RATES OF RETURN TO TERTIARY EDUCATION IN SOUTH AFRICA[1]

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Abstract

South African research has found tertiary education to have the highest rate of return amongst levels of education. Measures of effectiveness of the large allocation by government are a crucial area of study relatively untapped. Income levels relative to level of education were found to have significant correlation with probability of entering into an income bracket of above R8 000 being 2.3 times higher with a tertiary degree. A sample of Rhodes University NSFAS funded students, analysed within the framework of a cost benefit equation, indicated the positive effect of government funding on rates of return.

1. INTRODUCTION

TERTIARY/VOCATIONAL EDUCATION IN SOUTH AFRICA is a crucial element of transformation for the nation. The Freedom Charter states that "higher education and technical training shall be opened to all by means of state allowances and scholarships awarded on the basis of merit and that adult illiteracy shall be ended by a mass state education plan" (Freedom Charter, 1955:1). The paper focuses on the funding of tertiary and vocational education and consequently the provision of sustainable job market entry skills. Affordability and access to education remains the primary hindrance factor. The state is and has invested large sums of money into tertiary/ vocational education. As stated by Trevor Manuel (Manuel, 2009:1), Minister of Finance, "government's contribution to education remains the single largest investment of government as it is key to poverty reduction and future economic growth: over the period 2005-2007 government expenditure on education grew by 14% annually and for the 2008/ 2009 period accounts for R140.4 billion of provincial and national budgets." Accordingly, a measure of the effectiveness of the allocation is a crucial and a relatively untapped area of study in South Africa. The purpose of the paper is to consider such effectiveness according to both private and social rates of return to previous funding.

2. HISTORY OF EDUCATION IN SOUTH AFRICA

 According to the National Student Financial Aid Scheme (NSFAS) access to education and the quality thereof has been a point of struggle and contestation for many years both pre and post democracy in South Africa. Education provides for a way out of deprivation

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[1]   Unpublished Honours Project, Department of Economics and Economic History, Rhodes University, Grahamstown, South Africa, 2009.

and is essential to building a participatory population that includes all South Africans" (NSFAS, 2009:1).

In order to understand the current position of tertiary education in South Africa, it is necessary to look at the overall picture of education at a hierarchy of levels. Statistical research in the area is plentiful, as programmes, both of an educational nature and a macroeconomic nature, have been implemented, and progress results are crucial to ongoing commitment to those variables, which have improved the educational level within South Africa. According to the 2007, General Household Survey (most recent online edition) there were 16.1 million learners currently registered with an educational institution in 2007. Translated into percentages this was 33.7% of the population. At the same time 9.3% of the population reported never having any formal educational at all, eleven years prior (1996) this figure stood at 23% (Statistics SA, 2009:1).

Since 2007, for the medium term, emphasis has been put on Early Childhood Development Programmes by the Ministry of Education. Percentages of learners from categorical populations are graphed in Table 1:

Table 1. Learner Participation Rates as a Percentage of Respective Categorical Populations, South Africa: 2002 versus 2007

Age (years)	2002 (%)	2007 (%)
0-4	7.6	16.6
5	40.1	60.4
6	70.0	87.7
7-15	96.3	97.9

Source: Pandor, 2009: 1

Through a longer-term view the 7-15 age group participation rate has increased slightly, noting the attendance rate of 89% for 1996. However, in 2007 those holding a grade 12 certificate accounted for only 23.6% of the population (Statistics SA, 2009: 1). Most recent results also indicate that in 2008 only 62.5% of the 533 561 learners registered for Grade 12 passed the examinations. From this only 20.2% or 107, 462 learners achieved university endorsement. An additional 124, 000 learners achieved entrance into a diploma or non-degree programme (Pandor, 2009:1). Commitment by the Department of Education is now largely on Further Educational Training (FET) Colleges and Sector Education and Training Authorities (SETa's) for learners who may not be accepted into higher educational institutions. Nevertheless, opportunity needs to be open for entrance into the higher education that an individual may have the potential to pursue.

The reason given for such poor educational participation and achievement relates to historical disadvantage, poverty, uneven support and poor management of the educational system. Although the matric pass rate decreased between prior years and 2008, the percentage of university entrance achievements increased, so universities and funding schemes needed to gear up for the intake. (Pandor, 2009: 1). Having results on educational participation the context of the tertiary education enrolment rates must be understood: in 2007 9.8% of the population aged 20 years and older had obtained a tertiary education (Statistics SA, 2009:1) and at that point 17.8 million citizens were enrolled in tertiary education, 286, 481 of which were in distance programmes. Of the total 76% were previously disadvantaged and 55.5% female. 42% of the total studying

humanities, 31% business and 28% in science and technology, such factors pertaining to the development needs of the economy (Department of Education, 2007: 30-42).

According to Statistics SA, most studies provide a lack of fees as the most prominent reason for not attending a tertiary educational institution, accounting for precisely 39.6% of surveyed non-attendants in 2007. Demographically, it is seen that women are more likely than men to have not received any formal education; in 2007, 7.1% of men reported themselves as having no formal education, whilst for women this number stood at 11.3%. Accordingly, there is a great need for funding according to identification of need by economic demand (economic planning needs such as science and technology) and supply (population by race and socioeconomic background) factors (Statistics, 2009: 1).

3. THE NSFAS

Jackson (2002: 83 - 84) aimed to answer whether the NSFAS, being the primary means of governmental investment into tertiary education, effectively fulfilled its objectives of enabling academically deserving and financially needy students to meet their own and South Africa's economic development needs, of building a sustainable financial aid scheme and of impacting on South Africa's racially skewed student profile.

"Through the National Student Financial Aid Scheme (NSFAS) the South African government has made a commitment to equity and redress in the tertiary education system. The NSFAS provides a sustainable financial aid system to academically deserving and financially needy students to enable them to empower themselves and indirectly develop South Africa as a nation" (Jackson, 2002: 82). Initially in 1991, the Tertiary Education Fund of South Africa (TEFSA) was established to aid previously disadvantaged students. At that point there was no national financial aid scheme and so the responsibility was on individual institutions to support needy students. The system however led to a student debt issue with their respective institution. Post 1994, TEFSA was able to collaborate more closely with government, leading to the establishment of the NSFAS in 2000, incorporating TEFSA. The scheme has since been upheld by two pillars of trust: government's commitment to adequate funding (in 2009 being R330 million) and student's commitment to repay their loans, this being at a rate more affordable than the bank overdraft rate (Jackson, 2002: 82-85).

The NSFAS's partnership with the twenty-three tertiary education institutions nationally (eleven universities, six comprehensive universities and six universities of technology) is documented annually, each institution being responsible for managing their students and the respective loans. Exceptional progress by NSFAS has been reported (see Table 2) not only for student participation rates but also for teacher training bursaries that ensure the long-term sustainability of the participation rates.

Table 2: NSFAS Progress and Projection

Indicator	Past			Current	Projected		
	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	2009/ 2010	2010/ 2011	2011/ 2012
Students assisted	106, 852	108, 416	113, 616	120, 000	130, 000	140, 000	150, 000
Pass Rate (%)	74	73	75	75	76	76	77
Funds recovered (Rm)	329	390	479	501	526	578	608
Teacher Training Bursaries	0	0	3,842	5, 447	8, 715	9, 240	9, 795

Source: Department of Education, 2009: 263

The 2001 publication by the South African National Departments of Education and Labour indicates South Africa's primary development need as focussed in areas of science, engineering and technology, with the majority of awards in 2000 and 2001 made to students in these particular areas (South African Government Information, 2009:1).

Jackson (2002: 88-93) described the criteria that are accolades for the success to date of the NSFAS which, amongst other elements, involved

    a.   that it is a young scheme based on an extensive body of international literature already existing from which policy-makers could learn and record successes and failures (see, for example, Johnstone, 1986; Albrecht and Ziderman, 1991; Woodhall, 1989 and 1991),

    b.   government's political will,

    c.   extensive funding,

    d.   legislation surrounding the scheme and it's operation,

    e.   a macro design,

    f.   a positive real rate of interest and

    g.   income contingent loan repayments (Jackson, 2002: 88-93).

The number of South African university attendants is expected to increase from 530, 000 in 2009 to 837, 000 in 2011, accordingly government has allocated an additional R700 million for the expansion. The NSFAS also received a R330 million boost to enhance disabled learners participation. The 2009-10 budget indicates a 10.8% increase in government subsidy to higher education to the R15.3 billion level, slightly lower than the 14% annual increase in overall education over the prior three years. NSFAS is hence expected to support 130, 000 disadvantaged students with the new and existing funding (Mcgregor, 2009: 1).

With the rapid growth in student numbers, rates of return are a topical issue within tertiary education funding. It is held that private returns to the graduate exceed indirect social returns to society. It is for this reason that South Africa has committed itself to a loan and bursary scheme instead of a scheme relying solely on grants, being confident of the employment rates of graduates and their respective above-average earnings. It is however noted that the contributions of graduates to the overall South African economy should not be underestimated, leading to the reasoning behind the government subsidizing up to 40% of student loans when academic performance (minimum of 50% per year for all subjects) is met.

4. LITERATURE REVIEW

Education, training and experience are three channels of human capital, with education being primary for most individuals as it increases industry's productivity by adding new skills and knowledge, producing resources needed to develop new technologies, businesses, wealth and consequently economic growth (Joint Economic Committee, 2000: 1). Returns to education have been estimated since the mid 1950's, in which there have been numerous reviews of empirical results across countries and levels of education with the aim of forming a set pattern or economic theory to guide such investment according to human capital theory. Thus a brief overview of the latest exponential growth of techniques, theories and estimates found in the international literature up to 2008 will be given.

Internal Rates of Return (IRR) to education are a measure of the profitability of furthering education (Becker, 1967: 23). Psacharopoulos (1994: 1-18 and 1995: 5-10) and Heckman, Lochner and Todd (2005: 1) in an overview of a variety of methods of calculating returns to education found that the most common [of the methods] were the discount [method] and the Mincerian methods, both of which converged with similar results holding certain assumptions stable. In a review of the most recent literature documenting empirical studies (Boarini et. al, 2008) the two methods were combined into a cost benefit equation and it was concluded that the IRR should be calculated as the discount rate that equates the benefits from education (estimated from Mincerian equations) and its costs (Boarini and Strauss, 2007:7). The Mincerian method has its foundation in econometric estimation of human capital earnings functions based on individual data (Mincer, 1974: 283-285). The cost benefit equation then provides a foundation for decisions of furthering education in an economic way.

Internationally, empirical studies of return literature are numerous. Most prominently the work of Boarini and Strauss (2007), Boarini et. al (2008), Psacharopoulos (1973, 1994, 1995) and Psacharopoulos and Patrinos (2002 and 2004) investigated the determinants of investment in education and patterns of return. It was concluded that there had been a slight increase in rates of return over time due to globalisation of best practices and that the traditionally proven pattern of decreasing returns by level of education as well as level of economic development existed. Emphasis has been put on the pattern by educational level backed by psychological studies that indicate 80% of the human brain development within the first three years of life, owing focus for childhood development and educational stimulation at preschool age (Lagman, 2009: 1).

In South Africa, efforts have been made to estimate returns to education at different levels across different race and gender variables. Research conducted specifically for South Africa, mainly by Joubert (1978), Trotter (1984), Archer and Moll (1992) and Hosking (1990, 1992a, 1992b and 2003), concluded that rates of return increase with the level of education instead of following the international norm [of decreasing by level of increased education]. Debate over whether South Africa should follow the international or locally researched trend is inconclusive. It was noted by Hosking (2003: 100) however, that internationally investment in higher education does not usually accurately reflect external or social benefits, which are a large part of the return to tertiary education. In order to improve the present educational levels of the South African population, much opportunity remains to continue research on returns to education by level to most effectively and rapidly guide investment for the individual and society's long-term benefit.

5. RESEARCH GOALS AND METHOD

The aim of the study was to determine the relevance of a tertiary education in South Africa to both the private individual as well as society and further determine the rates of return to tertiary education to encourage funding by government, considering the extensive private and social returns evident from similar studies completed internationally.

Firstly, data of occupation and earning levels by educational level was analysed in order to determine the effect of education on employment and earnings. Secondly, data of poverty rates and success of first time employment according to race was considered. Thirdly, Rhodes University NSFAS funded students were used as the sample, starting with first year enrolments in 2003 who were in some way funded by NSFAS for the duration of their time at Rhodes University. A rate of return was calculated in the form of a cost benefit equation, firstly estimating the cost of the degree against initial earnings and, secondly, the cost of the degree, taking into account funding provided by NSFAS, against initial earnings. This would indicate the likely rate of return, which would not have been possible without NSFAS aid. Beyond private income return, it was assumed that social return is also aided by more national output with an increase in wages by spending, investment and skill levels. It was assumed that various other loan opportunities are available; however, NSFAS has advantages to its system in comparison (40% subsidy on a pass achievement as well as a lower interest rate than the overdraft rate).

6. RELEVANCE OF A TERTIARY EDUCATION: DATA

Nearing the end of the 20th century the question arose as to the relevance of a tertiary education linked to employability (Teichler, 1999, 2000; Kellermann & Sagmeister, 2000; Kivinen *et al.*, 2000; Woodley & Brennan, 2000). 21st century tertiary institutions have been required to move away from "mode one," pure knowledge toward "mode two," a more practical, entrepreneurial and application based knowledge with relevance to present economic and social conditions to avoid the misallocation of resources in the subsidisation of education in circumstances where the link between education and employment has broken down (Maharasoa and Hay, 2001: 145).

The Statistics South Africa 2007 and 2008 labour force survey indicated that that as education levels increase, concurrently level of occupation rises and hence earnings are greater, meeting a priori expectation (see Appendix 1). Higher level occupations are occupied predominantly by those with secondary and tertiary educations, whilst lower level occupations are predominantly occupied by those with less that a secondary education (see Table 3)

Table 3: Highest and Lowest Occupation Category with Respect to Education Level (In thousands)

Education Status	No schooling	<Primary	Primary	<Secondary	Secondary	Tertiary
Legislators, senior officials and managers	13,6	23,3	16,2	155,0	401,6	454,4
Domestic workers	104,7	234,7	133,8	451,6	101,8	2,5

[Data extracted from Appendix 1, figures rounded to the nearest hundred]
Source: Statistics South Africa, 2009

Secondly, it was found that the a priori expectation of earnings increasing by level of education held true (see Appendix 2). The rates of return according to probability of potential earnings associated with certain educational levels based on past records were calculated. An important conclusion was drawn regarding the earning power generated by a tertiary education (see Table 4): Looking solely at the upper four levels of income (R8, 000 – R30, 000 or greater), should addition be made of all those citizens in such category who have only completed grade 12, the sum amounts to 510,200 citizens. Should addition then be made of all those citizens in the same earning category who have completed a tertiary qualification (all categories mentioned) the sum amounts to 1,191,300 cictizens. The conclusion thus drawn is that the calculated probability of entering into the earnings bracket of greater than R8, 000 is 2.3 (1,191,300/ 510,200) times greater should a tertiary education be achieved (Statistics SA, 2009).

Table 4: Top Four Earnings Brackets Indicating Value of a Tertiary Education (in thousands)

Education / Income	None	Grade 0-3	Grade 4-7	Grade 8-9	Grade 10-12	NTC (1,2,3)	Certificate	Bachelors	Honours	Higher
8001+	2,4	.4	7,1	12,2	245,9	12,3	242,7	98,2	27,7	9,6
11001+	1,0	.8	1,7	4,1	140,6	8,1	151,8	70,2	32,2	14,1
16001+	.2	-	3,2	2,9	66,7	5,3	112,3	65,8	46,3	34,4
30001+	-	-	.8	1,4	18,8	-	22,5	133,3	82,7	21,8
TOTALS					510,2					1,191,3

[Data extracted from Appendix 2, figures rounded to the nearest hundred]
Source: Statistics South Africa, 2009

Thirdly, points indicating clusters of earnings by categorical populations of differing levels of education were calculated (see Appendix 3 and Figure 1). It was found that for entirely non-school goers earnings cluster slightly below the R500 per month mark. For those having completed junior school, earnings cluster slightly above R500 per month, for those having completed high school around R1 500 and for those having completed a form of tertiary education around R8 000.

From the findings, a cost benefit equation for each level and the respective rate of return was calculated for the average South African. For the average representative individual who chooses to pursue education up to tertiary level after grade 12 achievement, a free fee junior school is most likely attended [as it is government's aim to maintain a minimum of 40% of all schools as non paying institutions with up to R350 spent on each child per annum (Department of Education, 2007: 1)]. Thereafter a public high school is attended, which costs on average R10 500 per annum (South African Information, 2009: 1). Thereafter a university or vocational school is attended which may cost anywhere in the range of R8,000 per annum for vocational training such as with Intec, or up to R20,000 for a Rhodes University degree. It is evident then that the most dramatic change in rates of return rely on the type of tertiary education chosen, making government funding at this level a crucial determinant not only of choice of tertiary

pursuit but also of the rate of return which is affected by government funding as will be explained under Section Seven.

Rates of return were overestimated as constant inflation revision rates were not possible to calculate. Secondly, the results are only estimates as data from different periods are brought into the calculation due to accurate historical data being unattainable. Present education costs of all levels against 2007 average earnings were used, whereas for accuracy costs of schooling for the school-going generation that began work in 2007 and hence junior school in the 1990's would be used. Accordingly then junior school would have a private rate of return to the individual over one year of 17%, (R6,000 per annum earnings/ R350 per annum fee), high school would have private rate of return to the individual of 1.7% (R18,000 per annum earnings/ R10,500 per annum fee) and tertiary education would have a private rate of return to the individual of between 12% (R96,000 per annum earnings/ R8,000 per annum fee) to 4.8% (R96,000 per annum earnings/ R20,000 per annum fee).
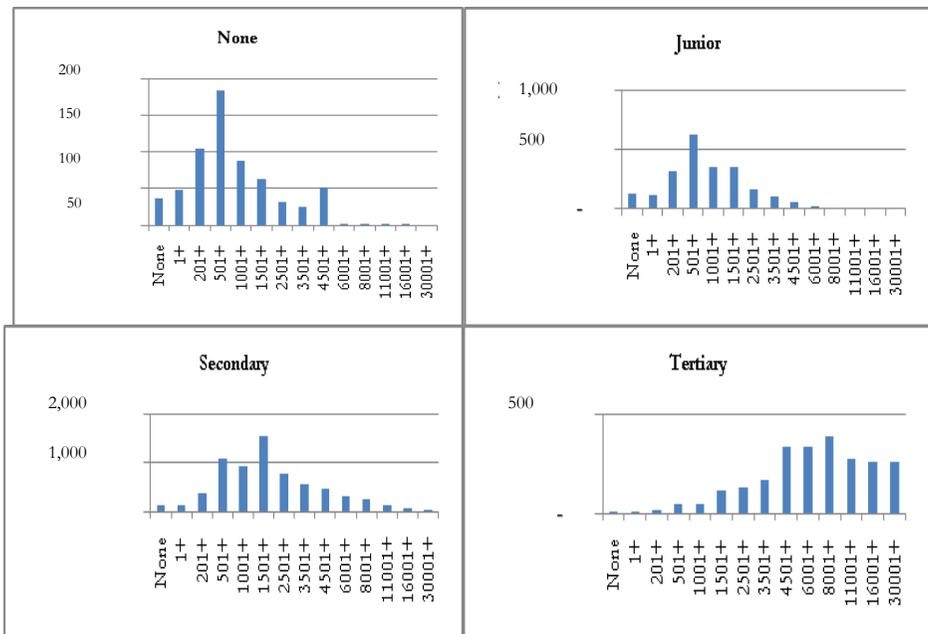

Figure 1: Earnings Cluster Points as Per Each Level of Education
[Data extracted from Appendix 3, categorical populations on vertical axis in thousands]
Source: Statistics South Africa, 2009

From the cost benefit analysis, it is evident that the highest private rate of return to the individual is at junior school level, largely due to current highly subsidised junior schooling. The result however, is not to be be mistaken as being a comparison to international or local trends as this is the return to the individual based on subsidisation not actual cost. The result of low internal rates of return to the individual at higher levels may be true, however it is necessary to note that most of the return to higher levels is accrued to society in the form of improved crime, health and research rates as well as improved service delivery and joint initiatives, all of which are less able to be measured

quantitatively. Furthermore it is noted that the study proves only one path of education amongst various costing routes. Lastly, regardless of the education route chosen by the individual, socioeconomic background was proven still to be an influence on entry into the job market and consequent wage levels as is discussed under section seven.

Finally it was found that the a priori assumption of higher earnings brackets being held by those higher in the hierarchy of tertiary education was true (see Appendix 4 and Figure 2). The reason for slightly lower average earnings by masters/ doctorate graduates over honours graduates may be due to more of an academically chosen lifestyle (Statistics SA, 2009:1) as well as the possibility that there are few advanced research jobs relative to the candidates available, with the oversubscription resulting in poor utilisation of advanced skill.
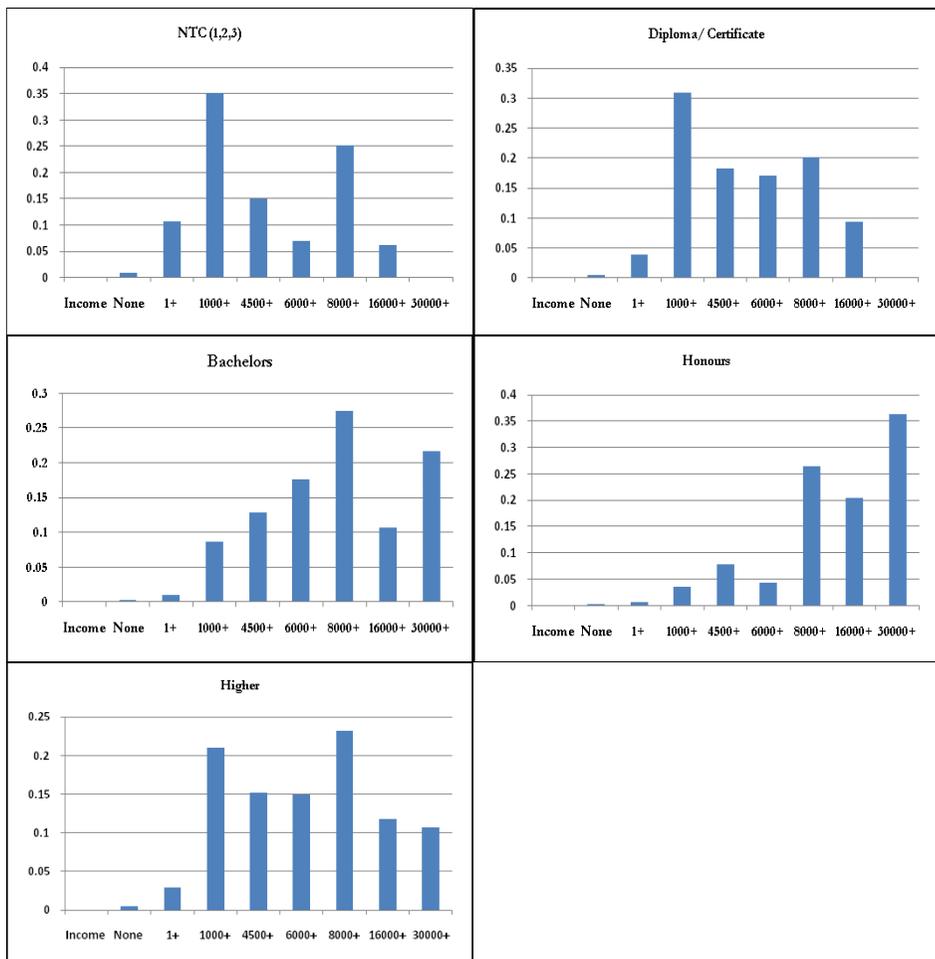

Figure 2: Rates of Return to Tertiary Education: Earnings Brackets Accorded to Each Level of Tertiary Education
[Data extracted from Appendix 4, percentages of the categorical populations on the vertical axis]
Source: Statistics South Africa, 2009

7. BARRIERS TO PARTICIPATION: DATA

Poverty rates in South Africa remain high and are largely pre-empted by lack of education, indicated by level of education (see Figure 3). It was found that there remains a large barrier to poverty reduction due to lack of opportunity for education most prominently at lower levels (Armstrong, 2008: 19).
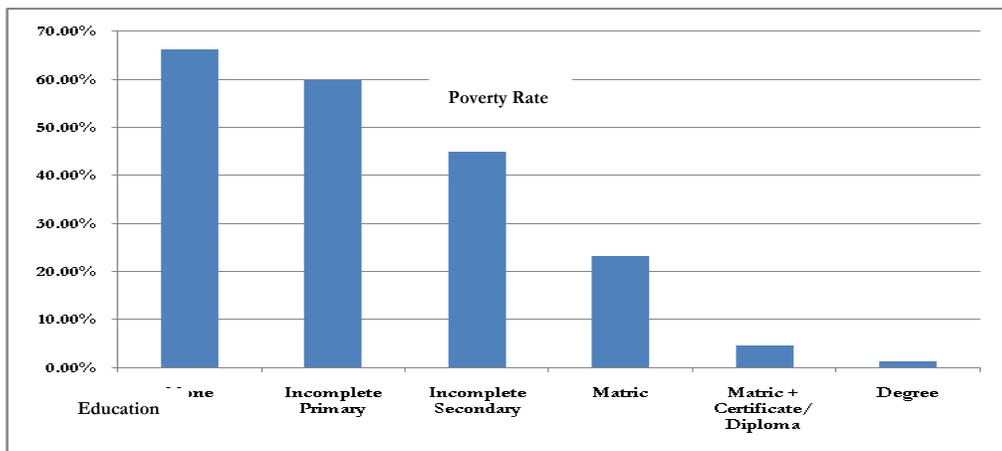

Figure 3: Poverty Rates by Educational Attainment, South Africa 2007
Source: Armstrong, 2008: 19

Kraak (2004: 31) calculated the annual rate of high school leavers who enter the labour market and get a job (see Table 5). It was concluded that not only did education play a role in determining first time employment but also that there was still a racial barrier to the job market, likely due socio-economic upbringing and a lack of quality education in more rural locations.

Table 5: Effects of Socio-Economic Background on Employment

Racial Group by Size	% Distibution of SA Population	Employment Rate of First Time Leaving Labour Market Entrants
African	77	29
White	11	75
Indian	9	50
Coloured	3	70
TOTAL	**100**	**37**

Source: Kraak, 2004: 31

From tables 4 and 5 it may be concluded that lack of participation in education may be attributed predominantly to poverty and secondly that lack of potential participation in the job market may be due to educational quality afforded to individuals from rural communities. Pertaining to the first problem, however, it is important to note that tertiary education funds for bursaries by government are largely unspent. In 2007 R89,3 m in the

National Student Financial Aid Scheme went unspent and in 2008 R95,5m (Nzimande, 2009: 1). According to Higher Education Minister Blade Nzimande there was R21bn in unspent funds in the NSFAS, the National Skills Fund and various Sector Education and Training Authorities. The primary reason given for this situation, according to a report in Parliament by Nzimande was a lack of suitable candidates who could succeed in tertiary education alongside a lack of capable teachers and administration managers for which funding could be allocated to train to raise the standards of the educational system (Nzimande, 2009: 1). This indicates that although local economic studies prove the greater benefit in investing in tertiary education, the problem is largely structural and needs to be corrected over the generation beginning at grassroots levels. A sample in the Eastern Cape region provides evidence that poor tertiary education participation rates are predominantly due to matriculation completion rates (see Table 6), which confirms Nzimande's notion that tertiary education funding is not being released as there are not enough available candidates. Using 2006 data, university endorsements were achieved by 38 of the 488 candidates who wrote the examinations. Although this sample may be an extreme case, it indicates that endorsement rates may be as low as 8% (38/488) and hence the path of graduation into tertiary education remains stagnant with unspent budgets. In 2008, national population figures indicate that schools are yet requiring attention with 20.2% of matric candidates having achieved university endorsement and an additional 23% entrance into non-degree programs (Statistics SA, 2009:1).

Table 6: Matric Pass Rates: Grahamstown East, 2004 - 2007

Schools	2003	2004	2005	2006	2007	Endorsements 2006	Writing 2006	Passed 2006
A	90.7	63.3	60	84.8	63.2	11	66	56
B	78.3	70.8	81.3	73.6	64.3	17	178	131
C	40.9	19.6	32.1	28.1	30.8	1	32	9
D	42.5	40.9	25	28	18	0	50	14
E	38	26.9	45.5	37.1	81.8	0	62	23
F	62	62.5	61	74	32.1	2	54	40
G	29.1	52	44.3	71.7	70.2	7	46	33
Averages (%)	55.8	53.9	57.4	62.7				
Candidates	539	490	529	488	488	Total 38	488	306

Source: GADRA Education, 2009: 1

Current debate is largely over the quality of the National Senior Certificate (NSC) introduced in 2008 and whether it is still a potential predictor of success at university. Accordingly, the National Benchmarking Test (NBT) aimed to investigate the additional support required by university students by analysing a sample of 13, 000 first year students at several universities. The level of proficiency (ability to pass with ease) at university level was determined and found to be weak despite the ability to cope at matric level, raising concerns as to the quality of secondary education (Paton, 2009: 39 – 41).
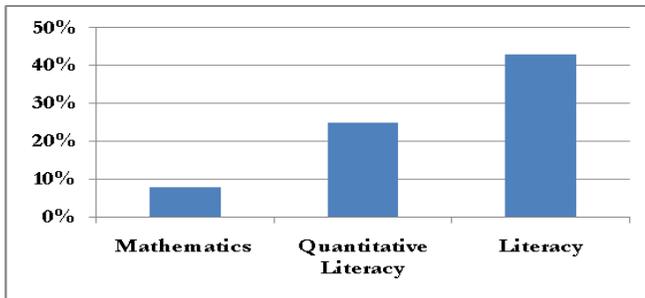
Figure 4. Proficiency Level for First Year University Students 2009 (South Africa)
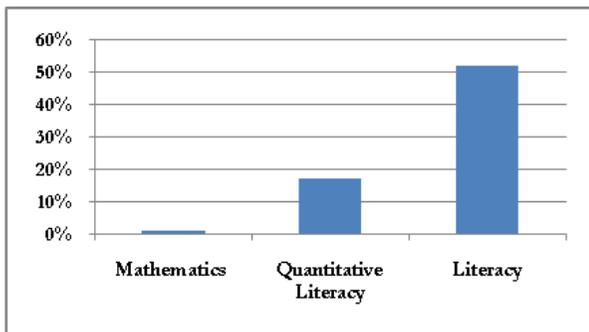*Source:* Paton, 2009: 40

Figure 5. Proficiency Level for First Year University Students 2009 (Rhodes University)
Source: Paton, 2009: 40

Given the low levels of proficiency of first year university students currently evident (see figure 4 and 5), it may be concluded that rates of return to secondary education are less able to be accurately compared within the respective educational level. The lack of comparison ability may be due to the widely divergent education quality offered, making the transmission of secondary education into employability and earnings less direct. It may be further concluded that rates of return to tertiary education are expected to decrease due to diminishing quality of secondary education with higher failure and repeat costs when capable matriculation students do not translate to capable university students. Lastly, weak proficiency lies predominantly in the field of mathematics, strongly required for the economy's much needed industry involving commerce, engineering and science. The solution required would involve ensuring congruence between the standard of secondary and tertiary education. The problem has been routed further back to primary level skills which have an accumulative effect. Importantly however, is that all levels need to ensure not only quality education translating to pass rates but also quality education relating to the practicalities of the job market to uphold the transmission between education and career pursuits (Paton, 2009: 39 – 41).

8. RHODES UNIVERSITY STUDY: RETURNS TO NSFAS FUNDING

The study completed held the aim of investigating the effect of NSFAS funding on rates of return for Rhodes University graduates. Records of all those students who began their studies specifically in 2003 at Rhodes University and were to some extent funded by

NSFAS in the duration of their studies were used. 89 individuals in total were funded. From such a pool, 25 completed degrees to postgraduate level, 12 were academically excluded, 17 moved from the university in the capacity of their own will and the remaining 54 completed their undergraduate degrees with the aid of NSFAS. It was assumed that should funding not have been offered by the NSFAS the candidates would have been less likely to embark on a tertiary education. From the education attained it was known (according to past studies) that the most commonly measured premia resulting would be of employability, experience and wage effects. In order to analyse wage effects the Rhodes sample was subdivided according to the faculty and investigation was made of students from Commerce and Science (see appendix five).

It was found that five-year internal rates of return to the individual were 145% greater with the aid of government subsidies. This was calculated using a cost benefit equation as follows: the funding apportioned to each individual as a loan as well as the 40% subsidy awarded should they have passed their curricula was determined. Estimated earnings were indicated as being in the top four earnings brackets as calculated under section five and were estimated at an average of R8, 000 (postgraduate pursuits were indicated to emphasise that this was a minimum; the cost benefit analysis is made regarding the base degree only). The internal rate of return was then calculated by analysis of the cost of the degree against future earnings, firstly without taking into account the government subsidy and secondly with account of the subsidy. Inclusion of interest rates in the calculation was omitted as complete information as to the repayment period of the loans was not available. The rate at which loans are paid back to NSFAS is determined by the gross annual income of the debtors; no fixed repayment period exists. Repayments are calculated at a rate of between 3-8% of gross annual income and debtors may choose to increase the monthly repayments should they so wish. The interest rate is standard regardless of the repayment period and is set at a current 2009 rate of 7.6% per annum (NSFAS, 2009). Therefore, with the exclusion of interest rates it is an assumption that the IRRs calculated are overstated by the amount that the interest is compounded on the loan, which may only be calculated having an understanding of each learner's chosen repayment period. Based on this method, the 145% higher government boosted IRR with government subsidisation as opposed to without was determined. Beyond this government aid came much more prominently in the form of initial loans for outlay costs. From such a sample, it may be assumed that the NSFAS funded student population has experienced similar rates of return to the samples for wage premia.

Beyond the private rate of return accruing from wage premia, it is assumed that premia of employability and experience existed, however data for such calculations were largely dependant upon perception making it more qualitative by nature with accuracy questionable and hence were omitted. Furthermore, social returns exist most quantitatively in the form of taxes of up to 40% of annual incomes. For simplicity incomes were held constant over the five years after graduation, however in reality there should be approximate minimum revision of 2% per annum to account for inflation and promotion. It is thus assumed that through government aid of tertiary education, higher incomes are achieved and hence government is indirectly investing in future taxes for public goods. Furthermore social returns may be experienced in the form of knowledge sharing, research, global best practices and so forth.

9. THE CURRENT FINANCIAL CRISIS – IMPLICATIONS FOR TERTIARY EDUCATION

"Economic losses of educational underperformance are significantly higher than the costs of the financial crisis" (Theil, 2009: 36) and "No country can afford to put at risk an entire generation because of the economic crisis" (Langman, 2009: 48). Accordingly nations are making education funding part of their anti crisis strategies. What is less clear is whether money is going where it has the greatest social and economic impact. A review by Theil (2009: 42-46) of a World Bank study in July 2009 proposed that the building of general world class universities was bleeding more necessary areas of education. Rather, in nations where tertiary education can afford financial focus, aims should be blueprinted according to the nation's needs. Examples include Obama's current strategy of a $12 billion boost for two-year community colleges, A largely practical tertiary offering designed with the aim of effective spending. Secondly is Abi Dhabi's Masdar Institute of Science and Technology, investing in education with the aim of sustaining the economy given its current and expected resources (Matthews and Nemtsova, 2009: 42 - 46). Thirdly is the rising market for vocational training as opposed to purely academic training throughout Africa (Underhill, 2009: 39 - 40). Crucial however is that amidst crises the largest returns come from investing in those who have been left behind as opposed to average performers as the result is long term social gain of less crime, less welfare spending and greater social cohesion to jointly uplifting the economy out of recession. In this, relative educational gain by individual (as is the focus for internal rates of return for NSFAS funded Rhodes students) needs to be the focus as opposed to outright achievement.

10. CONLUSION

Major restructuring within the South African Department of Education has taken place alongside the realisation that tertiary education does have large returns locally, but that the nation's development model has not been such that there have been enough potential candidates to make the sector viable at present. Accordingly, focus has shifted within higher levels of education to FETs and SETA's for which there remains opportunity to analyse the effects that such education will have on the output in a region. Concurrently, more tertiary educational qualifications cannot afford to decrease especially with the current global environment; hence the NSFAS plays a crucial role. However, the tertiary future of South Africa has been indicated to rely more predominantly on supply of candidates from lower levels of education (influenced by funding at the respective level) rather than on funding issues at tertiary level, where unspent funds by government have been reported.

Accurate rates of return inclusive of all social and private benefits are difficult to calculate as academic tertiary human capital is a lot more mobile than vocational tertiary human capital and hence government education expenditure links to output in a region are difficult to quantify. More appropriate would be to quantify rates of return by output levels accruing from research (that is actually implemented in a region) from academic tertiary individuals educated in the same region.

From the studies conducted it was found that those who complete a tertiary education in South Africa are 2.3% more likely to exist within the top four earnings brackets of above R8, 000 per month. According to the cost benefit study carried out, decreasing rates of return to the individual, not necessarily to actual cost, by level were found.

However, it was found that with a broader measure of IRRs inclusive of social returns, the return to society would compose a large portion of the total returns. The social returns however are often ambiguous, including measures of health, crime and poverty, all of which are difficult to quantify accurately. It is assumed that when considering actual cost, the South African norm of increasing rates of return hold

   Considering the positive effects of education confirmed at all levels and within the hierarchy of tertiary education, studies of barriers to education participation concluded that poverty had the greatest impact with race (often linked to quality of education in rural locations and socio-economic upbringing) still playing a role in determining job market entrance even with the acquisition of an education. It was found that tertiary participation levels are still low when funding is provided by government due to the university endorsement of matriculation learners, which were found to be as low as 8% in the Grahamstown study conducted.

   According to the Rhodes University science and commerce samples analysed, NSFAS has largely aided the tertiary participation rates at Rhodes with the data indicating a five year internal rate of return to the individual of 145% greater with government's subsidy aid as opposed to without. It is on such a premise that government would be encouraged to continue funding through NSFAS considering the high returns evident, both to the individual for a lower fee outlay as well as to government for the direct effect of increasing incomes and the indirect effect of taxes generated from tertiary education. However, for the sustainability of the tertiary sector it is evident that lower levels of education require priority in order to feed higher education and make effective use of respective budgets. Finally, coordination between the graduate market and the labour market is crucial in order to prevent distortion of the economy through the education policy encouraged (Theil, 2009: 35 - 37).

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