and nursing by only reducing the levy for teachers and nurses. Therefore, if a graduate leaves the teaching profession, for example to become an economist, they would no longer be paying the lower rate of the levy. In the case of the economics teacher, who earns the same income as another high school teacher for example an English/history teacher, they will pay the same levy for their university education under TEL (unlike HECS). This will then result in an equivalent PRR for teachers across the various discipline areas.

d) An increase in the overall level of Government funding and an improvement in the allocation of resources

Under the TEL model the Government can determine the levy in regards to what level of contribution they want the students to pay as a proportion of total course costs. As discussed in Chapter Six, Australia is the only country in the OECD to experience a decrease in public expenditure on higher education as a proportion of GDP between the years 1995 and 2003. The relatively high Social Rate of Return on higher education overall and the SRR exceeding the PRR in areas such as commerce and economics suggests that the Government is not only

underfunding higher education overall but profiting from areas in higher education. If the Government set the TEL at three percent for the average university graduate, the level of student contributions would be 31.5 percent of course costs. This would result in a shift in the cost of higher education to a level more comparable with other OECD nations. This would reduce the contribution made by all graduates except for nurses who pay HECS fees equal to 29 percent of their total course cost (Table 1.8). However, the Government could set a two percent levy for the national priority areas teaching and nursing, which would equate to 21.5 percent of total course costs. For some graduates the student contribution would be significantly lower. For example, in 2008 students studying both law and economics will pay HECS fees equal to 85 percent of their total course costs.

The TEL model would also improve the allocation of resources. Under the current HECS system the Government is contributing relatively more funding to students studying in the areas of agriculture, physical science and visual and performing arts, than to the areas such as teaching, nursing, law and economics, despite the relatively higher unemployment rates in agriculture, physical science and visual and performing arts. This in turn encourages universities to offer places in these discipline areas with relatively high unemployment rates. The TEL model would encourage students to consider the true cost of the course when choosing what degree to study at university, given the levy is based on the cost of the course. Therefore, graduates studying agriculture and visual arts will pay a higher levy than students studying economics and law. As outlined in the introduction of the thesis, the Government should allocate relatively more funding to the areas of higher education that deliver the greatest returns to society. This will then improve the allocation of resources. Allocative efficiency exists when the fees students pay are related to both the marginal cost of the course and the Social Rate of Return. According to Chapman (2005 p. 4) the price of higher education is given by:

$$Px = Mx - Ex$$

where Px is the price of good or service x;

Mx is the marginal cost of producing x;

and Ex is the marginal value of the externalities associated with the production or consumption of x.

The TEL model will increase allocative efficiency by linking the fees closer to the real marginal cost of operating the course. As discussed in Chapter Six, higher education funding has not been allocated efficiently to match demand or the needs of society. According to the AVCC (2006b), there were excessive places offered in agriculture and physical science and a shortage of places offered in the areas such as teaching, nursing, law and economics. In 2006 the Government could have provided a place for all eligible applicants wishing to study either law or economics, if funds were transferred from some of the lower demand but higher funded courses. The TEL model is likely to not only encourage more students to enrol in areas such as teaching, nursing, law and economics, it will also tend to discourage the number of students enrolling in areas with higher unemployment rates that have been over subsidised under HECS such as agriculture, physical science and visual and performing arts.

e) Variations of the model

There are a number of possible variations that could be applied to the basic TEL model as described. These could include:

(i) The TEL model could include the option where the graduate stops paying the levy once their repayment total is 30 percent of the course costs plus interest.

(ii) The TEL model could include the option where the graduate could pay off their TEL fortnightly repayment at a higher rate per fortnight or as a lump sum and therefore pay back the cost of the course in less than a 25 year period.

(iii) The TEL model could include travel and living expenses and other costs associated with tuition, such as textbooks. For example, an allowance of up to $10,000 per annum for assisting poorer students to attend university.

Policy recommendation 2

The Australian Government should increase the availability of information to future university students including results from the Graduate Destination Survey (GDS) and the Course Experience Questionnaire (CEQ).

A significant weakness of Australia's higher education system is that the students' decision making process is characterised by asymmetric information. The lack of information available to future university students means university students are not thinking as informed rational consumers when making decisions, such as which institution to attend and which course to study. This partly explains why students often assume that the more prestigious universities have the highest level of quality teaching and why students are not enrolling in discipline areas where there are shortages of graduates.

As discussed in Chapter Two, the movement towards a free market will not equip students to demand quality courses but rather it will provide incentives for universities to offer poor quality courses. Akerlof's (1970) *Lemons Principle* suggests that in a market where there is a lack of information students will choose courses that are more expensive, assuming they will be of higher quality and universities will offer low quality courses, as it is more profitable. To avoid this, the Government needs to make more readily accessible to future university students results from the Course Experience Questionnaire (CEQ). Therefore, future students can consider factors such as the quality of teaching, the level of generic skills, overall student satisfaction and graduate full-time employment rates when deciding which university to attend.

The Productivity Commission (2007 p. 252) states that the Government needs to play a role in 'signaling to students areas where there are shortages and where there is likely to be oversupply'. As discussed in Chapter Six, students will not be able to respond to changes in the PRR and future demands, if they are ill-informed. The Government should make the results from the Graduate Destination Survey (GDS) more accessible to students in schools and TAFE and the wider community. Therefore, future students can include in their decision

making factors such as the level of unemployment and starting salaries when choosing which course to study.

Policy recommendation 3

The Government should change both the level and direction of funding to effectively address the areas of national shortage.

As discussed in Chapter Six, the Government can reduce the areas of national shortage by allocating extra Government funding based on occupations not courses. The findings suggest that the Government should support students studying mining engineering, and those studying mathematics and science who are wishing to become teachers and not simply allocate relatively more funding to the courses, engineering, mathematics and science. Despite this, the Government has announced in the *2007-08 Federal Budget* that Commonwealth Grant Scheme (CGS) funding will increase for the discipline areas engineering, mathematics and science. From 2008 the Commonwealth grant for engineering and science will increase $952 to $14,363 per student and the Commonwealth grant for mathematics will increase $2836 to $8217 per student (Treasury, 2007). Bishop (2007a) argues that the increase in government funding in these areas will address the skills shortages. Bishop (2007a p. 1) states:

> These new arrangements allow universities more flexibility to allocate places across different disciplines and more quickly respond to student and employer demand.

However, as discussed in Chapter Six, universities will not allocate funding to the needs of society, such as mining engineering or for places for students who are studying mathematics and science to become teachers, but rather universities will allocate funding to courses. Therefore, the misallocation of Government funding could increase the unemployment rate for potential university graduates and not reduce national shortages.

Meanwhile, the Government has reduced the amount of funding allocated to the disciplines accounting, administration, economics, and commerce from $2703 per student in 2007 to

$1674 per student in 2008. At the same time, universities will have the option to charge students studying these disciplines a maximum HECS-HELP contribution equal to law at $8499 per year (Treasury, 2007). The reason for these changes, according to Bishop (2007a), is the 'higher salaries that graduates of accounting, administration, economics and commerce receive over a lifetime and the competitive nature of the labour market for these skills'.

Here the Government is trying to link qualifications with occupations and careers. For example, the Government is assuming that a graduate majoring in economics will become an economist. However, the results in Chapter Four and Chapter Six show that a single qualification can lead to a variety of occupations and incomes.

Moreover, the findings in Chapter Six suggest that the Government should have allocated more funding to economics in 2008 not less. The results from this study show that the SRR exceeds the PRR for economics. This suggests that the Government was already profiting from students studying economics before the *2007-08 Federal Budget* changes. This movement by the Government also contradicts their aim of addressing skills shortages, when the unemployment rate for economists in 2006 was lower than the unemployment rate for mathematicians, scientists and all engineers other than mining engineers (Table 6.20). If the SRR is greater than the PRR, then raising the HECS fees for students studying economics will only broaden the gap between the SRR and PRR and further discourage students to study economics.

This move by the Government to reduce the funding allocated to discipline areas, such as business studies, is in contrast to the findings of previous studies, such as Lewis, Daly and Fleming (2004), which suggest that the return on a business degree has fallen over time. This contradicts the statement by Bishop (2007a) that degrees in accounting, administration and business studies are generating higher salaries over time. Table 6.20 shows that not only do economists, accountants and business studies graduates earn a lower salary than lawyers, doctors and dentists, they all earn different salaries. Therefore, there is no justification for raising the HECS fees for students studying economics, business and accounting. Furthermore, Table 6.20 shows that students studying physical science and computer science both receive

relatively more government funding and earn a relatively higher income than students studying economics, accounting and business studies. Despite this, the HECS fees for students studying physical science and computer science will remain at HECS band two.

The Government also argues that this move to raise HECS fees for economics, accounting and business studies students will encourage price competition. Bishop (2007a p. 1) states:

> It will be a decision for each university as to whether they raise the student contribution for these disciplines.

However, the previous move by the Government to raise HECS fees by 25 percent shows that this will not encourage price flexibility but rather a uniform move by universities to charge the higher HECS band. Most, if not all, universities will feel the need to charge band three HECS fees in order to cover the loss of Government revenue in these discipline areas.

Policy recommendation 4

The Government should abolish the 35 percent limit on the number of domestic full fee paying places.

From 2008 there will be no cap on the number of domestic full fee paying students (Treasury, 2007). The only condition is that universities must fill Commonwealth Supported Places first before offering full fee paying places. The Government's decision to remove the 35 percent cap on full fee paying students could result in some courses being entirely domestic full fee paying courses. The NTEU (2007 p. 15) argues that:

> A university could allocate all its Commonwealth Supported Places to business and economics students, leaving it free to offer places in undergraduate law entirely as full fee places.

A serious consequence of the Government's move to increase the number of domestic full fee paying places is the quality of education. As discussed in Chapter Two, an increase in the supply of places will lower the quality of university graduates. However, the quality of university graduates would be of an even lower standard if the places were FEE-HELP positions rather than if the Government was to offer additional Commonwealth Supported Places. The option for universities in 2005 to allocate up to 35 percent of all university places to domestic full fee paying places resulted in a fall in entry requirements. The university cut-off scores for domestic full fee paying students is often at least five percentage points lower than the cut-off score for HECS-HELP positions. According to McInnis and Hartley (2002) and Applegate and Daly (2005) there is a strong correlation between a student's grade point average at university and their university admission score. These findings suggest that the quality of university graduates will worsen with the removal of the 35 percent cap on full fee paying students.

It was also discussed in Chapter Two that the option for universities to allocate up to 35 percent of all university places to domestic full fee paying places had created an inequitable system, where students of lower ability were able to gain a position at university over higher achieving students because of their ability to pay. The removal of the 35 percent cap on domestic full fee paying students suggests that the inequality of Australia's higher education system will not only continue but worsen. From 2008 a new form of inequality will characterise Australia's higher education system, that of student choice based on their ability to pay. From 2008 particular courses could potentially be solely full fee paying. This means that unlike previously, where HECS-HELP students could have access to all courses, they may no longer be able to access certain courses unless they can afford full fees. If domestic full fee paying places were abolished, this would restore the optimum level of choice for HECS-HELP students.

The question is why would the Government remove the 35 percent cap on domestic full fee students, when the proportion of domestic full fee paying students equaled 4.1 percent of all students in 2005. However, Figure 2.2 shows that while domestic full fee paying places make up a small proportion of all places in university, the number of students enrolling in full fee

paying places is growing. The Government's decision to remove the cap on domestic full fee paying places is another sign that Australia's higher education system is moving more towards a user pays system. However, unlike competitive markets Australia's higher education system is one characterised by asymmetric information and 'prestige' universities. According to Alexander (2007) 100 courses will cost $100,000 or more in 2008. Alexander argues that while universities such as Sydney University are charging students fees in excess of $200,000, there is no direct correlation between the fees universities are charging students and the quality of their courses.

Policy recommendation 5

The Australian Government should reform youth allowance to reduce the financial burden on students and their families from low socio-economic backgrounds.

Despite the need for greater public funding of universities, an increase in Government funding alone will not encourage students from lower socio-economic backgrounds to study at university. According to DEST (2006a), the number of students from low SES declined from 102,598 in 2001 to 102,394 in 2005 and the proportion of students of low SES declined 0.6 percentage points to 14.5 percent in 2005. It was also pointed out in Chapter One that the number of students receiving youth allowance had fallen from 458,053 in 2003-04 to 435,661 in 2005-06. These findings suggest that the inequality of Australia's higher education has worsened as a result of increasing disincentives to study.

Youth allowance is provided to students aged between 16 and 24 whose parental income is $30,750[48] or less (Centrelink, 2007). Not only is the parental income threshold significantly low, students are not considered independent unless they are 25 years of age. This age of independence seems unrealistic when youth allowance is provided to students aged between 16 and 24 years[49]. The Government should reduce the age of independence from 25 years to

[48] Adjustments are made to this threshold for each dependent child other than the student applying for youth allowance.

[49] If students were receiving youth allowance before turning 25 and are doing the same tertiary course, they can still receive youth allowance, otherwise students 25 years and over receive Austudy.

22 years, the age of independence of the mid 1990s. According to Universities Australia (2007), the *Social Security Act 1991* states that the age of independence 'will be progressively reduced over time'. Universities Australia (2007) argue that this provision has been in place for nine years but the age of independence has not yet been reduced. Reducing the age of independence to 22 years would reduce the financial burden for a greater number of students.

To further reduce the financial burden on low income students the 'income test free area' should be indexed to the CPI. Students receiving youth allowance can only earn $236 per fortnight before their youth allowance payments are affected. Students lose 50 cents in every dollar for each dollar earned between $236 and $316 per fortnight and for every dollar earned over $316 per fortnight the student loses 60 cents. Andrews (2005b p. 3) states that this 'income test free area' is generous. However, this 'income test free area' of $236 per fortnight has been at the same level since 2001. This means that instead of the Government increasing the level of income support for low income students, in real terms these students are worse off today than what they were in 2001. This 'income test free area' should be indexed to the CPI to maintain its value in real terms. Furthermore, this 'income test free area' is not generous when you take into account the higher rate of tax low income students pay. The maximum youth allowance fortnightly payment for students 18 years and over and living at home is $229.10 (Centrelink, 2007). Students receiving the maximum youth allowance fortnightly payment cannot claim the tax free threshold when working, as their youth allowance payments nearly equate to the tax free threshold.

Policy recommendation 6

The Government should increase the number and value of Commonwealth Scholarships and change the way in which they are distributed to institutions and students.

The Government announced in the *2007-08 Federal Budget* that they would increase the number of new Commonwealth Scholarships[50] from 8500 to 12,000 in 2008 (Treasury 2007). Bishop (2007a) argues that these scholarships will provide low income students increased

[50] Commonwealth Scholarships were formally named Commonwealth Learning Scholarships.

opportunities to go to university. Despite the Government's attempt to support a greater number of low income students, the vast majority of low income students are not being supported. According to DEST (2006b) 102,394 students from low SES were studying in 2005. This means that if the same number of students from low SES are studying at university in 2008, 88 percent of them will not receive a Commonwealth Scholarship from the Government.

However, these findings by DEST (2006b) only consider the number of students who have a place at university. According to Bishop (2007) two thousand of these new scholarships will be offered to students who did not qualify for a place at university. Bishop (2007 p.1) states:

> Two thousand of the new scholarships will be offered to students who may not otherwise qualify for a higher education place, to study two year associate degrees as a pathway to full degrees.

This raises the question as to why the Government would support students who have not been accepted into university over those who have.

Not only are low income students more likely to miss out on a scholarship than receive one, depending on which university they attend the likelihood of receiving a scholarship will vary (refer to Section 1.6.4). However, even if the Government was to increase the number of Commonwealth Scholarships and change the way they were distributed, it would still not encourage all low income students to attend university because of the eligibility criteria. As discussed in Chapter One, in order to be eligible for a Commonwealth Scholarship you must already be enrolled in a university. This means that under the current higher education system the financial barriers to entry still remain for those who did not apply for university. Not only do low income students have to take the chance and enrol in a university in order to receive a scholarship, they may also have to forgo student choice. The maximum life of a Commonwealth Scholarship is four years. This means low income students are less likely to choose degrees, such as dentistry and medicine or combined degrees and honours.

It is not only important for the Government to increase the number of scholarships, it is also important for the Government to raise the value of scholarships. It was discussed in Chapter One that the cost of moving and living away from home far exceeded the value of both scholarships. Although the Government announced in the *2007-08 Federal Budget* that they would increase the number of new Commonwealth Scholarships, there is no increase in the real value of either scholarship. In 2008 the value of CECS will be $2162 and the value of CAS $4324 or $41.58 and $83.15 per week, respectively. It was discussed in Chapter One, that in 2005 a student living in Sydney who was fortunate enough to receive both a CECS and a CAS, along with the maximum youth allowance payments and maximum rental assistance for shared accommodation, would still have outstanding expenses of $2795.38 per annum. Therefore, assuming that the real cost of living has not increased since 2005 a student receiving both scholarships would still not have sufficient funds to study at a university in Sydney.

The value of CECS for 2008 should be raised from $2161 per year to $2603 per year. This is equal to the student outlay for books, tuition and extra travel adjusted from the Borland (2002) estimates for 2001, adjusted to 2008 using the Tertiary Education Index (refer to Section 4.1.2). The value of CAS for 2008 should be raised by $2545 to $6869 per year. This is the outstanding expenses of $2795.38 per annum adjusted by the CPI minus the increase in the value of CECS.

7.3 Areas for further research

7.3.1 The extent to which attitudinal factors affect low income students

Previous studies (Aungles et al. 2002, James, 2002, Wright 2005) have shown that an increase in HECS fees deter students from low income backgrounds. Research would be valuable in identifying how important factors, such as debt adversity, play in the decision making of low income students. This would then provide useful information regarding the attitudes of low income students towards a HECS debt and the current eligibility criteria for Commonwealth Scholarships, such as having to being enrolled in a university before applying for a

scholarship. Studies measuring the attitudes of low income students would then provide a platform for developing psychological and phycho-social policies to deal with these issues.

7.3.2 The impact of introducing TEL and HECS for TAFE

In 2008 the fees for students studying at TAFE in NSW will increase by nine percent (O'Halloran, 2007). Chapman, Rodrigues and Ryan (2007) argue that this could lead to sub-optimal outcomes, as some students may forgo a TAFE education for financial reasons. Chapman, Rodrigues and Ryan (2007) suggest that the up-front fees students face when studying at TAFE should be replaced by an income contingent system, such as HECS, to encourage more students from low socio-economic backgrounds. However, studies in the past have suggested that low income students are debt averse. A detailed analysis comparing the impact of both HECS and TEL on the participation of students from low socio-economic backgrounds could provide a more efficient and equitable alternative funding system for TAFE.

7.3.3 The effect of introducing TEL in other nations

It would be possible to undertake a comprehensive study that compares TEL with other higher education financing systems, such as student loans in the USA. This could reveal valuable differences between the equity and efficiency of the various systems.

7.4 Conclusion

The Government argues that the movement of Australia's higher education system towards a user pays system with price flexibility is to create greater efficiency. The Government further argues that with provisions in place such as Commonwealth Scholarships the equity of Australia's higher education will improve. This study shows that not only is Australia's higher education system seriously underfunded, it is also inefficient and inequitable. This study has found that not only is the SRR for an average university degree higher than alternative

investments, for some qualifications and occupations the SRR is greater than the PRR. These findings provide evidence to suggest that the Government needs to both increase the overall level of funding for universities and allocate relatively more funding to the areas with high Social Rates of Return and high graduate employment rates. The movement towards market pricing has not lead to greater efficiency and an improved allocation of resources, as Australia's higher education system is not a perfect market. Given that Australia's higher education system is characterised by both 'prestige' universities and asymmetric information, the outcome has been a uniform increase in HECS fees, and a fall in the quality of graduates. Equity measures, such as Commonwealth Scholarships have proven ineffective, with research showing that there has been a decrease in the quantity of higher education demanded, in particular from students from low socio-economic backgrounds. This is reinforced by the smaller proportion of higher achieving students accepting university offers. This is the product of higher HECS fees and the low number, value and accessibility of Commonwealth Scholarships. This study suggests that efficiency and equity can be compatible goals. If the Government reduces the financial burden on students, then both greater efficiency and equity can be achieved.

Appendix

Table A.1 Descriptive statistics for a male year 12 graduate with no post-school qualifications for the ages 18 to 60 years

	Mean	Std. Deviation	N
Log of income	6.311	1.164	2203
Age	36.82	12.51	2203
Age squared	1512	943.8	2203
Country of birth			
Australia (base case)	0.793	0.407	2203
An English speaking country other than Australia	0.086	0.281	2203
A non-English speaking country	0.121	0.326	2203
Marital status			
Lone person with no dependent children (base case)	0.336	0.471	2203
Lone person with dependent children	0.017	0.129	2203
Couple with dependent children	0.381	0.486	2203
Couple with no dependents	0.266	0.442	2203
Type of employment			
Full-time employment (base case)	0.818	0.388	2203
Part-time employment	0.182	0.386	2203
Years of schooling			
Completed year 12 (base case)	0.401	0.491	2203
Left before year 12	0.599	0.490	2203
Type of occupation			
Professional (base case)	0.065	0.233	2203
Managers and administrators	0.067	0.250	2203
Associate professionals	0.112	0.316	2203
Tradespersons	0.139	0.346	2203
Advanced clerical and service workers	0.009	0.0925	2203
Intermediate clerical, sales and service workers	0.120	0.324	2203
Intermediate production and transport workers	0.234	0.423	2203
Elementary clerical, sales and service workers	0.090	0.287	2203
Labourers and related workers	0.164	0.371	2203

Table A.1 Descriptive statistics for a male year 12 graduate with no post-school qualifications for the ages 18 to 60 years (contd.)

	Mean	Std. Deviation	N
Type of industry			
Property and business services (base case)	0.069	0.263	2203
Agriculture	0.045	0.206	2203
Mining	0.020	0.138	2203
Manufacturing	0.180	0.384	2203
Electricity	0.010	0.097	2203
Construction	0.092	0.289	2203
Wholesale trade	0.083	0.275	2203
Retail trade	0.154	0.361	2203
Accommodation and cafes	0.045	0.207	2203
Transport and storage	0.099	0.299	2203
Communication services	0.025	0.155	2203
Finance and insurance	0.021	0.145	2203
Government administration and defence	0.051	0.220	2203
Education	0.018	0.132	2203
Health and community services	0.024	0.152	2203
Cultural and recreational services	0.025	0.155	2203
Personal and other services	0.039	0.193	2203

Table A.2 Descriptive statistics for a female year 12 graduate with no post-school qualifications for the ages 18 to 60 years

	Mean	Std. Deviation	N
Log of income	5.881	1.298	2146
Age	38.232	12.01	2146
Age squared	1606	906.7	2146
Age cubed	72155	55676	2146
Country of birth			
Australia (base case)	0.795	0.404	2146
An English speaking country other than Australia	0.099	0.298	2146
A non-English speaking country	0.106	0.308	2146
Marital status			
Lone person with no dependent children (base case)	0.241	0.429	2146
Lone person with dependent children	0.081	0.273	2146
Couple with dependent children	0.352	0.478	2146
Couple with no dependents	0.326	0.469	2146
Type of employment			
Full-time employment (base case)	0.468	0.499	2146
Part-time employment	0.532	0.499	2146
Years of schooling			2146
Completed year 12 (base case)	0.393	0.489	2146
Left before year 12	0.607	0.488	2146
Type of occupation			
Professional (base case)	0.044	0.200	2146
Managers and administrators	0.024	0.155	2146
Associate professionals	0.104	0.305	2146
Tradespersons	0.022	0.148	2146
Advanced clerical and service workers	0.072	0.260	2146
Intermediate clerical, sales and service workers	0.359	0.480	2146
Intermediate production and transport workers	0.038	0.192	2146
Elementary clerical, sales and service workers	0.203	0.402	2146
Labourers and related workers	0.134	0.340	2146
Type of industry			
Property and business services (base case)	0.107	0.313	2146

Table A.2 Descriptive statistics for a female year 12 graduate with no post-school qualifications for the ages 18 to 60 years (contd.)

	Mean	Std. Deviation	N
Agriculture	0.021	0.142	2146
Mining	0.003	0.057	2146
Manufacturing	0.089	0.285	2146
Electricity	0.007	0.081	2146
Construction	0.017	0.130	2146
Wholesale trade	0.034	0.180	2146
Retail trade	0.232	0.422	2146
Accommodation and cafes	0.087	0.281	2146
Transport and storage	0.033	0.178	2146
Communication services	0.015	0.123	2146
Finance and insurance	0.054	0.226	2146
Government administration and defence	0.066	0.249	2146
Education	0.042	0.202	2146
Health and community services	0.137	0.344	2146
Cultural and recreational services	0.023	0.151	2146
Personal and other services	0.033	0.179	2146

Table A.3 Coefficient of results for a male year 12 graduate with no post-school qualifications for the ages 18 to 60 years

Variables	Unstandardised B	Standard error	t	Sig.
(Constant)	5.401	0.263	20.55	0.000
Age	0.076	0.014	5.583	0.000
Age squared	-0.001	0.000	-5.635	0.000
Country of birth				
An English speaking country other than Australia	0.005	0.081	0.057	0.955
A non-English speaking country	-0.007	0.071	-0.093	0.926
Marital status				
Lone person with dependent children	0.000	0.177	0.002	0.999
Couple with dependent children	0.008	0.057	0.147	0.883
Couple with no dependents	0.101	0.064	1.584	0.113
Type of employment				
Part-time employment	-0.942	0.066	-14.32	0.000
Years of schooling				
Left before year 12	-0.067	0.052	-1.294	0.196
Type of occupation				
Managers and administrators	-0.504	0.131	-3.843	0.000
Associate professionals	-0.014	0.119	-0.114	0.909
Tradespersons	-0.290	0.119	-2.431	0.015
Advanced clerical and service workers	-0.105	0.260	-0.403	0.687
Intermediate clerical, sales and service workers	-0.134	0.117	-1.139	0.255
Intermediate production and transport workers	-0.160	0.113	-1.417	0.157
Elementary clerical, sales and service workers	-0.258	0.125	-2.060	0.040
Labourers and related workers	-0.306	0.116	-2.640	0.008
Type of industry				
Agriculture	-0.497	0.139	-3.574	0.000
Mining	0.542	0.184	2.944	0.003
Manufacturing	0.127	0.102	1.252	0.211
Electricity	0.290	0.244	1.189	0.235
Construction	0.112	0.116	0.964	0.335

Table A.3 Coefficient of results for a male year 12 graduate with no post-school qualifications for the ages 18 to 60 years (contd.)

Variables	Unstandardised B	Standard error	t	Sig.
Wholesale trade	-0.071	0.116	-0.612	0.540
Retail trade	-0.110	0.103	-1.077	0.282
Accommodation and cafes	-0.396	0.137	-2.883	0.004
Transport and storage	0.220	0.114	1.926	0.054
Communication services	0.244	0.165	1.477	0.140
Finance and insurance	0.266	0.176	1.514	0.130
Government administration and defence	0.173	0.130	1.332	0.183
Education	-0.052	0.187	-0.281	0.779
Health and community services	-0.422	0.168	-2.502	0.012
Cultural and recreational services	-0.027	0.164	-0.163	0.871
Personal and other services	-0.171	0.140	-1.215	0.224
N	2203			
Standard error of the estimate	1.039			
Adjusted R square	0.199			

Table A.4 Coefficient of results for a female year 12 graduate with no post-school qualifications for the ages 18 to 60 years

Variables	Unstandardised B	Standard error	t	Sig.
(Constant)	3.933	0.896	4.389	0.000
Age	0.185	0.078	2.390	0.017
Age squared	-0.004	0.002	-1.760	0.079
Age cubed	2.24E-05	0.000	1.219	0.223
Country of birth				
An English speaking country other than Australia	-0.015	0.088	-0.167	0.867
A non-English speaking country	-0.157	0.087	-1.792	0.073
Marital status				
Lone person with dependent children	-0.126	0.110	-1.152	0.249
Couple with dependent children	-0.204	0.075	-2.704	0.007
Couple with no dependents	-0.048	0.074	-0.652	0.514
Type of employment				
Part-time employment	-0.765	0.059	-13.01	0.000
Years of schooling				
Left before year 12	-0.104	0.061	-1.706	0.088
Type of occupation				
Managers and administrators	-0.977	0.212	-4.614	0.000
Associate professionals	0.052	0.153	0.339	0.734
Tradespersons	-0.040	0.218	-0.183	0.855
Advanced clerical and service workers	-0.103	0.163	-0.628	0.530
Intermediate clerical, sales and service workers	-0.038	0.139	-0.272	0.786
Intermediate production and transport workers	-0.068	0.192	-0.354	0.723
Elementary clerical, sales and service workers	-0.149	0.155	-0.962	0.336
Labourers and related workers	-0.212	0.153	-1.380	0.168
Type of industry				
Agriculture	-1.270	0.199	-6.380	0.000
Mining	0.453	0.458	0.990	0.322
Manufacturing	0.069	0.120	0.570	0.569
Electricity	0.180	0.329	0.548	0.584

Table A.4 Coefficient of results for a female year 12 graduate with no post-school qualifications for the ages 18 to 60 years (contd.)

Variables	Unstandardised B	Standard error	t	Sig.
Construction	0.283	0.213	1.329	0.184
Wholesale trade	-0.363	0.162	-2.233	0.026
Retail trade	-0.112	0.107	-1.049	0.294
Accommodation and cafes	-0.017	0.121	-0.138	0.890
Transport and storage	-0.016	0.165	-0.098	0.922
Communication services	0.185	0.226	0.816	0.414
Finance and insurance	0.087	0.137	0.630	0.529
Government administration and defence	0.168	0.130	1.290	0.197
Education	-0.007	0.150	-0.045	0.964
Health and community services	-0.100	0.108	-0.926	0.354
Cultural and recreational services	-0.345	0.187	-1.846	0.065
Personal and other services	-0.372	0.163	-2.279	0.023
N	2146			
Standard error of the estimate	1.185			
Adjusted R square	0.167			

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