

# THE CHANGING FACE OF HIGHER EDUCATION FINANCE, WITH SPECIAL REFERENCE TO SOUTH AFRICA<sup>1</sup>

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## Introduction

Government participation in the economy increased substantially during the previous century. In the same way public spending on education increased due to the development of the human capital model during the 1960s<sup>3</sup>. According to the human capital model, people are made more productive by further training and the market will subsequently pay higher remuneration to well trained workers. This resulted in the belief that more investment in human capital will lead to higher economic growth rates and that the rates of return on these investments for both government and private individuals are very profitable.

In the first section of the paper the profitability of investment in education is explored and the expenditure on specifically higher education world wide will receive special attention. The experience of the changing in public funding of higher education in South Africa for the period 1987 – 2003 will then be investigated<sup>4</sup>. This is the period since the SAPSE reporting system came into operation and before the new merging of higher educational institutions actually started. During this period the higher educational system in South Africa stayed fairly unchanged and series can be compared over the whole period. The paper will then focus on possible future financial scenarios and will end off with some recommendations.

## Profitability of investment in education

One method that can be used to calculate the profitability of an investment in education is cost benefit analysis. With this method the costs and benefits are discounted to their present value and if the present value of the benefits is greater than the present value of the costs it is profitable to undertake a project. Another method, and a more generally used one, is to calculate the interest rate that will equate the discounted values of the benefits and costs. This is also known as the internal rate of return. Worldwide several studies have been done to calculate the profitability of investment in education. Psacharopoulos and Patrinos (2002) give a good summary of these results of studies that have been done in 98 countries over the period 1960-1999. These results are summarised in Table 1.

From Table 1 certain clear tendencies can be deduced. Firstly, the private rate of return is higher than the social rate of return for all areas and all levels of education. On average

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<sup>1</sup> Paper read at the ESSA Conference, Durban, 7-9 September 2005

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<sup>3</sup> Theodore Shultz, Edward Denison and Gary Becker did pioneering work in this field. See for example Rosen (1987) and Cohn and Geske (1990) for a good discussion of this period.

<sup>4</sup> This section of the paper is based on an (as yet) unpublished research report for the CHE that was completed at the end of August 2005.

for the world the private rate of return for primary education is 7.7 percentage points higher than the social rate of return and the corresponding figure for secondary schooling is 3.9 percentage points. On average the private rate of return for higher education is no less than 8.2 percentage points higher than the social rate of return. This gives the impression that there seems to be scope for individuals to pay more of their own cost for higher education. However, one has to remember that the table includes countries where higher education is almost fully subsidised which increase the private rates of return to artificially high levels, because the individual's contribution to their own education is very small. The private rates of return is higher than the social rates of return for all educational levels, but the rates normally decrease as the level of education increases. The rates of return in developing countries are normally higher for all levels of education than the rates in developed countries. Let us now take a closer look at the situation in developing countries.

**Table 1**  
*Rate of return of investment in education*

Region	Social			Private		
	Primary	Secondary	Higher	Primary	Secondary	Higher
Asia	16.2	11.1	11.0	20.0	15.8	18.2
Europe/Middle East/North Africa	15.6	9.7	9.9	13.8	13.6	18.8
Latin America	17.4	12.9	12.3	26.6	17.0	19.5
OCED	8.5	9.4	8.5	13.4	11.3	11.6
Sub-Saharan Africa	25.4	18.4	11.3	37.6	24.6	27.8
South Africa (1980)	22.1	17.7	11.8	-	-	-
<b>World</b>	18.9	13.1	10.8	26.6	17.0	19.0

Source: Psacharopoulos & Patrinos, 2002: 14 and Psacharopoulos 1994

When one looks at the sub-Saharan Africa region (which South Africa forms part of) it is clear that the rates of return are the highest of all regions in the world for all levels of education. Especially the private rate of return on higher education is very high. Very little research on this topic has been done for South Africa. There are no private rates of return available for South Africa, but according to Psacharopoulos (1994) the social rate of return for all levels of education is higher than the average for the world (see Table 1). These rates are based on studies done in metropolitan areas in Kwazulu-Natal and may not be representative of the whole of South Africa. Although there are no obvious reasons to believe why the private rates will not also be higher, there is no empirical evidence to prove it.

The high private rate of return is a good argument to increase the private fees of education. The implication of these high rates is that private fees can be increased without the fear that it will become unprofitable for individuals to invest in their own education. The high social rates of return also indicate that investment in education is a

profitable investment for the state. This means that an argument can be made in favour of increased public expenditure in education.

**Table 2**  
*Return to higher education by faculty (percentage)*

<b>Subject</b>	<b>Social</b>	<b>Private</b>
Agriculture	7.6	15.0
Social Science, Arts & Humanities	9.1	1.6
Economics & Business	12.0	17.7
Engineering	10.9	19.0
Law	12.7	16.8
Medicine	10.0	17.7
Physics	1.8	13.7
Sciences	8.9	17.0

Source: Psacharopoulos 1994: 1330

Here it is important to draw a distinction between different fields of study, because there are not uniform rates of return for all higher education programmes. No studies on this topic has been done in South Africa, but research elsewhere in the world by Psacharopoulos (See Table 2) indicates that the social rate of return is the highest in law (12.7%), economic and business sciences (12.0%) and engineering (10.9%). The highest private rate of return is in engineering (19.0%), economic and business sciences (17.7%) and medicine (17.7%). These rates indicate that there is a case to be made in favour of the introduction of differentiated class fees for different fields of study and that certain fields of study may be financed to a larger extent by the students themselves. In his article the results of 98 research projects were incorporated, but it is unclear for how many countries and for what time period these rates were calculated. There is no conclusive proof in the South African case whether the public sector must increase its contribution to education or whether more must be paid by the individual.

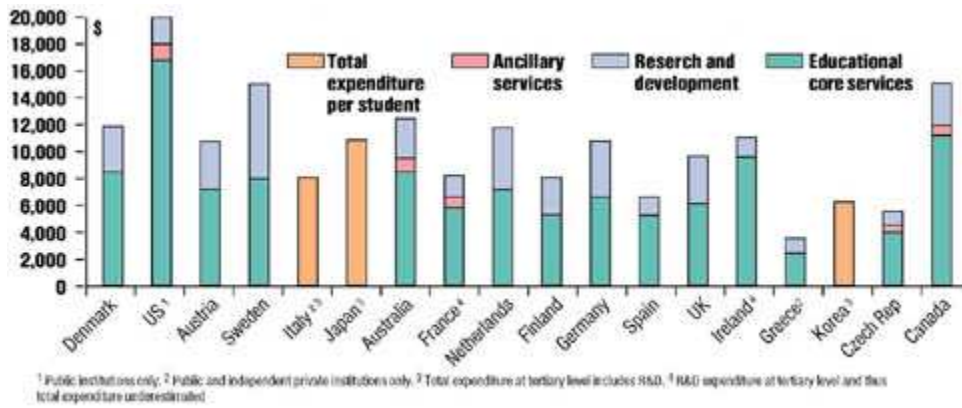
Differentiated rates of return are further proved by a study in Britain concerning learners that passed at least two subjects on A-level (Money Back 2003). Learners that studied in fields like law, mathematics and economics earned 25 per cent more than what graduates earn on average. Social studies give a 10 per cent premium, in languages and education the premium is very low while negative returns are experienced in arts. One must remember, however, that student numbers increased by 25 per cent over the last decade in Britain and like any product the returns may decrease as the supply increases.

### **Public and private fees in higher education**

In most countries some form of public financing of higher education is experienced. Total expenditure on higher education per student, both private and public, differs substantially among countries. In OECD countries, for example, this varied between \$4 000 in Greece in 2003 to \$20 000 in the USA (Figure 1). Also, if higher educational expenditure as a percentage of the GDP is used as a yardstick, America spends the highest percentage on education (Figure 2). Although extra funds per se do not guarantee greater efficiency and quality, it does seem as though America's higher education is more successful if it is

compared with the systems in other developed countries. [In a recent study in Shanghai (quoted in Who pays to study? 2004), a list of the top 50 universities in the world included only 15 universities outside America. From Europe only Oxford and Cambridge made it to the top ten while no university from Europe made the top 40.]

**Figure 1**  
*Expenditure on higher education per student in OECD countries*



Source: OECD, 2003

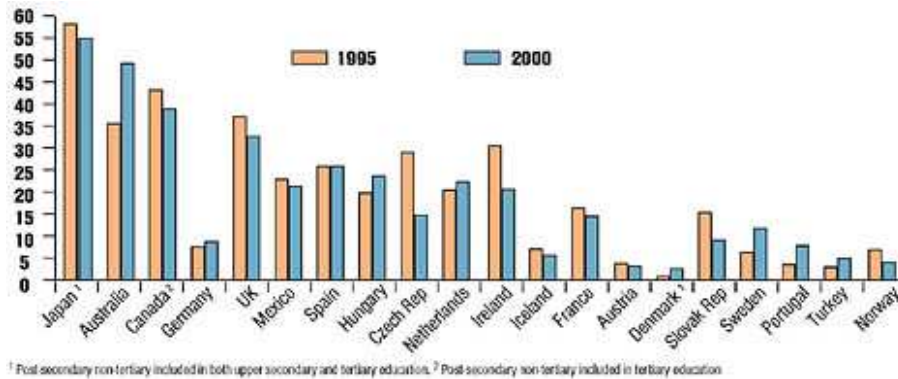
When expenditure on higher education is considered (Figure 2), America’s contribution is the highest (±2.7% of GDP) of the OECD countries. Especially the private component of educational expenditure is much higher than in any other country.

**Figure 2**  
*Expenditure on higher education as percentage of GDP*



Source: Economist, 2004a

**Figure 3**  
*Share of private expenditure in relation to total expenditure at higher educational institutions in OECD countries*



Source: OECD, 2003

The share of private financing at higher educational institutions in OECD countries, with the exception of Australia, did not increase much during the period 1995-2000. Apart from the 15 per cent increase in Australia, there were only marginal increases in Germany, Hungary, Netherlands, Denmark, Sweden and Portugal and in Spain it stayed the same. In Japan, Canada, UK, Mexico, Czech Republic, Ireland, Iceland, France, Austria, Slovak Republic and Norway it decreased (Figure 3). The private contribution to higher education differed substantially between countries. In 2000 only 3% of total higher educational expenditure in Denmark were privately funded while the corresponding figure in Japan was 55%.

### **An international perspective of public spending on higher education in South Africa**

Since the South African state's annual allocation to HE is the outcome of a long negotiation process influenced by economic and political processes, these allocations could vary from year to year. Since the introduction of the Medium Term Expenditure Framework (MTEF) by the government a few years ago, whereby not only the HE allocation for a specific financial year is given, but also probable allocations for the next two financial years, more stability was introduced in HE funding because future allocations became more predictable.

In Table 3 the actual state allocations made by the Minister of Education to the HE sector for financial years 1987/88 to 2005/06 (in short 1987 to 2005) is shown. These allocations are also expressed as:

- percentages of the total expenditure of the state on education (EE)
- percentages of the total state expenditure (TE)
- percentages of the Gross Domestic Product (GDP) of the RSA.

**Table 3**  
Relative state allocations to universities and technikons: 1987-2005

Year	Sector	State allocation (R million)	% of education budget	% of total budget	% of GDP	% of GDP Excluding NSFAS
1987 <sup>1)</sup>	Universities	1 159.730	12.58	2.47	0.700	
	Technikons	263.071	2.85	0.56	0.160	
	Total	1 422.801	15.43	3.03	0.860	
1988 <sup>1)</sup>	Universities	1 210.187	11.79	2.25	0.590	
	Technikons	272.276	2.65	0.51	0.133	
	Total	1 482.463	14.44	2.76	0.722	
1989 <sup>1)</sup>	Universities	1 425.777	11.85	2.24	0.593	
	Technikons	334.985	2.79	0.53	0.139	
	Total	1 760.762	14.64	2.77	0.732	
1990 <sup>1)</sup>	Universities	1 648.529	10.67	2.29	0.608	
	Technikons	394.178	2.55	0.55	0.145	
	Total	2 042.707	13.22	2.84	0.753	
1991 <sup>1)</sup>	Universities	1 775.260	10.37	2.18	0.640	
	Technikons	478.158	2.79	0.59	0.170	
	Total	2 253.418	13.16	2.77	0.810	
1992 <sup>1)</sup>	Universities	1 948.650	9.55	1.85	0.582	
	Technikons	564.842	2.77	0.54	0.169	
	Total	2 513.492	12.31	2.39	0.751	
1993 <sup>1)</sup>	Universities	2 336.518	9.87	1.87	0.550	
	Technikons	692.676	2.93	0.55	0.160	
	Total	3 029.194	12.80	2.42	0.710	
1994	Universities	2 768.887	9.03	1.97	0.574	
	Technikons	795.484	2.60	0.57	0.165	
	Total	3 564.371	11.63	2.54	0.739	
1995	Universities	3 066.472	9.15	2.03	0.559	0.553
	Technikons	1 006.336	3.00	0.66	0.184	0.183
	Total	4 072.808	12.15	2.69	0.743	0.736
1996	Universities	3 850.804	9.22	2.19	0.623	0.589
	Technikons	1 356.458	3.25	0.77	0.220	0.205
	Total	5 207.262	12.46	2.97	0.843	0.794
1997	Universities	3 975.855	9.06	2.09	0.580	0.559
	Technikons	1 455.513	3.32	0.77	0.212	0.204
	Total	5 431.368	12.38	2.86	0.792	0.763
1998	Universities	4 336.687	9.71	2.15	0.584	0.558
	Technikons	1 663.101	3.73	0.83	0.224	0.210
	Total	5 999.788	13.44	2.98	0.808	0.768
1999	Universities	4 648.252	9.97	2.16	0.571	0.543
	Technikons	1 896.873	4.07	0.88	0.233	0.214
	Total	6 545.125	14.04	3.05	0.804	0.757

Table 3 (continued)

2000	Universities	5 001.196	9.95	2.13	0.542	0.515
	Technikons	1 976.701	3.93	0.84	0.214	0.194
	Total	6 977.897	13.89	2.97	0.757	0.709
2001 <sup>2)</sup>	Universities	5 398.837	9.82	2.05	0.529	0.505
	Technikons	2 122.769	3.86	0.81	0.208	0.190
	Total	7 521.606	13.68	2.86	0.737	0.694
2002 <sup>2)</sup>	Universities	5 707.815	9.22	1.96	0.490	0.466
	Technikons	2 215.857	3.58	0.76	0.190	0.172
	Total	7 923.672	12.80	2.72	0.680	0.638
2003 <sup>2)</sup>	Universities	6 070.619	8.67	1.85	0.485	0.461
	Technikons	2 563.990	3.66	0.78	0.205	0.187
	Total	8 634.609	12.34	2.63	0.690	0.647
2004 <sup>2)</sup>	Total	9 364	12.44	2.53	0.681	0.639
2005 <sup>2)</sup>	Total	10215	12.65	2.44	0.680	0.623

- 1) Excluding the TBVC states
- 2) Amounts include incorporation of teacher training colleges, but exclude NSFAS administration cost, provision for student fee differences at teacher training colleges, as well as funding for institutional restructuring in 2003-2005.

Sources: Steyn (2002) for 1987 -1993  
 Department of Education budgets: 2001-2005  
 GDP for 1994 - 2004: SARB (2005)  
 Projection of GDP for 2005: BER at Stellenbosch University

**Figure 4**  
*Relative expenditure on universities and technikons: 1987-2004*

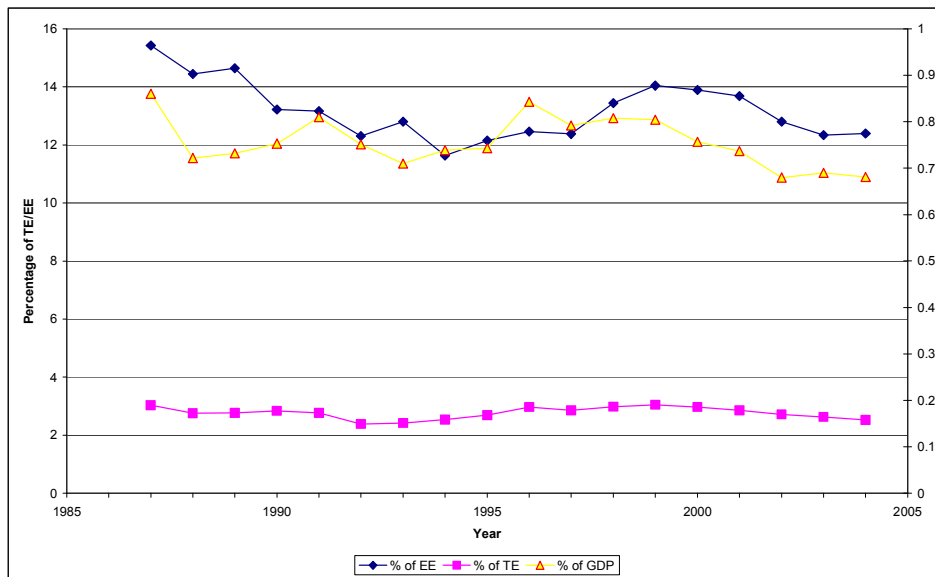


Figure 4 shows the amounts paid to higher education using the above-mentioned indicators. Although the official state budgets for higher education include the NSFAS allocations since the first allocations were made from this aid scheme in 1995, part of the NSFAS allocations should, strictly speaking, be excluded from the calculation of the above defined indicators of relative HE state expenditure. In the last column of Table 3

the HE expenditure of the state as a percentage of the GDP (probably the most informative of the three indicators) is also calculated when the NSFAS allocations are excluded.

The following trends can be deduced from Table 3 and Figure 4:

- The joint total state allocations to universities and technikons as a percentage of EE decreased rather rapidly during the late 1980s from 15.43% in 1987 to an all-time low of 11.63% in 1994. Since then this percentage has steadily increased to 14.04% in 1999 but has slumped back annually since then to 12.34% in 2003.
- The universities' share of EE has declined from 12.58% in 1987 to about 8.67% in 2003. In contrast to this the technikons' share has steadily increased from 2.55% in 1990 to 4.07% in 1999 with the 2003 percentage on 3.66%. This is the result of a higher growth rate in student numbers, especially during the 1990s, at technikons than at universities. The fact that since 1993 the projection formula for ESS in the revised SAPSE formula for technikons allowed for a higher subsidizable growth than the revised SAPSE formula for universities, also contributed to these inverse relationships.
- The total allocations to HE as a percentage of TE show some fluctuations in the earlier years, then a sharp increase to 1999 and since then an alarming decline to 2.53% in 2004, i.e. a decline of more than 17% in 5 years.
- The total allocations to universities and technikons as a percentage of the GDP have fluctuated during the study period, mainly between 0.7 and 0.8. A consistent annual decline from 0.80% in 1999 to 0.68% in 2005 is, however, evident. When the NSFAS allocations are subtracted from the total allocations to the HE sector, this indicator declined to 0.62% in 2005, i.e. a decline of almost 23% in 6 years.
- The increases in the mid-1990s of the total state allocations to universities and technikons in all three relative measures of spending are partly the result of the transfer of the HE institutions in the so-called TBVC states to the SA system during that time. No relative increases are, however, noted in 2001 and 2002 when the teacher training colleges were incorporated into the HE system, thus concealing a further decline in funding for HE.

Table 3 shows a summary of the total expenditure on higher education institutions and higher educational administration as a percentage of the GDP made by local, regional and national governments in 2001 for 84 countries. According to OECD (2003) the average public spending on HE (also as a percentage of the GDP) of 29 OECD countries in 2000 was 0.90.

The RSA expenditure on HE as a percentage of the GDP, namely 0.74 (or 0.70 if the NSFAS allocations are excluded) for 2001 is lower than both the average value for all 84 countries and the average value for 15 countries in Africa. The same is true if the same measure for the RSA for 2000 is compared with the OECD average referred to in the previous paragraph.

**Table 4**

*Total expenditure on HE by government as a percentage of the GDP for 2001 according to continent/region*

<b>Continent/region</b>	<b>Number of countries</b>	<b>% of GDP Average</b>
Africa	15	0.85
North America	13	0.88
South America	6	0.85
Asia	24	0.64
Europe	21	0.95
Oceania	5	0.74
<b>TOTAL</b>	<b>84</b>	<b>0.81</b>

Source: UNESCO Institute of Statistics (2004): *Global Education Digest 2004 Comparing Education Statistics across the World*, Table 11

The past 11 years (including the preliminary budgeted figures for 2004 and 2005 financial years) show a steady increase in the annual allocations to the NSFAS. Many institutions benefit by these increased allocations since it tends to increase the proportion of tuition fees collected annually. The significant increases in NSFAS allocations are, however, eroding the HE block funding since these allocations must usually be afforded inside the very stringent and conservative MTEF of the state. NSFAS allocations can even in some sense be seen as funding for community development or poverty relief.

### **Effect of lower relative public spending on higher education in South Africa**

Due to the high costs of HE and few financial support structures for students from poor communities, student debt increased substantially over the years. Data are not available for all institutions and for those that data could be obtained only for 2000-2003. From Table 5 the trend is very clear with student debt increasing by 79% over the period 2001-2003 and student debt written off by 102% from 2000-2003. The picture may even be worse because the institutions for which no data is available fall into the institutional groups where large debts could be expected.

**Table 5**

*The size of student debt at 26 HE Institutions in South Africa*

<b>Year</b>	<b>Student debt (R)</b>	<b>Student debt written off(R)</b>
<b>2000</b>	-	94 218 000
<b>2001</b>	669 031 192	120 383 000
<b>2002</b>	1 161 116 000	116 676 000
<b>2003</b>	1 195 397 712	190 208 306

**Table 6**  
*NSFAS allocations at HE institutions in South Africa*

<b>Year</b>	<b>State budget for NSFAS (Rand)</b>	<b>Actual expenditure on NSFAS (Rand)</b>	<b>Number of awards</b>	<b>Average size of award (Rand)</b>
<b>1995</b>	40 000 000	-	-	-
<b>1996</b>	300 000 000	333 343 000	73 140	4 558
<b>1997</b>	200 000 000	350 996 000	68 918	5 093
<b>1998</b>	296 388 000	394 495 000	75 720	5 210
<b>1999</b>	384 897 000	441 053 000	75 900	5 811
<b>2000</b>	437 400 000	510 801 000	83 769	6 098
<b>2001</b>	440 002 000	635 092 000	97 517	6 513
<b>2002</b>	489 000 000	733 473 000	101 312	7 240
<b>2003</b>	533 000 000	893 672 471	112 264	7 960

Due to large student debt and to make HE more affordable to needy students the NSFAS scheme was introduced in 1995. Thousands of students have benefited from this scheme, but the demand for funds outstrips the supply by far. As can clearly be seen in Table 5 the state allocation for NSFAS increased substantially over time and with donor receipts and the repayment of loans the actual expenditure increased by 168% from 1996 to 2003. During the same time the annual number of awards increased by 53%. This scheme played an important role to ensure that certain HE institutions did not run into cash flow problems due to outstanding student debt. The state has channeled more of their funds to the NSFAS scheme and HE institutions actually received a smaller percentage of the education budget. The problem with this policy is that although it helps to decrease student debt it doesn't pay for expenditure of HE institutions. Another problem is that only a very small percentage of students benefit from this scheme.

**Table 7**  
*Real tuition fees per WFTEs and real state appropriations per WFTEs according to HE group and year (in constant 2000 prices)*

<b>Group</b>	<b>Real tuition fee per WFTEs</b>			<b>Real state appropriation per WFTEs</b>		
	<b>1987</b>	<b>1994</b>	<b>2003</b>	<b>1987</b>	<b>1994</b>	<b>2003</b>
All instit. <sup>1)</sup>	5 896	6 749	8 535	30 556	21 046	19 494
HAUs	6 462	8 063	9 527	24 276	19 198	16 697
HDUs	5 135	5 644	6 739	25 987	13 227	13 410
HATs	4 024	4 732	7 393	18 751	10 254	12 167
HDTs	2 590	4 701	5 804	41 008	13 922	13 847

1) All institutions – HAUs & HDUs = historically advantaged and disadvantaged universities  
HATs & HDTs = historically advantaged and disadvantaged technicians

Given the above-mentioned practice and the fact that public funding of HE has decreased annually in real terms, how do the HE institutions cope with this loss in income? The most informative conclusion is that tuition fee income had to increase in order to compensate for the loss of government appropriations to HE institutions. The third money stream income was fluctuating over the study period and no significant trends were found. Table 6 shows the real tuition fee and state appropriations per weighted full-

time equivalent student (WFTES) for the 4 groups of HE institutions in South Africa for 3 years during the study period that ranged from 1987-2003.

It is evident from Table 6 that real tuition fees per WFTES in all groups had increased substantially over the study period while simultaneously real state appropriations per WFTES decreased dramatically. In the case of HAUs state allocations contributed 51% of all income to these institutions in 1986 and this percentage has decreased to 40% in 2003. During the same period tuition fees had increased from a contribution of 13% of total income to 23%. For HDUs state allocations decreased from 66% of their income in 1986 to 51% in 2003 while tuition fees increased from 11% to 25% over the same period. For HDTs the state contributions dropped from 63% of the total income to 50% while tuition fees increased from 13 % to 31%. For HDTs the same trends can be seen. Government contributions decreased from 69% of their income to 56% of their income during the period 1986-2003. As is the case for the other institutions, tuition fees increased from 4% of total income to 24% of their income.

Due to the decrease in the real value of funds being allocated to HE, personnel in this sector did not keep up with the increase in student numbers. From Table 8 it can be deduced that the total WFTES in the HE system increased by 141% during the period 1986-2003 while the total academic personnel increased by only 53% and the 'other personnel' by only 22%. Academic personnel have increased more than the 'other personnel' since many services, e.g. cleaning and gardening services have been contracted out since the early 1990s. Especially some of the so-called service workers were phased out and the remuneration expenses associated with the retrenched personnel have been transformed into expenditure on supplies and services.

**Table 8**

*Weighted FTE enrolled students, FTE instruction/research personnel numbers and FTE 'Other personnel' numbers according to institutional group and year*

Group	Weighted FTE students		FTE instruction/ research personnel		FTE other personnel	
	1986	2003	1986	2003	1986	2003
All institutions.	183 604	442 962	14 036	21 510	28 354	34 538
HAUs	121 267	216 213	9 604	12 557	19 238	18 825
HDUs	28 722	77 220	2 177	3 790	5 530	6 792
HATs	27 954	101 238	1 763	3 734	2 828	6 657
HDTs	5 661	48 291	492	1 429	758	2 309

The numbers of instruction/research personnel (both in terms of permanent appointments and FTEs), who are performing the teaching and research functions at HE institutions, had thus increased over the study period, but not nearly at the rate of enrolled students. Consequently the overall *Student/Lecturer (S/L)* ratio of the university sector increased from 12.7 in 1986 to 18.0 in 2003, while the technikon sector's *S/L* ratio increased from 14.9 in 1986 to a very high 29.0 in 2003. Compared to 'international standards' (the average *S/L* ratio of 11 countries for 1992 was 19.9) the university ratios are acceptable but from 1990 the technikon ratios are too high.

**Table 9**

*Real recurrent expenditure per WFTES and qualification awarded according to HE group and year (in constant 2000 prices)*

Group	Real Expenditure per WFTES			Real Expenditure per qualification awarded		
	1987	1995	2003	1987	1995	2003
HAUs	29 881	30 403	38 010	120 581	105 225	123 924
HDUs	19 070	16 395	29 783	78 263	70 075	169 464
HATs	15 804	12 346	21 579	78 622	74 201	111 096
HDTs	25 299	17 892	20 772	213 259	95 589	96 966

The real recurrent expenditure per WFTES and per qualification awarded of the 4 groups of institutions for specific years are given in Table 9. There was in general an increasing trend in the real recurrent expenditure per WFTES for all groups of institutions except the HDTs. It is also clear that real expenditure per WFTES in the university sector was much higher than in the technikon sector. The 4 groups show different characteristics when we look at the real value of recurrent expenditure per qualification awarded. For HAUs it stayed fairly constant – implying maintained cost efficiency in delivering qualifications. For the HDUs the real expenditure per qualification awarded stayed fairly constant until about 1997 and since then started to increase. The HATs followed almost the identical pattern although the rate of increase was much less than for the HDUs. The series of HDTs is very volatile, but in general expenditure came down from very high levels and was fairly constant since 1993. Obviously the different student growth patterns at the 4 institutional groups over the study period play an important role in these unit costs.

Since the primary purpose of HE institutions is to provide graduates to society, the number of qualifications (degrees, diplomas and certificates) awarded annually by HE institutions is of great significance to any country. Since HE is very expensive for both the state and the students, it is important to measure the resources needed to deliver a successful graduate. The annual ratio of qualifications awarded to lecturers gives a useful indicator that shed some light on possible changes in the cost effectiveness or performance of the teaching process. The following performance indicators can be defined:

*Q/L ratio = Total number of qualifications awarded per FTE instruction/research personnel member.*

*M/L ratio = Total number of masters degrees awarded by a university per FTE instruction/research personnel member.*

*3YD/L ratio = Total number of 1<sup>st</sup> (3 year) national diplomas awarded by a technikon per FTE instruction/research personnel member.*

Obviously many other ratios, using other qualification types, could also be used, but the above were regarded as expedient. Tables 10 and 11 indicate the number of qualifications awarded to students per FTE instruction/research personnel member at universities and technikons respectively during the years 1986 to 2003. The *Q/L* ratios and the *M/L* ratios for the universities (as well as the *D/L* ratio – doctoral degrees per FTE

instructional/research personnel member) for the study period appear in the Table 9, while the *Q/L* ratios and the *3YD/L* ratios for technikons appear in Table 10.

**Table 10**

*Qualification awarded per FTE instructional/research personnel member at universities: 1986-2003*

Year	HAUs				HDUs			
	Total	Masters	Doctoral	Other	Total	Masters	Doctoral	Other
1986	3.168	0.261	0.054	2.853	2.812	0.041	0.007	2.764
1987	3.142	0.243	0.052	2.847	3.754	0.057	0.008	3.689
1988	3.223	0.250	0.058	2.917	3.928	0.047	0.009	3.871
1989	3.294	0.255	0.061	2.978	4.122	0.049	0.010	4.064
1990	3.353	0.267	0.055	3.031	3.999	0.058	0.012	3.929
1991	3.465	0.291	0.059	3.115	4.884	0.059	0.010	4.815
1992	3.606	0.308	0.059	3.238	5.113	0.065	0.012	5.036
1993	3.836	0.326	0.064	3.446	5.019	0.066	0.012	4.941
1994	4.112	0.319	0.068	3.725	5.307	0.070	0.012	5.226
1995	4.360	0.340	0.063	3.958	5.453	0.089	0.010	5.355
1996	4.359	0.363	0.063	3.932	5.546	0.062	0.007	5.478
1997	4.565	0.381	0.062	4.122	4.993	0.095	0.012	4.887
1998	4.723	0.409	0.069	4.246	4.426	0.063	0.011	4.352
1999	4.630	0.426	0.067	4.137	4.322	0.099	0.015	4.208
2000	4.537	0.444	0.064	4.028	4.218	0.135	0.019	4.064
2001	4.957	0.463	0.060	4.434	3.783	0.140	0.017	3.626
2002	5.310	0.504	0.074	4.732	3.309	0.175	0.022	3.111
2003	5.281	0.517	0.073	4.691	3.950	0.182	0.029	3.739

**Table 11**

*Qualification awarded per FTE instructional/research personnel member at technikons: 1986-2003*

Year	HATs		HDTs	
	Total	1 <sup>st</sup> Nat Diploma	Total	1 <sup>st</sup> Nat Diploma
1986	3.821	2.448	2.392	1.539
1987	3.772	2.542	1.976	1.288
1988	4.248	2.917	1.860	1.290
1989	4.876	3.513	2.626	1.812
1990	5.189	3.808	2.991	2.188
1991	5.024	3.811	3.412	2.377
1992	5.301	4.048	3.559	2.662
1993	5.626	4.323	3.673	2.768
1994	5.368	4.072	3.633	2.854
1995	6.076	4.871	3.991	3.002
1996	6.283	4.970	3.909	3.134
1997	5.967	4.681	3.903	3.091
1998	5.533	4.306	4.106	3.219
1999	5.208	3.618	4.346	3.525
2000	4.883	2.930	4.585	3.830
2001	5.073	3.165	5.522	4.536
2002	4.802	2.990	5.781	4.667
2003	5.159	3.096	6.379	5.102

What can be learnt from these tables and figures? The  $Q/L$  ratio of universities increased by 60% - from 3.10 in 1986 to 4.97 in 2003. During the same years the technikons'  $Q/L$  ratio increased by 55% from 3.54 to 5.50. These trends show that significant more 'products' were produced in the HE sector per lecturer in 2003 than in 1986. Table 10 shows some differences in the  $Q/L$  ratios for the two groups of universities. Although the ratio for the HDUs initially increased it started to decrease from 1997 and only increased in 2003 again. This can be attributed to the decrease in student numbers at these institutions since 1996. The ratio for HAUs increased throughout the whole period under discussion, with 1999 and 2000 being the only exceptions. The trends in the ratios for the two groups of technikons, as shown in Table 11 are the opposite of the university situation. This follows from the slump in weighted  $FTE$  students at historical advantaged technikons in the second half of the 1990s. The positive correlation between student numbers and  $Q/L$  ratios was fuelled by the unwillingness of institutions to decrease academic personnel when student numbers plunged. This was the result of the understandable belief that decreasing student numbers was only a temporary phenomenon. This outlook was proven correct as student numbers started to increase again in 2001.

The increasing  $Q/L$  ratios show that the HE sector increased its academic efficiency significantly during the study period (1986-2003). This is specifically evident in the case of the HAUs and the HDTs. It is, however, difficult to say whether the HE system still has the capacity for further efficiency improvements and to what extent some institutions are already suffering from academic overload. The question could also be asked whether such high  $Q/L$  ratios still conform to acceptable academic standards.

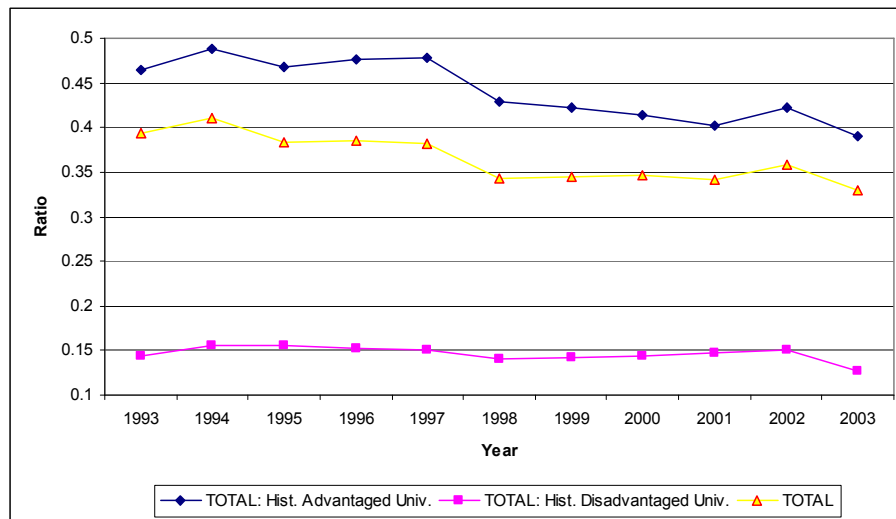
The relative output in master degrees at universities, as measured by the  $M/L$  ratio, has doubled from 0.22 in 1986 to 0.44 in 2003. A continuous increase in this ratio during the whole study period is evident from Table 10 for both groups of universities. Although the ratios for the HDUs are much lower than for the HAUs, the growth rate in the ratio of the HDUs is much higher than for the HAUs. Table 11 shows that the  $3YD/L$  ratio for technikons is very similar to the  $Q/L$  ratio for technikons. This is not surprising since the number of 1<sup>st</sup> (3 year) national diplomas awarded at technikons had comprised about 65% of all qualifications awarded at technikons during the study period. The  $3YD/L$  ratio and the  $Q/L$  ratio should therefore be correlated.

Given these increases in student numbers without an accompanying increase in personnel numbers, what happened to research output at HE institutions? The number of approved research output units (See Department of Education 1995: Report 014(95/10)) - also known as publication units - per instruction/research personnel member, and the number of doctoral degrees awarded per instruction/research personnel member can be used as a yardstick to measure this. The utilisation of  $FTE$  personnel values rather than permanently appointed personnel headcounts as denominator in the calculation of the two indicators is more accurate since part-time temporary instruction/research personnel could also be involved in the generation of research output.

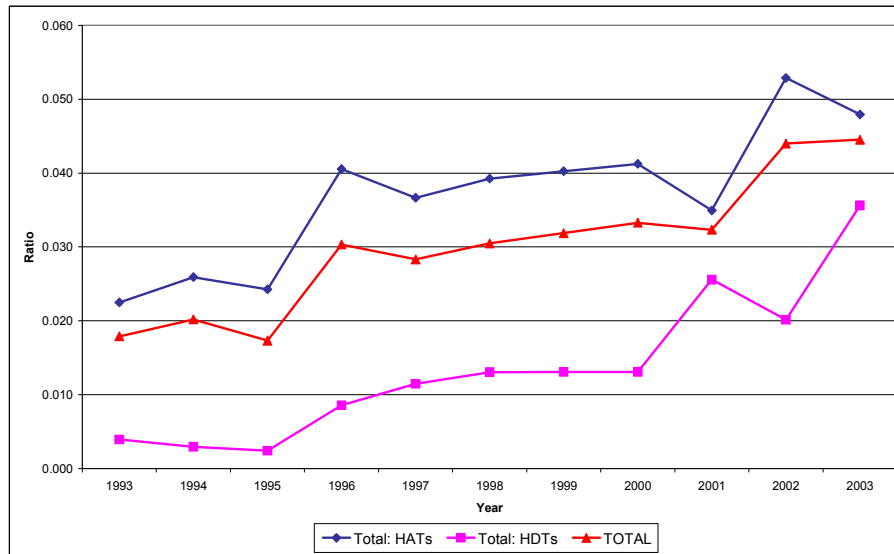
Unfortunately the actual approved publication units for HE institutions for the period before 1993 are not available and the replacement of these missing values with their projections used in the SAPSE formulas (which are available) will introduce an inherent incompatibility in the publication data series. It was therefore decided to only use the actual approved units for HE institutions from 1993. Publication units (PU) of universities fluctuated around 5 300 units a year during the period 1993-2003 with an all-time high of 5 606 in 2002. The total number of publication units of technikons increased rather dramatically from only 55 units in 1993 to 230 in 2003. The PU(Headcount) ratio for universities shows a horizontal trend with some small fluctuation around 0.5 while the same ratio for technikons has increased from a very low base value of 0.022 in 1993 to 0.061 in 2003.

Figures 5 and 6 shows the PU(FTE) ratios for the two institutional groupings for universities and technikons respectively. Clearly, the historically advantaged institutions' PU rates are about three times as high as the historically disadvantaged institutions' rates in both the university and technikon sectors. There are indications that the higher student/lecturer ratio has the result that makes it more difficult for lecturers to carry on with research activities. Although there was significant progress in research (as measured by the publication units) at technikons, especially in the last couple of years, their contribution is still relatively small compared to the research output of most universities.

**Figure 5**  
*Publication units per FTE instruction/research personnel member for universities: 1993-2003*



**Figure 6**  
*Publication units per FTE instruction/research personnel member for  
 technikons: 1993-2003*



A disturbing observation is the decreasing trend in the PU(FTE) at universities since 1997 (with the exception of 2002). The five universities with the highest publication numbers (in absolute terms but usually also in terms of PU-rates) are annually responsible for about 60% of the total number of approved publications in the HE sector. It seems important to ensure that at least these universities will not become so pressurised by annually increasing *S/L* ratios or unrealistic graduation rate targets that they lose the edge on their research capacity. There are indications that this is already happening

With the deteriorating state of HE in South Africa one can ask the question whether the situation will improve in the near future. As was pointed out in Table 3 the funds allocated to higher education fluctuated from a high of 15.4% of the educational budget in 1987 to a low of 11.6% in 1994 and in 2005 it was 12.65%. As a percentage of the GDP the contribution to higher education fluctuated from a high of 0.86% in 1987 to a low of 0.68% in 2005.

### **Scenarios of government funding of higher education**

One could make the assumption that total public higher education expenditure should at least stay constant as a percentage of GDP. This means that the growth in public HE expenditure should stay in pace with the growth in the economy. From Table 3 it can be deduced that on average HE expenditure in South Africa was 0.752% of GDP for the period 1987-2005. Keep in mind that from 1995 this amount included the NSFAS awards. From 1987-1994 (in other words without NSFAS awards) the public sector's contribution to HE was almost the same, namely 0.760% of GDP. The sizes of the NSFAS awards for the period 2000-2005 varied between 0.042% and 0.059% of GDP. In Table 4 it was indicated that an international benchmark in 2001 for public HE

expenditure based on 84 countries was 0.81% of GDP, with the average for 15 African countries even higher at 0.85%.

**Table 12**  
*Public expenditure on higher education: Different scenarios using HE expenditure as percentage of GDP as yardstick (R million)*

<b>Year</b>	<b>Estimated nominal GDP<sup>1)</sup></b>	<b>Formula &amp; ad hoc allocations<sup>2)</sup></b>	<b>NSFAS awards</b>	<b>Total HE Expenditure</b>
<b><i>Actual allocations</i></b>				
2003	1 251 468	8 102	533	8 635
2004	1 374 476	8 786	578	9 364
2005	1 431 422	9 351	864	10 215
<b><i>MTEF Estimates</i></b>				
2006		9 927	926	10 853
2007		10 424	1 113	11 537
<b><i>Scenario 1: Keep HE expenditure at 0.81% of nominal GDP</i></b>				
2006	1 647 379	12 355	988	13 344
2007	1 799 787	13 498	1 080	14 578
2008	1 965 952	14 745	1 180	15 924
2009	2 153 653	16 152	1 292	17 445
2010	2 367 954	17 760	1 421	19 180
<b><i>Scenario 2: Keep HE expenditure at 0.752% of nominal GDP</i></b>				
2006	1 647 379	11 400	988	12 388
2007	1 799 787	12 455	1 080	13 534
2008	1 965 952	13 604	1 180	14 784
2009	2 153 653	14 903	1 292	16 195
2010	2 367 954	16 386	1 421	17 807
<b><i>Scenario 3: Keep HE expenditure at present 0.680% of nominal GDP</i></b>				
2006	1 647 379	10 214	988	11 202
2007	1 799 787	11 159	1 080	12 239
2008	1 965 952	12 189	1 180	13 368
2009	2 153 653	13 353	1 292	14 645
2010	2 367 954	14 681	1 421	16 102

1) Values for 2003 and 2004 as published by SARB (2005). For 2005-2010 BER estimates are used.

2) Amounts exclude institutional restructuring (merger) funding

To keep the financing of HE in South Africa on the levels experienced elsewhere in the world, HE expenditure should be 0.75% of GDP if we assume that a further 0.06% (the latest value, namely for 2005/06) will in future be awarded through the NSFAS awards (*Scenario 1*). In this sense we do accept the current practice to include NSFAS awards as part of public financing of higher education in South Africa. In Table 3 it was shown that state allocation to higher education in 2005 is R10 215 million and should thus increase to R13 344 million in 2006. This amount, as well as the allocations for the years 2007-2009, according to Scenario 1 is shown in Table 12. According to this scenario expenditure on higher education should increase by more than 87% over the 6-year period 2005-2010 in nominal terms. This will probably be much higher than what the

Treasury is currently budgeting for. According to the MTEF estimate R10 853 million will be allocated to HE in 2006 and R11 537 in 2007. This is already almost R2.5 billion less than the 2006 and more than R3 billion less than the 2007 allocation under Scenario 1.

*Scenario 2* assumes a total HE expenditure (including NSFAS) of 0.752% of GDP for the forecasted period. This is to keep total HE expenditure on the average level that it has been during the last 19 years, namely 1987-2005 (although NSFAS awards have only been added to the total HE expenditure since 1995). The NSFAS allocations are assumed to be the same as in Scenario 1. These calculations are also given in Table 12 and this scenario will require a 74% increase in HE expenditure over the period 2005-2010. The 2006 estimated allocation under this scenario is still R1.5 billion higher than the present MTEF budget estimate of government for 2006/07 and almost R2 billion more than the MTEF budget for 2007/08.

*Scenario 3* assumes that the most recent confirmed (but very unsatisfactory) situation of a state HE allocation of 0.680% of the GDP for the financial year 2005/06 (See Table 3) is to be maintained for 2006-2010. This will require a nominal increase of 58% over the period 2005-2010. If the present MTEF figures are used as a yardstick it is rather disturbing that even Scenario 3 shows that the estimated HE allocation for 2007 is R720 million higher than the present MTEF budget estimate of government for 2007/08. The MTEF budget estimate for 2006/07 is estimated to be only 0.659% of GDP. For 2007/08 it is even lower at 0.641% of GDP. Using this GDP measure the 2007/08 HE allocation, if not adjusted, will represent a 5.7% decrease in the funding level of 2005/06. This is a worrying trend in a sector that is plagued by a shortage of resources in its effort to empower enough students with the skills that the economy needs urgently. It seems as though there will not be much financial relief for the HE sector in South Africa in the near future.

Another way to look at HE funding is to assume that the state's contribution per weighted FTE student should at least stay constant in real terms. This implies that the expenditure per student should increase with the anticipated inflation rate. Total expenditure on higher education by the state will then be dependent on the assumption about what will happen with the number of students in higher education. There was a steep decline in the per capita allocation per weighted FTE student from about R30 000 in 1987 to about R20 000 in 1992. Since then the real per capita allocation fluctuated around R20 000 per annum with the latest amount per WFTES available for 2003, namely R 19 493.

**Table 13**

*CPI inflation and public HE allocations per WFTES for 2003 and estimated per WFTES allocations for 2004-2009 in order for the allocations to stay constant in real terms*

	2003	2004	2005	2006	2007	2008	2009	2010
<b>Headline CPI inflation</b>	5.9%	1.6%	4.2%	6.2%	4.9%	2.8%	4.3%	4.4%
<b>Allocations per WFTES</b>	19 493	19 805	20 637	21 917	22 991	23 635	24 651	25 736

In Table 13 the predicted inflation rates by the BER are given for the years 2003 to 2010, as well as the nominal HE state allocation per WFTES. These nominal allocations were calculated in order for the relative allocations to stay constant in real terms; in other words expenditure per WFTES must increase with the anticipated inflation rate. This implies that R25 736 must be spent by the state per WFTES in 2010 to have the same buying power as was the case in 2003. This method thus assumes that educational expenditure increase by the same percentage as is the case with the general price level.

In Table 14 different WFTES growth rate scenarios are considered and for each scenario the HE allocations are calculated on the assumption that HE allocations per WFTES will stay constant in real terms for 2004-2010. Note that while the HE allocations are already available for 2004 and 2005 the most up to date WFTES values are for 2003 and therefore we treat the state HE allocations for these two years as unknown.

**Table 14**

*State HE allocations in nominal and real terms for different growth rates in WFTES on the assumption that the real state HE allocations per WFTES will stay constant for 2003-2009 (R millions)*

<b>Year</b>	<b>State HE allocation (keep tract with only increases in student numbers)</b>	<b>State HE allocation (keep tract with increases in price and student numbers)</b>
<i>MTEF Estimates</i>		<i>Total Allocation</i>
	2006	10 853
	2007	11 537
<i>Scenario 4: WFTES stay at 2003 level</i>		
2003	8 635	8 635
2004	8 635	8 773
2005	8 635	9 142
2006	8 635	9 708
2007	8 635	10 184
2008	8 635	10 469
2009	8 635	10 919
2010	8 635	11 400
<i>Scenario 5: WFTES increase by 2% per annum</i>		
2003	8 635	8 635
2004	8 808	8 949
2005	8 984	9 511
2006	9 164	10 303
2007	9 347	11 024
2008	9 534	11 559
2009	9 724	12 297
2010	9 919	13 095

**Table 14 (continued)**

<i>Scenario 6: WFTES increase by 4% per annum</i>		
2003	8 635	8 635
2004	8 980	9 124
2005	9 340	9 888
2006	9 713	10 921
2007	10 102	11 914
2008	10 506	12 737
2009	10 926	13 817
2010	11 363	15 002
<i>Scenario 7: WFTES increase by 6% per annum</i>		
2003	8 635	8 635
2004	9 153	9 300
2005	9 702	10 272
2006	10 284	11 563
2007	10 901	12 857
2008	11 556	14 010
2009	12 249	15 489
2010	12 984	17 141

The first scenario in this approach (*Scenario 4*) to HE budget estimates is a baseline scenario where the WFTES numbers stay constant at the 2003 level until 2010. The second column of Table 14 gives the HE allocations which do not provide for inflation (in other words, constant nominal allocation per WFTES) and are only included for comparative purposes. The more important figures are the HE allocations in the last column which indicate allocations which have the characteristic that the real per WFTES allocations stay constant from 2003 to 2010. The NSFAS allocations are assumed to be the same for the years 2003 to 2010 as given in Table 12 and only the total allocations (excluding restructuring/merger funding) are therefore given in Table 14. If the HE allocations per WFTES were to stay the same in real terms they should increase by 32% from 2003 to 2010 under scenario 4, and by 25% from 2005 to 2010. As expected the allocations for 2004 and 2005 are much lower than the actual allocations (see Table 12) and also lower in 2006 and 2007 than the MTEF budget estimates of R10 853 million and R11 537 million respectively. It must be noted that a scenario with no student growth in the HE sector in South Africa can hardly be seen as realistic.

With *Scenario 5* we assume that the number of weighted FTE students increases by 2% per annum. For per capita HE allocations to stay constant in real terms they must increase by 52 % from 2003 to 2010 and by 38% from 2005 to 2010. In this scenario the allocations for 2004 and 2005 are still lower than the actual allocations (See Table 12) in these years and also lower in 2006 and 2007 than the MTEF budget estimates.

With *Scenario 6* we assume moderate annual student growth of 4. In order for per capita HE allocation to stay constant in real terms Table 5.8 shows that HE allocations must increase by 74% from 2003 to 2010 and by 52% during 2005-2010. In this scenario the allocations for 2004 and 2005 are still lower than the actual allocations (See Table 5.6) in

these years, but the HE allocation for 2006 is R63 million more than the MTEF budget estimate of R10 853 million for 2006/07 and in 2007 it is R377 million more than the MTEF estimate of R11 537million for 2007/08. This shows how totally unrealistic the MTEF budget estimates are. These estimates should thus seriously be reconsidered, especially in the light of the higher than expected realised economic growth rate in 2004. This led to higher tax collection than was budgeted for.

This last scenario (*Scenario 7*) assumes a rather high annual increase of weighted FTE students of 6% per annum. In the light of the fact that WFTES increased by 7.6% from 2002 to 2003 this scenario is by no means unrealistic. In order for per capita HE allocation to stay constant in real terms Table 14 shows that HE allocations must increase by 99 % from 2003 to 2010 and by 67% from 2005 to 2010. In this scenario the allocations for 2004 are still slightly lower than the actual allocation for 2004, but the 2005 allocation is higher than the actual allocation for 2005 (See Table 12). The HE allocation for 2006 is R710 million more than the MTEF budget estimate of R10 853 million for 2006/07 and in 2007 it is R1 320 million more than the MTEF budget estimate of R11 537 million.

The Minister of Education has already introduced restrictions on FTE student growth in determining the block grants for HE institutions for 2005/06. With the present ministerial growth restrictions that could be translated to about 4% annual growth in WFTES from 2002 to 2003 (for the 2005/06 HE allocations), and the proposed differential institutional restrictions on student growth of between 0% and 3% per annum, scenarios 5 and 6 could be considered as important scenarios for the future.

## **Conclusion**

Since higher education display characteristics of both private and public goods, it is difficult to scientifically determine the magnitude of the total private gain (direct and indirect) from higher education. The private and public advantages of higher education are yet to be quantified. Available rates of return do however indicate that private investment in higher education is profitable, although research in specific developing countries in this regard is very limited.

Although government spending increased in the previous century, government's share to higher education relative to the private contribution is decreasing world-wide. Europe especially seems to be looking for ways in which to increase private contributions to higher education. Government funding however remains the most important source of income for higher education institutions world-wide. All countries make provision for students from poor communities in various ways. The income-contingent loan scheme of the UK has application potential for South Africa, especially if something similar could be implemented on the postgraduate level initially.

At first glance it may look as though the HE sector in South Africa became more efficient because graduates are 'produced' at lower real costs than before. This is a direct result of the relative decrease in the share of the budget that is devoted to HE. There are definite indications that it is becoming increasingly difficult for lecturers to carry on with research activities at universities. According to the MTEF of the government the situation in HE

will not improve in the near future. This will put much strain on the HE sector to deliver enough well-trained workers to the labour market and be involved in enough research activities.

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