

**GREENACRE EDUCATIONAL
PUBLICATIONS (GEP)**

Economics Working Paper Series

*The Impact of Increased HECS Charges
on Student Participation from Different
Socio-economic Groups in the Sydney
Region*

Sarah J. Wright

Working Paper: 07001

Abstract

The aim of this research is to examine the impact of the 1996/97 budgetary changes in Higher Education Contribution Scheme (HECS) on student participation from different socio-economic areas. Regression analysis is used to test the following hypothesis, that the 1996/97 budgetary changes in HECS, increasing the cost of higher education, would create a larger financial burden for low-income students and families and therefore adversely affect the proportion of students participating in university from low socio-economic areas.

The research finds that HECS has increasingly discriminated against low-income students with the unequal access to higher education in 1996 worsening in 2001. The evaluation of results shows the proportion of students in university from higher socio-economic areas increased more than twice the proportion of students from lower socio-economic areas from 1996 to 2001. This under-representation of students from low-income areas suggests the need for effective Government policies to reduce the financial burden on students and families from lower socio-economic areas.

The Impact of Increased HECS Charges on Student Participation from Different Socio-economic Groups in the Sydney Region

Sarah Wright

ACU National

This research examines the impact of the 1996/97 budgetary changes in HECS on student participation from different socio-economic areas. While previous studies (Lewis and Vella 1985 and Chapman 1997) show there is an increase in student participation from low socio-economic areas, these studies are in numerical terms and reflect the increase in university places offered not the demand for higher education, measured by the number of applications. The quantity of demand for higher education (Andrews 1997, Aungles et al. 2002, AVCC 2003, DEST 2001b, NTEU 2000) has declined as a consequence of the 1996/97 budgetary changes in HECS. In addition some, like Chapman and Ryan (2003), consider there is no evidence of a decrease in commencements at university by members of low socio-economic groups since the higher HECS charges following the 1996/7 budgetary changes. This research finds that not only has the participation rate of students from low socio-economic groups declined but also the number of commencing students from low socio-economic areas has also fallen. Unlike other research on this topic, this research is founded upon a longitudinal study 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) in the Sydney region.

Human Capital Theory and Higher Education Policy in Australia

In the 1960's, Human Capital Theory became the rationale for Australian public policy to expand higher education. 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'. 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. This '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 Phillip Coombs Chairman of the 1961 OECD Conference and the work of Shultz (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 in *The Wealth of Nations* 1776:

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 (Smith 1976).

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 (1890) 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'.

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 view. Blaug (1976) disputed Human Capital Theory proclaiming education is a 'screening devise' 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 devise used to identify the right applicant at the least cost but does not directly increase productivity.

Although, the 'screening theory' contradicts the Human Capital Theory with the role of education and proclaims to be universal, these two theories were linked together under 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.

The Role of Higher Education Contribution Scheme (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 (HECS).

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 upfront' received a 25 percent discount, as would students with a 'partial up-front payment' of \$500 or more. Only when HECS debtors reached the compulsory repayment threshold were they required to repay the loan.

Features of the HECS System 1996-2001

The characteristics of the HECS system, as it applied between 1996 and 2001, were a consequence of several changes that 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 percent¹ (Dawkins 1988 p. 2401). The repayments ranged from one percent to three percent of taxable income depending 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 were introduced by the newly elected Liberal Government, after the *Higher Education Amendment Bill 1996* was passed. Changes included student charges increasing approximately 40 percent and a three tier-system replacing a uniform rate of contribution (Band 1, \$3300, Band 2, \$4700, Band 3, \$5500)².

Vanstone (1996) stated, that the student contribution equaled 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.

¹ The 1992-1993 Federal Budget raised the discount to 25%.

² Band 1 includes Arts, Humanities, Education and Nursing. Band 2 includes Mathematics, Computing, Architecture and Sciences. Band 3 includes Law, Medicine and Dentistry.

The three-tier system replicated the proposition put forward by the Wran Committee in 1989 except 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 equaled \$20,000, which was introduced in 1995-96, and the lowering of income thresholds (Table 1). 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’.

Table 1. 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 ³	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: www.ato.gov.au

³ 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 1996/1997 it was called Taxable Income.

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 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.

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 1999-2000 Federal Budget, due to its ineffectiveness. DETYA's (1998) *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'.

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% in 1996 to 40.2% in 2001 while student contributions had increased from 11.6% to 17.4% respectively (DEST 1996, 2001a).

The NTEU (2003 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, according to the Department of Education, Science and Training (DEST) the Commonwealth would 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 DEST (2003 p. 1).

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 totaling more than 78 per cent. However the 1996/97 budgetary changes resulted in students in Band 1 and Band 2 subsidising the highest Band. Jackson (2001 p. 1) states, 'the standard HECS rate for Arts and Science is equivalent to 33 per cent of the median fee and 40 per cent of total costs, whereas the HECS for dentistry etc. is only 25 per cent of the median fee and 33 per cent of total cost' (see Table 2).

Table 2. Student contribution towards HECS per band

Field of study	HECS 1997 (\$ pa)	Total Costs 1997 (\$ pa)
Arts	3300	8110
Law	5500	8110
Economics	4700	8110
Science, Engineering	4700	12110
Dentistry, Veterinary science	5500	16700

Source: Modified from Jackson 2001 p. 2.

HECS - an Income Contingent Charge System

According to Chapman (2001 pp. 1-6)⁴ 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'. However, 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.

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

⁴ A fundamental aspect of the existing literature is the several reports 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.

featuring no upfront 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, President of the Australian Vice Chancellor's Committee (AVCC) (2003 p. 1), 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'. However, 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, 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 (1997a pp. 228-229) 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 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).

A Model of Student Participation in Higher Education in the Sydney Region

This model is designed to measure the effect of changes in HECS on student participation from different socio-economic areas in higher education. The quantity of higher education demanded by students in the Sydney region can be measured by:

$$Q_d = f(P_h, C, r, Y_r)$$

P_h represents the price of higher education, in this case HECS; C is the cost of substitutes to university as a source of post-school qualifications such as, TAFE and other educational institutions; 'r' represents the expected rate of return; and Y_r is relative income. It is assumed that these variables with the exception of Y_r are constant for individuals at a particular point in time. While students are charged different prices according to the type of course, for a given point of time the price of higher education will be constant. C , the cost of alternative education is also constant at a particular point in time. The rate of return will also be treated as constant, as even if the rate of return was calculated for each individual, for a given point of time the individual's rate of return would remain unchanged. However, relative income (Y_r) unlike the other variables is not constant as it varies between individuals at a point of time. Therefore, student demand for higher education is directly related to relative income (Y_r). Y_r is the median income of each SLA as a proportion of average income of all SLAs in the Sydney region.

It is expected the model will show that as relative income (Y_r) increases so will the quantity of higher education demanded. This in turn will be reflected in a higher participation rate for students coming from areas with higher relative incomes, compared to those from lower relative incomes. It is expected that the model will show a positive correlation between the proportion of university students (S_p) and relative income (Y_r). It is also expected that this correlation between the proportion of university students and relative income will increase between 1996 and 2001, as a result of the increase in HECS. The increased cost of higher education is likely to affect lower income earners more, as this is a higher relative cost for them compared to higher income earners. The lower relative income earners are more likely to turn to cheaper substitutes for their post-school qualifications, such as, TAFE or give up higher education and enter the workforce.

A Description of the Sample

The correlation research is founded upon a longitudinal study of ABS Census data from 1996 and 2001 to determine the relationship between changes in relative income (Y_r) in Statistical Local Areas (SLAs) and student participation at university (S_p). The number of university students used in the following research data, are classified according to the 'place of enumeration' on each census night within the 46 Statistical Local Areas (SLAs) in the Sydney region. However, a limitation of this model in determining the relationship between the proportion of students and relative income is the number of students who choose to live in close proximity to one of Sydney's main universities. This limitation will be considered later in this report.

The income in each year is the median weekly income in each of the SLAs as calculated in the 1996 and 2001 ABS censuses respectively. Relative income (Y_{r96} and Y_{r01}) is calculated by dividing the median weekly income (Y_{96} and Y_{01}) for each SLA by the average income for each

year (sum of median incomes for the given year divided by 46 (the number of SLAs)). The average median incomes for 1996 and 2001 were \$372.30 and \$721.37 respectively.

Relative income is calculated as it allows for the impact of inflation upon the value of income between 1996 and 2001, and by using median weekly earnings instead of mean weekly earnings, the central tendency is based on the middle value of the data set, therefore, not responsive to extreme minimum and maximum values that skew quantitative data.

The proportion of university students, S_p , is the number of university students in a SLA compared to the total population in the SLA. The proportion of university students is calculated by dividing the number of university students in each SLA for each of the years by the population of the SLA multiplied by 100 to give a percentage. The percentage of university students for each SLA is rounded to four decimal places to allow greater accuracy when measuring the degree of correlation between income and student participation and forming the line of regression. The relationship between student participation and socio-economic background can then be determined.

Table 3 Descriptive statistics of the proportion of students and relative income for the Sydney region for 1996 and 2001

		S_{P96}	Y_{r96}	S_{P01}	Y_{r01}
N	Valid	46	46	46	46
	Missing	0	0	0	0
Mean		4.280935	1.000012	4.778648	0.999999
Std. Error of Mean		0.287607	0.036122	0.325660	0.030675
Median		3.976350	0.954875	4.518250	0.945423
Std. Deviation		1.950643	0.244992	2.208737	0.208045
Variance		3.805	0.060	4.879	0.043
Range		7.7901	1.0019	9.2699	1.0147
Minimum		1.2810	0.6017	1.5078	0.7652
Maximum		9.0711	1.6035	10.7777	1.7799

Table 3 shows that there were students attending university from all 46 SLAs for both 1996 and 2001. The mean proportion of students attending university had increased from 4.2809 percent of the population in 1996 to 4.7786 percent of the population in 2001 while the mean relative income remained close to 1.0.

The maximum proportion of students in 1996 at 9.0711 percent of the population occurred in the SLA, Randwick⁵. The maximum proportion of students for 2001 at 10.7777 percent of the population of the SLA occurred in Sydney remainder, with Randwick following at 10.0035.

The minimum relative income for both 1996 and 2001 occurred in Fairfield corresponding with a below median proportion of students for both years. Of the top 12 SLAs for 1996 based on relative income (top 25 percent of SLAs), all had an above median proportion of students with only Strathfield and Burwood from the bottom 12 SLAs (bottom 25 percent of SLAs), with an above median proportion of students. In 2001, all SLAs with relative income above 1.0, except for inner Sydney SLA, had an above median proportion of students, however the entire 12 bottom SLAs had a proportion of students below the median. Wyong had the minimum proportion of students attending university for both 1996 and 2001⁶ and is among the bottom three SLAs based on relative income for both years.

From the above descriptive statistics, there can be seen a relationship between the proportion of students and relative income. However, there are exceptions, with the inner Sydney SLA with maximum income in 2001 but a below median proportion of students, and Randwick with the maximum proportion of students in 1996 and second highest proportion of students in 2001

⁵ One of the three main universities in the Sydney region, is the University of NSW located in Randwick.

⁶ Traveling distance could also be a factor here.

outside the top 12 SLAs for both years. The above exceptions illustrate some movement of students to SLAs with universities, partly distorting the relationship between relative income and student proportion. This issue will be considered later in this article.

The Model Estimated

The 1996/97 budgetary changes in HECS included the replacement of a uniform rate of contribution with a three-tier system, that is, a differential system, with different prices for higher education (bands) based on the cost of the course and potential earnings (Band 1, \$3300, Band 2, \$4700, Band 3, \$5500)⁷. The introduction of the three-tier system, increased student charges approximately 40 percent and coincided with other budgetary changes such as, lower income thresholds and tighter income support.

In order to analyse the impact of HECS upon student participation from different socio-economic backgrounds between 1996 and 2001, SPSS was used to measure and test a two variable linear regression model. It is assumed that the independent variable, relative income is related to the dependent variable, the proportion of students.

The model is represented by the following equation:

$$S_p = \beta_0 + \beta_1 Y_r + e$$

S_p is the dependent variable, Y_r is the independent variable, β_0 and β_1 together represent the coefficients while e is the random error component. It is expected that the coefficient of SLA

⁷ Band 1 includes Arts, Humanities, Education and Nursing. Band 2 includes Mathematics, Computing, Architecture and Sciences. Band 3 includes Law, Medicine and Dentistry.

relative income (Y_r) is positive, as the higher the relative income, the greater the student demand for higher education and as a result increased participation in higher education. The least square estimates of the coefficients of the variables (under the heading 'B') for 1996, are shown in Table 4, and for 2001, in Table 5. For 1996 $\beta_0 = 0.581$ and $\beta_1 = 3.700$ and for 2001 $\beta_0 = 0.100$ and $\beta_1 = 4.678$.

Table 4. Coefficients of student participation in higher education for 1996

Model 1		Unstandardized Coefficients		t	Sig.
		B	Std. Error		
	(Constant)	0.581	1.094	0.531	0.598
	Y_{r96}	3.700	1.063	3.482	0.001

Table 5 Coefficients of student participation in higher education for 2001

Model 2		Unstandardized Coefficients		t	Sig.
		B	Std. Error		
	(Constant)	0.100	1.467	0.068	0.946
	Y_{r01}	4.678	1.437	3.256	0.002

The estimated regression equation for 1996 is:

$$S_p = 0.581 + 3.700 Y_{r96}$$

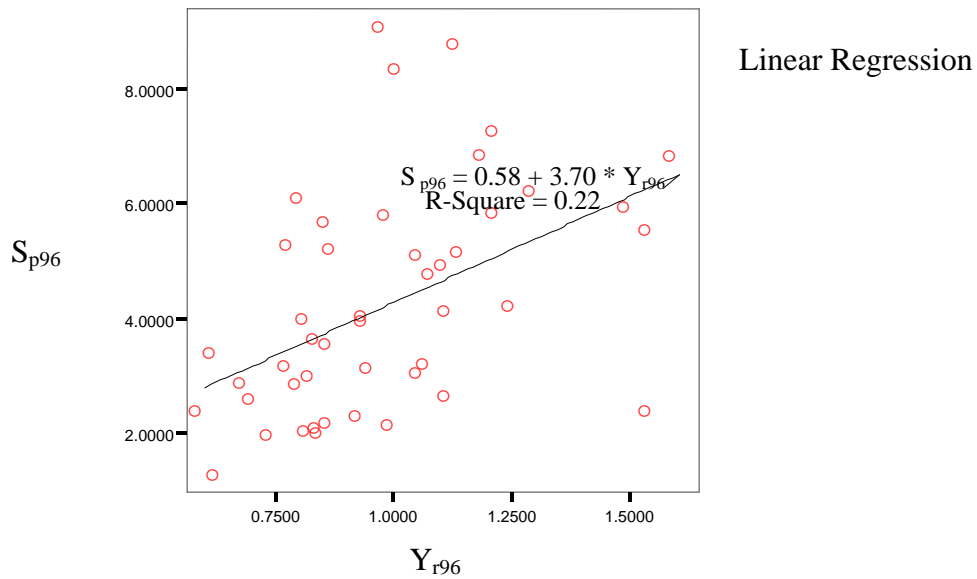
$$(1.094) (1.063)$$

The estimated regression equation for 2001 is:

$$S_p = 0.100 + 4.678 Y_{r01}$$

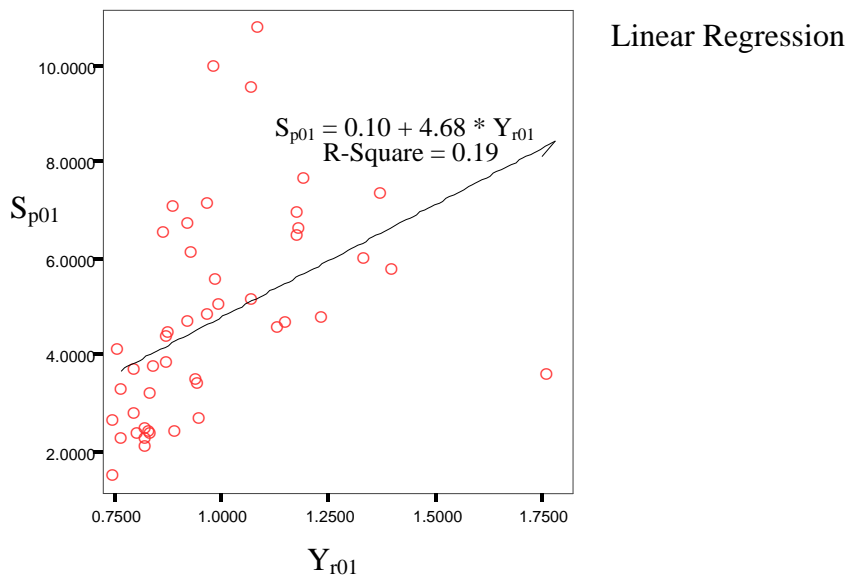
$$(1.467) (1.437)$$

Figure 1. The relationship between the proportion of students and relative income for 1996



Each point in Figure 1 represents a SLA showing the relationship between the proportion of students (S_p) and relative income (Y_r).

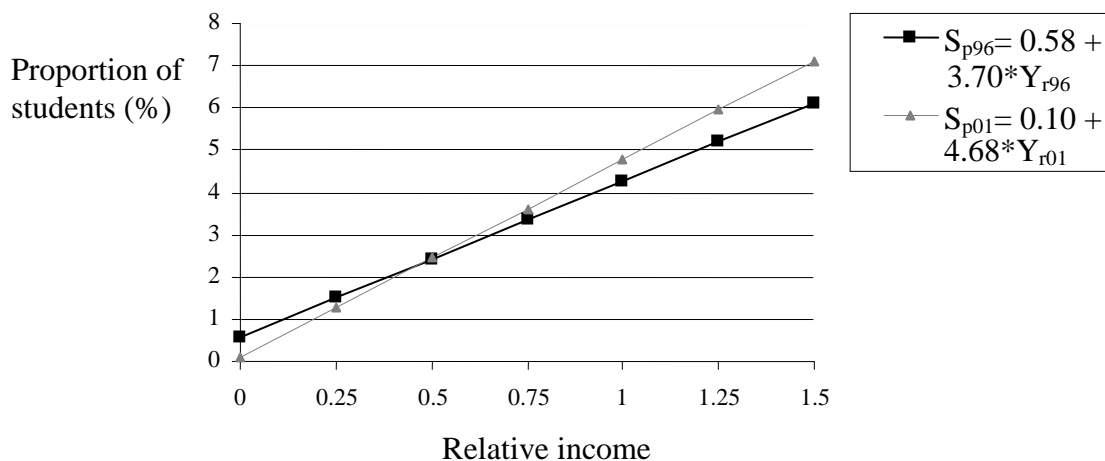
Figure 2 The relationship between the proportion of students and relative income for 2001



Both the regression equations and Figures 1 and 2 suggest that a change in relative income does directly affect the proportion of students in higher education. The regression equation for 2001 and the slope of the regression line in Figure 3.4 indicate relative income has had an even larger impact on the participation of students in 2001, compared to 1996. For example, considering the mean relative income is approximately 1.0, then, a 0.1 change in relative income in 1996 would increase the proportion of students in the population by 0.37 percentage points, whereas, a 0.1 change in relative income in 2001 would increase the proportion of students in the population by 0.47 percentage points.

The regression equations and Figure 3 also suggest the proportion of students is directly related to the relative income of different socio-economic backgrounds. A lower socio-economic area with a relative income of 0.75 (below average relative income) is estimated to have a proportion of students equal to 3.356 for 1996 and 3.609 for 2001, both below the median proportion of students for each given year.

Figure 3 The regression lines for 1996 and 2001



A socio-economic background with a relative income of 1.0 has an estimated proportion of students above the median proportion of students for each given year, estimated at 4.281 and

4.778, respectively. Whereas, a higher socio-economic area with a relative income of 1.25 (above average relative income) is estimated to have a proportion of students equal to 5.206 for 1996 and 5.948 for 2001, both significantly above the median proportion of students for each given year. Between 1996 and 2001 the proportion of students from lower socio-economic areas (0.75 relative income) increased 0.253 percentage points whereas the proportion of students in higher socio-economic areas (1.25 relative income) increased 0.742 percentage points, almost three times as great.

Even though the number of students participating in university has increased from all socio-economic areas between 1996 and 2001, this is a result of the higher number of places offered by universities and not an increase in student demand for higher education. The proportion of students from a higher socio-economic area have increased more than the proportion of students from a lower socio-economic area, coinciding with the 1996/97 budgetary changes in HECS and consequently, increasing the under representation of students from lower socio-economic areas.

The results may be distorted by the high proportion of students living near the main three universities⁸ in Sydney. As a result the SLAs of Randwick, Sydney remainder and South Sydney were then removed from the regression analysis for both 1996 and 2001 (Figures 4 and 5). Both the R square and Adjusted R square for 1996 increased to 29.9 percent and 28.2 percent, respectively. The R square and adjusted R square also rose for 2001, to 25.9 percent and 24.1 percent, respectively. This shows a stronger relationship between the proportion of students and relative income for both 1996 and 2001. This also partly reduces the effect of one of the main

⁸ These three SLAs cover the University of Sydney, the University of NSW and the University of Technology, Sydney.

factors limiting the previous models i.e. the number of students, living in close proximity to three of Sydney's largest universities and students living on campus rather than in their family homes.

The estimated regression equation for 1996 excluding Randwick, Sydney remainder and South Sydney is:

$$S_p = 0.517 + 3.466Y_{r96}$$

(0.851) (0.829)

The estimated regression equation for 2001 excluding Randwick, Sydney remainder and South Sydney is:

$$S_p = 0.283 + 4.142Y_{r01}$$

(1.113) (1.093)

Figure 4. The relationship between the proportion of students and relative income for 1996 excluding Randwick, Sydney remainder and South Sydney

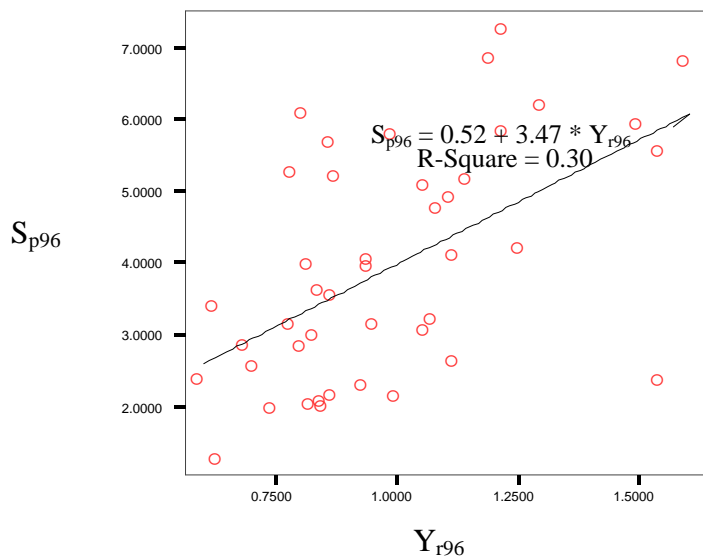
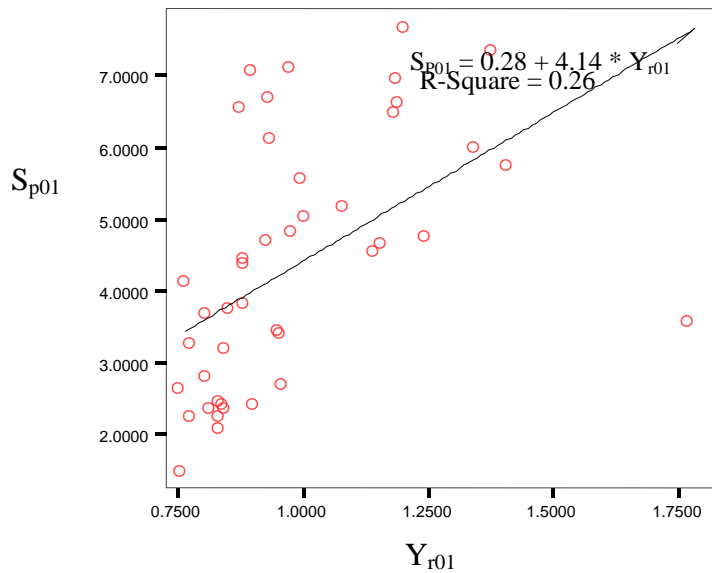
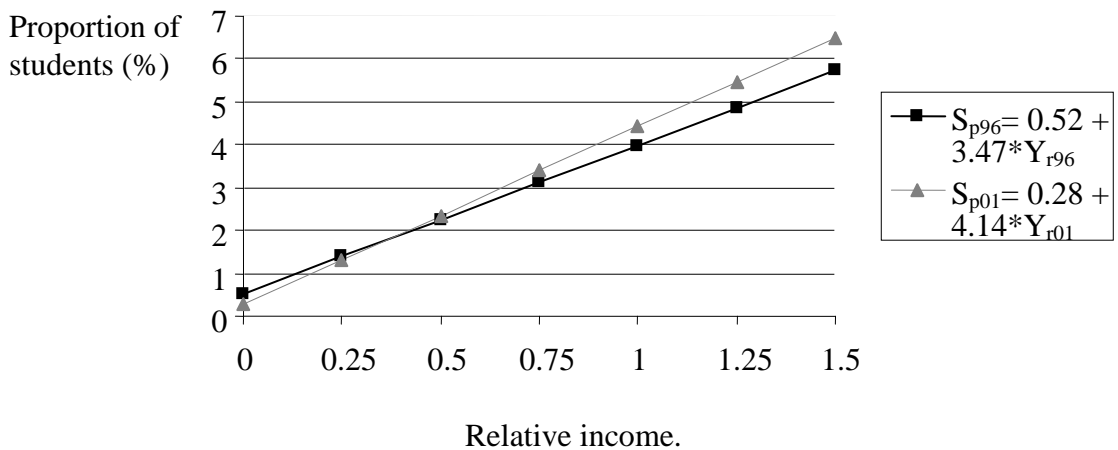


Figure 5 The relationship between the proportion of students and relative income for 2001 excluding Randwick, Sydney remainder and South Sydney



The upward bias on the proportion of students resulting from the number of students living in close proximity to the main three universities is further supported by, the comparison between previous regression equations for 1996 and 2001 and Figure 3, and the estimated regression equations excluding Randwick, Sydney remainder and South Sydney and Figure 6. For example, previously a 0.10 change in relative income for 1996 increased the proportion of students by 0.37 percentage points, and for 2001 0.47 percentage points, whereas, a 0.10 change in relative income (using regression equations excluding Randwick, Sydney remainder and South Sydney) in 1996 increased the proportion of students by 0.35 percentage points and in 2001, 0.41 percentage points.

Figure 6 The regression lines for 1996 and 2001 excluding Randwick, Sydney remainder and South Sydney



The number of students living near the three main universities also positively skewed the proportion of students from high-income areas consequently, increasing the difference between the proportion of students participating in university from high socio-economic areas compared to low socio-economic areas. For example, a lower socio-economic area with a relative income of 0.75 is estimated to have a proportion of students equal to 3.117 for 1996 and 3.390 for 2001, the proportion of students increasing 0.273 percentage points, higher than the previous estimation of 0.253 percentage points. A higher socio-economic area with a relative income of 1.25 is estimated to have a proportion of students equal to 4.850 for 1996 and 5.461 for 2001 increasing the proportion of students by 0.611 percentage but lower than the previous estimation of 0.742 percentage points. The proportion of students from higher socio-economic areas (1.25 relative income) increased more than the proportion of students from lower socio-economic areas (0.75 relative income), however, the proportion of students from high socio-economic areas increased by 2.2 times the proportion of students from low socio-economic areas, not 2.9 as previously estimated.

Nonetheless, the proportion of students from low socio-economic areas is still below the median proportion of students at 3.6343 percent of the population and 4.3926 percent of population for 1996 and 2001, respectively, whereas, the proportion of students from high socio-economic areas is significantly above the median proportion of students for both years (Table 6). The results also suggest that despite the proportion of students increasing from 1996 to 2001 for all socio-economic areas, the increase in HECS increased the relative proportion of students from higher socio-economic areas participating in higher education compared to students from lower socio-economic areas in 2001 as compared to 1996.

Table 6 Descriptive statistics of the proportion of students and relative income for the Sydney region for 1996 and 2001, excluding Randwick, Sydney remainder and South Sydney

		S _{P96}	Y _{r96}	S _{P01}	Y _{r01}
N	Valid	43	43	43	43
	Missing	3	3	3	3
Mean		3.971037	0.996508	4.406812	0.995490
Std. Error of Mean		0.244119	0.038515	0.265801	0.032674
Median		3.634300	0.948160	4.392600	0.939878
Std. Deviation		1.600797	0.252558	1.742976	0.214259
Variance		2.563	0.064	3.038	0.046
Range		5.9758	1.0019	6.1701	1.0147
Minimum		1.2810	0.6017	1.5078	0.7652
Maximum		7.2568	1.6035	7.6779	1.7799

Post-2001

The most recent data from DEST supports the findings of this study that the HECS changes have discouraged students from low socio-economic areas from attending university. In the period from 1999 to 2004 not only did the proportion of students commencing university from low socio-economic areas decline but the actual numbers of commencing students has declined (Table 7). In the period 1999 to 2004 the total number of commencing domestic university students grew by 1.88 percent but the number from low socio-economic areas declined by 1.73

percent. This demonstrates that the problem is worsening. Allowing for the further increase in HECS that occurred from 2005 it could be expected that a further deterioration in the situation would be likely.

Table 7 Commencing domestic university students in Australia 1999-2004

	1999	2000	2001	2002	2003	2004
Low socio-economic status	36,926	37,061	37,913	38,657	37,257	36,289
Total domestic students	240,089	241,485	248,156	253,537	249,443	244,595
Ratio of low socio-economic status	0.154	0.153	0.153	0.152	0.149	0.148

Source: Department of Education, Science and Training (2006)

Conclusion

Even though, the number of students at university has increased between 1996 and 2004, the increase in the cost of university education (HECS) had impacted upon student participation in university from different socio-economic backgrounds between 1996 and 2004. The longitudinal study of 46 Statistical Local Areas (SLAs) in the Sydney region between 1996 and 2001, showed the proportion of students from a lower socio-economic area with a relative income of 0.75 had increased 0.253 percentage points, whereas, the proportion of students from a higher socioeconomic area with a relative income of 1.25 increased 0.742 percentage points, almost three times as great. Even when the three SLAs, Randwick, Sydney remainder and South Sydney were removed from the study, so as to reduce the partial distortion caused by the number of students living in close proximity to Sydney's main three universities, the increase in the proportion of students was 0.611 percentage points for higher socio-economic areas (1.25 relative

income) compared to 0.273 percentage points for lower socio-economic areas (0.75 relative income).

The regression equations show that the effect of relative income on student participation has risen from $S_p = 0.58 + 3.70Y_{r96}$ in 1996 to $S_p = 0.10 + 4.68Y_{r01}$ in 2001, following the HECS increase. Even excluding the three SLA's near the main universities, the effect of relative income on student participation still increased from $S_p = 0.52 + 3.47Y_{r96}$ in 1996 to $S_p = 0.28 + 4.14Y_{r01}$ in 2001.

The lower opportunity for students to participate in university from lower socio-economic areas compared to students from higher socio-economic areas between 1996 and 2004, has consequently led to greater inequality and the under representation of students from lower socio-economic areas to increase. The outcome of this research challenges the view that HECS has established a higher education system characterised by 'equity of access'. The changes in higher education policy in 2005 with further increases in fees and charges of up to 25 percent will only heighten barriers to access and the unequal opportunity to higher education. Students from low socio-economic areas may consider cheaper substitutes to higher education such as, TAFE or continue the trend in studying courses that are least expensive at university.

The increased cost of higher education could also affect the quality of education. As it has been shown that HECS increases discriminate against students from low socio-economic backgrounds, students with high academic ability from lower socio-economic areas may be replaced by students from higher socio-economic areas but not necessarily with comparably high academic abilities. The possible fall in the level of academic quality could then affect the value of human capital stock generated in higher education in Australia. As a result there is a need for the

Government to redress these problems by providing considerably more funding and financial assistance especially for students from low socio-economic areas and other disadvantaged groups.

Reference List

- Andrews, L. (1997). The effect of HECS on interest in undertaking higher education. Canberra, Higher Education Division, Department of Employment, Education, Training and Youth Affairs.
- Aungles, P. Buchanan, I. Karmel, T. and Maclachlan, M. (2002). HECS and opportunities in higher education: a paper investigating the impact if the Higher Education Contributions Scheme (HECS) on the higher education system. Canberra, Department of Education, Science and Training.
- Australian Taxation Office (ATO). Canberra, Australian Taxation Office. Viewed: July 23rd 2004. <http://www.ato.gov.au>
- Australian Vice Chancellors' Committee (AVCC) (2003). 'Growing Australia's universities- the facts: AVCC.' Fact Sheets 2003. Canberra, Australian Vice Chancellors' Committee. Viewed: June 17th 2004. http://www.avcc.edu.au/news/public_statements/publications/facts03/GrowingAustraliasUniversities_facts.pdf
- Bartel, A. and Lichtenberg, F. (1987). 'The comparative advantage of educated workers in implementing new technology.' The review of Economics and Statistics. **69** (1): 1-11.
- Becker, G. S. (1993). Human Capital, a theoretical and empirical analysis with special reference to education. Chicago, University of Chicago Press.
- Blaug, M. (1976). 'The empirical status of human capital theory: a slightly jaundiced survey.' Journal of Economic Literature. **14** (3): 827-855.

- Chapman, B. 1997, 'Conceptual Issues and the Australian Experience with Income Contingent Charges for Higher Education.' The Economic Journal. **107** (442): 738-751
- Chapman, B. (2001). 'Australia higher education financing: issues for reform. A submission to the senate employment, workplace relations, small business and education references committee inquiry: the capacity of public universities to meet Australia's higher education needs.' Australian Economic Review. **34** (2): 195-204.
- Chapman, B. and Ryan, C. (2003). Higher education financing and student access: a review of the literature. Australian national University, Economic Program, Research School of Social Sciences. Viewed: 29th April 2004.
http://www.avcc.edu.au/policies_activities/education_review/Chapman_HECS_study_Oct03.pdf
- Commonwealth Government. (1988). Higher Education Funding Act 1988. Australia: Commonwealth of Australia: Viewed: 17th February 2004.
http://www.austlii.edu.au/au/legis/cth/consol_act/hefa1988221/
- Commonwealth Government. (1999). Social Security (Family Allowance and Related Matters). Legislation Amendment Bill 1999. Australia: Commonwealth of Australia. Viewed: 1st August 2004. <http://www.aph.gov.au/library/pubs/bd/1998-99/99bd212.htm>
- Department of Education Science and Training (DEST). (1996). Selected higher education finance statistics 1996. Canberra, Department of Education Science and Training. Viewed: 12th March 2004.
www.dest.gov.au/highered/statistics/fianance/2001/finance96.pdf
- Department of Education Science and Training (DEST). (2001a). Selected higher finance statistics 2001. Canberra, Department of Education Science and Training. Viewed: 14th March 2004.
www.dest.gov.au/highered/statistics/fianance/2001/finance2001.xls

- Department of Education Science and Training (DEST). (2001b). The national report on higher education in Australia 2001. Canberra, Department of Education Science and Training. Viewed: 20th August 2004.
www.detya.gov.au/highered/otherpub/national_report/split.htm
- Department of Education Science and Training (DEST). (2006). Selected higher education statistics 2004. Canberra, Department of Education Science and Training. Viewed: 14th November 2006.
http://www.dest.gov.au/sectors/higher_education/publications_resources/statistics/publications_higher_education_statistics_collections.htm
- Department of Employment, Education, Training and Youth Affairs. (DETYA) (1998). 'Informal survey of equity officers.' In The Higher Education Contribution Scheme. Jackson, K. Australia, Parliamentary Library. Viewed: 27th February 2004. www.aph.gov.au/library/intguide/SP/hecs.htm
- Friedman, M. (1955). 'The role of the government in education' in Economics and the Public Interest. Solo, R. New Brunswick, N. J. Rutgers University Press.
- Friedman, M. (1962). Capitalism and freedom. Chicago, University of Chicago Press.
- Husz, M. (1998). Human capital, endogenous growth, and government public policy. Frankfurt am Main, Peter Lang GmbH.
- Jackson, K. (2001). Tuition fees and university funding. Australia, Parliamentary Library. Viewed: 28th February 2004.
<http://www.aph.gov.au/library/pubs/rn/1996-97/97rn54.htm>
- Kaufman, B. E. and Hotchkiss, J. L. (2000). The economics of labour markets. USA, The Dryden Press, A division of Harcourt College Publishers.
- Lewis, P. and Vella, F. (1985). 'Economic factors affecting the number of engineering graduates in Australia.' Australian Economic Papers. **24** (44): 66-65.

- Marginson, S. (1997a). Educating Australia: government, economy and citizen since 1960. Melbourne, Cambridge University Press.
- Marginson, S. (1997b). Markets in education. NSW, Allen & Unwin.
- Marshall, A. (1890). Principles of economics. Viewed: 20th March 2004.
www.marxists.org/reference/subject/economics/marshall/bk4ch06.htm
- Martin, L. H. (Chair) (1964). Australian universities commission, committee on the future of tertiary education in Australia. Canberra, Government Printer.
- National Tertiary Education Union. (2000). 'Does HECS deter? Falling applications suggest that it does.' 2000 NEWS. 15th November. Southbank: National Tertiary Education Union. Viewed: 11th June 2004.
www.nteu.org.au/news/2000/2000/980.
- National Tertiary Education Union. (2003). 'Students pay more, universities get less, the government pockets the difference. A study on subsidise student place funding from 1996 to 2001.' Policy Research Paper. 1 (2003): 1-10. Southbank: National Tertiary Education Union. Viewed: July 12th 2004.
http://www.google.com.au/search?q=cache:_RwZ6rfPb9YJ:www.nteu.org.au/freestylar/gui/files/file3e43248f8d9c4.pdf+NTEU++%22universities+receive+approximately+%241,200+less+per+subsidised%22+&hl=en
- Schultz, T. W. (1961). 'Investment in human capital'. American Economic Review. 51 (1): 1-17
- Smith, A. (1976). The wealth of nations. Chicago, University of Chicago
- Thurow, L. (1975). Generating inequality. New York, Basic Books.
- Vanstone, (1996). A comprehensive policy and funding package for higher education. Australia: Commonwealth of Australia. Viewed: May 16th 2005
http://www.dest.gov.au/archive/ministers/vanstone/v58_9_8.htm

- Wozniak, G. (1984). 'The adoption of interrelated innovations: a human capital approach.' Review of Economics and Statistics. **66** (1): 77-79.
- Wran Committee. (1988). Report of the Committee on Higher Education Financing. Canberra, AGPS.