STUDENT GRADUATION,
LABOUR MARKET DESTINATIONS AND
EMPLOYMENT EARNINGS

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ABSTRACT

This paper investigates the labour market destinations of graduates from seven higher education institutions in South Africa. A three-step estimation procedure is employed in which the relative importance of covariates such as age, race, and gender in each stage from educational attainment to pre-defined labour market outcomes, is estimated. The results indicate that race continues to be a significant determinant in South Africa of the probability of outcomes such as graduation and employment even when controlling for institution type and field of study. No differential in earnings is apparent on the basis of race once individuals have been selected into employment. Whilst socio-economic variables are important in determining graduation and success in the labour market, they are not crucial.

Acknowledgements

Disclaimer

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1. INTRODUCTION

Against the backdrop of rising unemployment rates in South Africa and the shortage of high-level skills in the labour market, the dual problems of low graduation rates and graduate unemployment are critically important. Research shows that attrition rates in South Africa are high, with only 30 percent of students enrolled in a bachelor's degree obtaining their qualifications within a five-year period (DoE, 2005). Moreover, there exist large disparities in graduation rates across different population groups. According to the Department of Education (DoE, 2001: 33), graduation rates of white students are almost double those of black students. It is in this context that the HSRC's Student Retention and Graduate Destination study (HSRC, 2005; henceforth, "the study") was undertaken.

The study traces the 2002-2003 cohort of non-completers and graduates from seven selected public higher education institutions (HEIs) in South Africa. In this paper we attempt to augment the findings of the HSRC (2005) study by taking a more quantitative approach to analysing the survey data. A three-step estimation procedure will be used, in which the relative importance of covariates such as age, race, and gender in each stage from educational attainment to pre-defined labour market outcomes, will be modelled.

The intention is to model the selection process from graduation to employment, investigating the determinants of graduation and of employment. Since education is considered to be an important determinant not only of employment but also of earnings, in the final stage of our modelling process an earnings function will be estimated. The availability of a comprehensive Student Retention and Graduate Destination data-set allows these three stages of the selection process to be modelled sequentially. Moreover, availability of these data by race enables us to investigate the factors contributing to the racial gaps in education, employment and earnings.

This paper begins with an empirical overview of the data and a descriptive analysis of selected variables of interest. A more quantitative approach follows in which the three observable outcomes in the dataset – graduation, employment and earnings – are modelled.

2. DATA

The study is structured as a cohort analysis that traces the non-completers and graduates of 2002-2003 from the seven selected higher education institutions (HEIs) into their final labour market destinations. It uses HSRC survey data derived from two postal surveys, the 2005 Graduate Destination Survey and the 2005 Student Retention Survey. Questionnaires were sent via mail to graduates and non-completers between June and September 2005. The mean sample were registered at their respective HEIs in 1999, but the surveys were mailed to individuals on the basis of whether they graduated or left the institution prematurely during 2002-2003, as opposed to the year in which they first registered.[1]

A graduate was defined as a student who fulfilled all the requirements for a qualification in 2002, and a non-completer was taken to be a student who left the institution prematurely between 2002 and 2003 without achieving a qualification. The total number of graduates and non-completers does not however, represent the total number of students enrolled in this period, since the students who were neither graduates nor non-completers and who continued with their studies in 2003 were not surveyed. Our estimates therefore contain a residual bias of those students who were still studying; that is those who were neither graduates nor non-completers in 2002-2003.

Of the total survey population of 34,548 individuals (20,353 non-completers and 14,195 graduates) within the selected HEIs, there were 5,491 valid responses, representing a 15.8 percent return rate. The selected institutions include both universities and technikons

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[1] The surveys were mailed to graduates and non-completers on the basis of when they completed their qualification or left the institution. The year in which the students enrolled at the institution was not taken into consideration when determining the population to be surveyed. Based on the survey data, the mean sample of graduates who completed their qualification in 2002 first registered at the institution in 1999. However, the graduates and non-completers in the survey population did not all register at the HEI in the same year.

(currently known as Universities of Technology): Stellenbosch University; University of the North; University of the Western Cape; University of Fort Hare; University of the Witwatersrand; Technikon Pretoria; and Peninsula Technikon. The surveys were administered between June and September 2005. The HEIs selected include both Historically Black Institutions (HBIs) and Historically White Institutions (HWIs),[2] in order to take into account the problem of preferential resource allocation to HWIs during apartheid.

The data-set covers a broad range of areas, including variables measuring personal and household level characteristics, socio-economic status, school and HEI attended, as well as information on employment such as earnings, occupation and sector.[3] Students' individual performance disaggregated by subject in the Senior Certificate Examination (SCE) is also provided. This, together with the grade level at which each subject was written, allows for the calculation of entry points into an HEI. As a measure of performance at the Matriculation level, these points were estimated by totalling up the points achieved in English and Mathematics and then adding to those the points achieved in the four best other subjects written.[4] Household level variables provided include parental income, parental education, home language and the number of siblings enrolled in HEIs. Additionally, the data-set provides individual characteristics of students as well as information on their personal reasons for leaving the institution and on the basis upon which they chose their subjects at school.

The data, however, suffer from certain drawbacks. First, questionnaires were mailed to students as opposed to in-person interviews being conducted. Second, only a small fraction of the total number of respondents mailed back their responses (5,491 out of 34,558). Thus the responses obtained provide only a snapshot sample of the original cohort of graduates and non-completers of 2002-2003 at the respective HEIs.

The response rates by institution and race are shown in Table 1 below:

Table 1: Response rates by institution and race

Institution	Black African	Coloured	Indian/Asian	White	Total
University of Fort Hare	22.0%	16.7%	0%	0%	21.9%
University Stellenbosch	10.0%	14.5%	12.5%	10.0%	10.5%
University of the North	18.2%	80.0%	25.0%	0%	18.2%
University of the Western Cape	17.8%	12.4%	11.7%	10.5%	15.0%
University of the Witwatersrand	14.1%	13.2%	11.6%	7.8%	11.5%
Peninsula Technikon	14.8%	13.3%	8.7%	8.7%	14.0%
Pretoria Technikon	16.4%	8.2%	2.9%	6.7%	13.9%
Apartheid classification of institution					
Historically Black	20.3%	13.6%	13.1%	11.5%	18.5%
Historically White	17.9%	8.9%	9.3%	8.1%	13.8%
Total	19.2%	13.6%	10.6%	8.7%	15.9%

Source: Student Retention and Graduate Destination study (HSRC, 2005).
Notes: Data here are weighted according to stratification by field of study, gender, race, and institution for graduates and non-completers.

Examining the response rates above, it is interesting to note that overall, HBIs had a higher response rate than HWIs. Also interesting is that the response rate of black Africans (henceforth, Africans) (19.2 percent) is more than double that of their white counterparts (8.7 percent).

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[2] The HWIs are the University of Stellenbosch, University of the Witwatersrand, and Pretoria Technikon. The HBIs are the University of Fort Hare, the University of the Western Cape, the University of the North, and Peninsula Technikon.

[3] The occupation variable was coded on the basis of the South Africa Standard Classification of Occupations (SASCO) issued by Statistics South Africa (StatsSA). Information on the main goods and services produced was used to determine sector. This was coded on the basis of the International Standard Industrial Classification of all Economic Activities (ISIC).

[4] In accordance with the conversion system used by the Admissions department at the University of Cape Town, for a Higher Grade subject, an A symbol carries 8 points, a B = 7 points, a C = 6 points, a D = 5 points, and so on. A Standard Grade A is equivalent to 6 points, a B to 5 points, a C to 4 points, and so on. For the purposes of this study, subjects written at Lower Grade were accorded the following points: A = 4 points, B =3 points, C = 2 points and D = 1 point. Anything below a D in Lower Grade was converted to zero.

Given these differences in response rates, the sample data were weighted in an attempt to control for bias caused by differences between the survey sample population of graduates and non-completers and the sample of students who responded. Weights were constructed using data given to the HSRC by the institutions on the total number of graduates and non-completers by gender, field of study, institution and race in 2002-2003.[5] Even though the weights enable us to control for gender, field, race and institution, we are unable to control for other variables such as occupation and sector because of the lack of any further data on the total population. It must be noted that the weights were created using the data on the students provided by the institution and that the accuracy of the institutional records is therefore open to scrutiny.

The survey data are further limited by their reliance upon the response of the individual. The accuracy of certain measures provided in the data-set is questionable since the students were a secondary source for information on parental income and parental education. Thus the estimates derived may be biased because of the lack of direct household data. Furthermore, our estimates for entry points rely on the accuracy with which students reported their marks in the SCE, along with the correct level at which they wrote their examinations (Higher, Standard or Lower Grade). We have no recourse to their formal marks through the DoE register. Since the questionnaires were administered by mail, the information provided is limited by the extent to which the respondent was able to correctly interpret the questions and provide a response in the absence of any guidance.

3. HIGHER EDUCATION TRANSITION: A Descriptive Overview

This section provides an empirical overview of some of the relevant variables for graduates and non-completers by institution. First, we present a snapshot of graduates and non-completers by exogenous characteristics. Then we examine the differences in the mean characteristics of the salient variables under consideration by the apartheid classification of the institution. As the data will show, inequalities persist in the post-1994 era between institutions as well as between the different race groups.

The data will focus on the three broad outcomes – graduation, employment and earnings – which we model sequentially later in this paper. The discussion of the data will focus on how these outcomes differ not only across different racial groups, but also within a race, depending on the historical type of institution attended.

Table 2 below shows the proportions of graduates and non-completers in the sample by race and gender. In the February 2002 Labour Force Survey, of those enrolled in HEIs, 69.1 percent were African, seven percent coloured, four percent Indian/Asian, and 19.5 percent white. This distribution is similar to that in our sample of graduates and non-completers.

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[5] Weights were calculated as N/n, where N = the number of students in the population of graduates or non-completers by institution, race, gender, and field, and n = the number of students in that cohort in the sample. The sum of our weights do not equal the population total of 34,548 (the total number of graduates and non-completers in 2002-2003) since some students in our sample were not identified as graduates or non-completers by the institution.

Table 2: Distribution of graduates and non-completers by race (frequencies and percentage shares)

	African		Coloured		Indian/Asian		White		Total
	Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	
Graduates	3,787	3,154	795	613	249	242	2,671	2,264	13,775
	34.32	*49.17*	*49.35*	*42.60*	*60.88*	*54.38*	*75.62*	*57.83*	*47.24*
Graduates: Total	6,941		1,408		491		4,935		13,775
	38.98		*46.16*		*57.49*		*66.27*		*47.24*
Non-Completers	7,246	3,260	816	826	160	203	861	1,651	15,383
	65.68	*50.83*	*50.65*	*57.40*	*39.12*	*45.62*	*24.38*	*42.17*	*52.76*
Non-Completers: Total	10,867		1,642		363		2,512		15,383
	61.02		*53.84*		*42.51*		*33.73*		*52.76*
Sample Size	17,807		3,050		854		7,447		29,158
Share of total	*61.07*		*10.46*		*2.93*		*25.54*		*100.00*

Source: Authors' calculations using data from the Student Retention and Graduate Destination study (HSRC, 2005).

Notes: 1. Data here are weighted according to stratification by field of study, gender, race, and institution for graduates and non-completers.

2. The sum of our weights do not equal the population total of 34,548 (the total number of graduates and non-completers in 2002-2003) since some students in our sample were not identified as graduates or non-completers by the institution.

The above table shows the ratio of graduates to non-completers by race and gender. The data suggest that for every two white students who graduate, one white student prematurely leaves the institution (66.27 : 33.73). The opposite is true for African students, with almost two students prematurely leaving the institution for every student who graduates (38.98 : 61.02). The graduate-to-non-completer ratios among coloured and Indian/Asian students are almost equal, with approximately one graduate for every non-completer.

African females appear the most disadvantaged, with a graduate-to-non-completer ratio of 34.32 : 65.68. Hence, for every female African student who graduates, approximately two leave the institution prematurely, whereas for every white female student who drops out, three white female students graduate (75.62 : 24.38).

For African males there appears to be a 50 percent probability of dropping out compared to graduating. It is interesting to note that the percentage of graduates who are white (36 percent) is disproportionate to their share in the sample population (26 percent), while the percentage of African graduates (50 percent) is less than the proportion of Africans in the total sample of graduates and non-completers (61 percent). It should be noted that the percentage of African non-completers is almost twice that of African graduates (61 percent compared to 39 percent). On the other hand, the share of white graduates is almost double that of white non-completers (66 percent compared to 34 percent).

Although among all racial groups proportionally more females than males graduate, African females have the lowest graduate-to-non-completer ratio (34.32 : 65.68) compared to the other groups. The two highest graduate-to-non-completer ratios are for white and Indian/Asian females.

Table 3 below attempts to estimate the share of graduates and non-completers by institution in order to better investigate the aggregate race and gender differences noted above.

Table 3: Distribution of graduates and non-completers by institution and race (percentage shares)

Institution	African			Coloured			Indian/Asian			White		
	NC	G	Total	NC	G	Total	NC	G	Total	NC	G	Total
Fort Hare	7.5	2.1	9.5	--	--	--	--	--	--	--	--	--
Stellenbosch	0.2	1.0	1.1	3.7	6.3	9.9	--	1.3	1.3	7.7	32.4	40.1
Univ. of the North	14.5	2.5	17.0	--	--	--	--	0.4	0.4	--	--	--
Western Cape	3.1	3.9	6.9	27.3	16.4	43.7	1.9	9.5	11.4	--	--	0.1
Witwatersrand	4.9	5.1	10.0	1.8	0.9	2.7	33.0	41.8	74.8	2.8	13.2	16.0
Peninsula Technikon	6.8	6.1	12.9	18.2	21.4	39.6	0.6	0.2	0.8	0.1	0.3	0.3
Pretoria Technikon	24.1	18.4	42.5	2.8	1.3	4.1	7.0	4.3	11.4	23.1	20.4	43.5
Total	**61.0**	**39.0**	**100**	**53.8**	**46.2**	**100**	**42.5**	**57.5**	**100**	**33.7**	**66.3**	**100**
Apartheid classification of institution												
HBI	31.8	14.6	46.4	45.5	37.8	83.3	2.5	10.1	12.5	0.1	0.3	0.4
HWI	29.2	24.4	53.6	8.3	8.4	16.7	40.0	47.4	87.5	33.6	66.0	99.6
Total	**61.0**	**39.0**	**100**	**53.8**	**46.2**	**100**	**42.5**	**57.5**	**100**	**33.7**	**66.3**	**100**

Source: Authors' calculations using data from the Student Retention and Graduate Destination study (HSRC, 2005).

Notes: 1. NC refers to non-completers, G refers to graduates.

2. Estimates corrected for by person weights. Data here are weighted according to stratification by field of study, gender, race, and institution for graduates and non-completers.

3. -- indicates missing values where no sample was present.

For most of the institutions shown in the table above, the percentage share of white graduates exceeds that of Africans. While for whites the share of non-completers is much smaller than that of graduates at most of the institutions, for Africans the share of non-completers exceeds the share of graduates at almost all of the institutions. Put differently, whites are more likely to graduate than Africans – regardless of the choice of institution.

An interesting outcome is the difference between Africans from HBIs and those from HWIs. For Africans from HBIs, the share of non-completers is double that of graduates (31.8 percent and 14.6 percent respectively), while for Africans at HWIs, this ratio is much lower. The share of Africans who graduate at HWIs (24.4 percent) is larger than the share of African graduates at HBIs (14.6 percent), despite the predominant share of enrolled Africans at HBIs. However, the information in the table above must be treated with caution. The population of enrolled students at HWIs remains disproportionately white, and at HBIs, predominantly African. For instance, the disproportionately large share of whites enrolled at the University of Stellenbosch provides a distorted picture of the share of non-completers by institution.

In order to control for differences in the total number of students enrolled at each institution, non-completion rates[6] were calculated for the different cohorts at the institutional level (Table 4).

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[6] The non-completion rates for each racial group at each institution were calculated by dividing the number of non-completers of each race and institution by the total number of graduates and non-completers of that race at that institution. For the purposes of this study, the population (enrolment) was taken to be the total number of graduates and non-completers. Non-completion rate (l) for race r at institution i:

$$l = \left(\frac{(non-completers)_{r,i}}{graduates_{r,i} + (non-completers)_{r,i}} \right)$$

Table 4: Non-completion rates by institution, gender, and race

Institution	African		Coloured		Indian/Asian		White		Total
	Male	Female	Male	Female	Male	Female	Male	Female	
Fort Hare	0.78 (0.027)	0.78 (0.043)		--	--	--	--	--	0.78 (0.027)
Stellenbosch	0.46 (0.258)	--	0.42 (0.129)	0.34 (0.234)		--	0.30 (0.119)	0.09 (0.032)	0.21 (0.062)
Univ. of the North	0.87* (0.017)	0.83 (0.026)	--	--	--	--	--	--	0.85 (0.015)
Western Cape	0.25 (0.084)	0.52 (0.064)	0.66 (0.050)	0.60 (0.080)	--	0.27 (0.168)	0.67 (0.315)	--	0.52 (0.035)
Witwatersrand	**0.46 (0.045)**	**0.53 (0.078)**	0.52 (0.206)	--	0.48 (0.096)	0.41 (0.122)	0.21 (0.053)	0.14 (0.055)	0.39 (0.029)
Peninsula Technikon	0.61 (0.042)	0.45 (0.053)	0.53 (0.060)	0.38 (0.088)	0.71 (0.289)	--	--	--	0.50 (0.031)
Pretoria Technikon	**0.24 (0.014)**	0.69 (0.023)	0.60 (0.199)	0.84 (0.160)	0.60 (0.284)	--	0.60 (0.111)	0.45 (0.066)	0.56 (0.025)
Apartheid classification of institution									
Historically Black	0.53 (0.015)	**0.71 (0.018)**	0.65 (0.050)	0.61 (0.050)	0.42 (0.257)	0.32 (0.161)	0.60 (0.011)	0.45 (0.066)	**0.62 (0.015)**
Historically White	**0.54 (0.032)**	**0.46 (0.043)**	0.51 (0.053)	0.39 (0.086)	0.47 (0.093)	0.40 (0.120)	0.27 (0.082)	**0.10 (0.034)**	0.37 (0.022)
Total	0.53 (0.014)	0.66 (0.018)	0.57 (0.038)	0.51 (0.056)	0.46 (0.098)	0.39 (0.105)	0.42 (0.088)	0.24 (0.028)	0.53 (0.013)

Source: Authors' calculations using data from the Student Retention and Graduate Destination study (HSRC, 2005).

Notes: 1. Standard errors in brackets. Bold indicates significance at five percent level of Africans with whites.
2. Estimates corrected for by person weights. Data here are weighted according to stratification by field of study, gender, race, and institution for graduates and non-completers.
3. -- indicates missing values where sample size was too small to construct an estimate or confidence intervals.

In examining the aggregate non-completion rates, it is clear that the estimates for African students are higher than those for all the other racial groups. In addition, non-completion rates for whites are much lower than those for Africans – a result true across all HWIs and across all racial groups. For example, the University of the Witwatersrand yields 53 non-completers per 100 female African students compared with only 14 non-completers per 100 female white students.

There is also a large differential between the non-completion rates at HBIs and HWIs. The non-completion rates at HBIs (62 percent) were significantly higher than those at HWIs (37 percent). In comparing Africans at HBIs with those at HWIs, we observe that while there is little difference between the non-completion rates of males at HBIs and HWIs, the estimated non-completion rates for African females at HBIs (71 percent) are significantly higher than those for their counterparts at HWIs (46 percent).

There is also an interesting gender effect that is observed when we examine the estimates for historically white and black institutions. At HBIs, females have non-completion rates significantly higher than males (71 percent compared with 53 percent for Africans), while at HWIs, the converse is true: the non-completion rates of females are lower than those of their male counterparts (46 percent compared with 54 percent for Africans and 10 percent compared with 27 percent for whites). Indeed, as noted above, African females have a higher non-completer rate than males across most institutions, while for other racial groups, females in general yield lower non-completion rates than their male counterparts. The cohort with the highest non-completion rates is African females at HBIs, who have non-completion rates seven times larger than white females at HWIs (71 percent compared with 10 percent respectively). However, it must be noted that there exists an upward bias in our estimated non-completion rates, since the sample does not include the students continuing with their studies in 2003 – who are unobserved in our sample.

The data presented above reinforce the centrality of race and gender in shaping student retention and the probability of graduation – a result that is unsurprising for South Africa. Furthermore, the estimated non-completion rates above suggest that in addition to inter-racial effects, intra-racial differences according to type of institution attended are also prevalent.

We now provide a more nuanced picture of the differences between graduates and non-completers and between HWIs and HBIs, according to a range of additional variables present in the dataset.

Table 5 shows the mean characteristics of some of the key variables under consideration in this study for HBIs and HWIs, and for graduates and non-completers. The data have been further disaggregated to illustrate the mean differences in characteristics between Africans from HBIs and Africans from HWIs, as well as whites from HWIs.

Table 5: Mean characteristics by *apartheid* classification of institution

Variable	Institution type (Apartheid classification)			Graduates	Non-Completers	Total
	HB-Africans	HW-Africans	HW-Whites			
Individual characteristics						
Male	0.35*	0.47	0.50	0.46	0.41	0.43
	(0.477)	(0.499)	(0.500)	(0.498)	(0.492)	(0.495)
Female	**0.65***	**0.53**	0.47	0.54	0.59	0.57
	(0.477)	**(0.499)**	(0.500)	(0.498)	(0.492)	(0.495)
Business/Commerce	0.18	0.18	0.13	0.16	0.18	0.17
	(0.392)	(0.395)	(0.260)	(0.365)	(0.385)	(0.376)
Education	**0.19***	**0.13**	0.03	0.12	0.13	0.12
	(0.356)	**(0.353)**	(0.202)	(0.322)	(0.331)	(0.327)
Humanities	0.33*	0.31	0.32	0.35	0.28	0.32
	(0.484)	(0.452)	(0.472)	(0.451)	(0.477)	(0.466)
Science, Engineering, Technology	**0.21***	0.34	0.38	0.34	0.23	0.28
	(0.407)	(0.474)	(0.485)	(0.473)	(0.423)	(0.451)
Home language English	**0.06**	**0.07**	0.45	**0.25**	0.13	0.18
	(0.233)	**(0.262)**	(0.498)	**(0.432)**	(0.332)	(0.387)
Mean entry points	**19.5**	**20.9**	37.4	**26.5**	22.2	0.52
	(8.204)	**(8.916)**	(8.456)	**(11.659)**	(0.029)	(0.225)
A in Maths	**0.02**	**0.03**	0.32	**0.15**	0.05	0.52
	(0.139)	**(0.175)**	(0.467)	**(0.361)**	(0.212)	(0.302)
A in English	**0.01**	**0.01**	0.27	0.10	0.05	0.52
	(0.070)	**(0.089)**	(0.445)	(0.294)	(0.213)	(0.256)
Merit/Distinction in SCE	0.50	0.51	0.59	0.49	0.51	0.51
	(0.500)	(0.500)	(0.493)	(0.500)	(0.500)	(0.500)
Lectured/not lectured	**0.87***	0.96	0.99	0.94	0.89	0.93
	(0.331)	(0.184)	(0.095)	(0.217)	(0.287)	(0.257)
Studying part-time	**0.25***	0.15	0.08	0.20	0.19	0.20
	(0.430)	(0.357)	(0.269)	(0.399)	(0.395)	(0.397)
Urban school attended	**0.93**	**0.92**	0.84	**0.59**	0.72	0.65
	(0.257)	**(0.271)**	(0.367)	**(0.448)**	(0.493)	(0.477)
Received scholarship/loan	**0.47***	**0.64**	0.42	**0.51**	0.42	0.46
	(0.499)	**(0.481)**	(0.494)	**(0.500)**	(0.494)	(0.499)
Household characteristics						
At least one parent employed	**0.52**	**0.59**	0.90	**0.70**	0.61	0.65
	(0.498)	**(0.499)**	(0.321)	**(0.460)**	(0.489)	(0.477)
Parental income (monthly)	**4,240**	**5,420**	40,491	**16,340**	7,523	11,631
	(14,136)	**(21,973)**	(68,678)	**(43,304)**	25,596)	(35,254)
Years of education of parents	**6.53**	**7.33**	12.94	**9.53**	7.90	8.67
	(4.224)	**(4.400)**	(2.229)	**(4.476)**	(4.486)	(4.555)
Have siblings who have graduated	**0.40**	**0.34**	0.61	0.50	0.39	0.44
	(0.490)	**(0.473)**	(0.488)	(0.500)	(0.488)	(0.497)
Parent with tertiary qualification	**0.25***	**0.33**	0.73	**0.45**	0.33	0.40
	(0.430)	**(0.471)**	(0.444)	**(0.500)**	(0.469)	(0.490)
Sample size	13,531	4,276	4,204	13,775	15,383	29,158
Share of total	*53.58*	*16.93*	*16.65*	*47.24*	*52.76*	*100*

Source: Authors' calculations using data from the Student Retention and Graduate Destination study (HSRC, 2005).

Notes:
1. Standard deviations shown in parentheses. Bold indicates significant difference at five percent of Africans with whites, or of graduates with non-completers. * Significant difference at five percent level of mean characteristic of Africans at HBIs with Africans at HWIs.
2. Data here are weighted.
3. Years of education of parents refers to the average of the years of education of the father and the mother. A in Maths and A in English indicates the share of the sample that obtained an A at the Higher Grade or Standard Grade. Urban school refers to individuals who attended schools in urban locations.

Table 5 includes variables that include parental, household and schooling characteristics that may be factors impacting on the three outcomes under consideration: student performance, employment and wages.

Significant disparities are observable across institution type for Africans and whites and between graduates and non-completers. For example there is approximately a six-year difference in the mean number of years of education completed by parents of whites (at previously white institutions) as opposed to those completed by Africans. This difference was statistically significant at the five percent level. Furthermore, the share of students whose home language is English is significantly higher for whites (45 percent) than for Africans (six percent and seven percent at HBIs and HWIs respectively), as is the share of whites who obtained an A in English in Matric (27 percent) compared to their African counterparts (one percent).

For certain variables, not only were there significant differences between Africans and whites, but there were also significant differences at the five percent level for Africans at HBIs and Africans at HWIs. For instance, a significantly higher proportion of white students have a parent who has graduated than do Africans. Furthermore, the share of Africans at HWIs who have a parent with a tertiary qualification is significantly higher than the share of Africans at HBIs who have a parent with a tertiary qualification (33 percent compared with 25 percent). The mean parental income for whites at HWIs is about eight times larger than that for Africans. Notably, the mean parental income of Africans at HWIs is higher than the income of parents of Africans at HBIs, suggesting a significant difference in the socio-economic background of Africans according to institution type.

The share of African students at HBIs receiving a scholarship or loan is significantly lower than that of their African counterparts in HWIs. There also appears to be a significant difference in performance in Matriculation for Africans and whites, with whites having significantly higher entry points, and with a larger share of Whites obtaining an A in Mathematics compared with their African counterparts (32 percent compared with two percent and three percent respectively for Africans at HBIs and HWIs).

Similar disparities for most of the variables are observed for graduates and non-completers. A dominant share of graduates achieved an A at the Higher Grade or Standard Grade level in English or Mathematics in Matriculation. A significantly larger number of graduates also report having at least one sibling or parent who graduated from a university or technikon. Note crucially, however, that the individual Matriculation performance of African students, as measured by mean entry points and the achievement of an A in Mathematics or English, does not differ significantly across HBIs and HWIs.

The information presented above suggests that there is a significant difference in the background and type of student who is a graduate versus a non-completer, and also a difference in students enrolled in HWIs and HBIs, even within the same racial group.

The table above showed that whites have entry points significantly higher than those of Africans and that graduates have entry points significantly larger than those of non-completers. Given that certain fields, such as Science, Engineering and Technology SET fields, require that a student have more entry points than other fields do, the observed differences in student performance may be attributed to field as opposed to race or other factors. In order to derive a more nuanced assessment of the overall performance in Matriculation by race and institution, entry points were re-estimated in Table 6 (this time controlling for field of study) in order to enable a fair comparison between entry points for the different race groups.

Table 6: Mean entry points for HBIs and HWIs, by race and field of study

Race Field of study	African Mean *(Std. dev)*	Coloured Mean *(Std. dev)*	Asian/Asian Mean *(Std. dev)*	White Mean *(Std. dev)*	Total mean entry points
		HBIs			
Business/Commerce	20.2 *(7.4)*	21.8 *(13.0)*	30.7 *(5.5)*	24.8 *(9.2)*	21.1 *(7.9)*
Education	18.3 *(10.5)*	11.1 *(9.7)*	--	29.3 *(16.7)*	18.0 *(10.6)*
Humanities	**18.2** ***(7.3)***	20.5 *(9.9)*	22.6 *(2.8)*	26.4 *(12.2)*	19.7 *(8.1)*
Science, Engineering, Technology	**22.1** ***(7.8)***	23.6 *(10.8)*	16.2 *(17.3)*	29.2 *(10.4)*	23.8 *(8.7)*
Other	**19.1** ***(7.6)***	23.4 *(10.5)*	32.3 *(3.4)*	34.5 *(10.3)*	24.6 *(8.6)*
Total Mean Entry points	19.7 *(8.1)*	21.2 *(11.0)*	30.1 *(10.8)*	22.0 *(10.9)*	21.5 *(8.9)*
		HWIs			
Business/Commerce	**19.5** ***(8.5)***	24.5 *(10.0)*	*34.5* *(12.8)*	39.4 *(5.3)*	27.7 *(11.2)*
Education	**18.4** ***(7.7)***	30.6 *(9.7)*	23.0 *(7.6)*	37.4 *(7.2)*	21.4 *(10.4)*
Humanities	**20.3** ***(8.6)***	23.1 *(10.8)*	30.7 *(4.1)*	35.8 *8.2)*	27.6 *(10.9)*
Science, Engineering, Technology	**22.6** ***(9.9)***	22.8 *(9.8)*	35.9 *(10.1)*	37.5 *(8.9)*	29.6 *(11.7)*
Other	**22.9** ***(9.3)***	30.3 *(9.3)*	37.4 *(6.9)*	38.6 *(8.8)*	34.0 *(11.0)*
Total mean entry points	**20.9** ***(9.4)***	23.8 *(9.9)*	34.9 *(9.4)*	37.4 *(8.2)*	28.7 *(11.5)*

Source: Authors' calculations using data from the Student Retention and Graduate Destination study (HSRC, 2005).

Notes: 1. Standard deviations shown in parentheses. Bold indicates significant difference at five percent of Africans with whites. Means tests could not be conducted for all fields in HBIs, with the exception of SET fields, since no whites were enrolled in those fields in those institutions.
2. Estimates corrected for by person weights. Data here are weighted according to stratification by field of study, gender, race, and institution for graduates and non-completers. Shares do not sum to 100 because of the exclusion of whites at HBIs from the table.
3. Missing values indicated by --.

The table shows that entry points of Africans and whites differ significantly from each other when controlling for field of study. There exists a statistically significant difference at the five percent level between the mean entry points of Africans compared with whites at HWIs, even when controlling for field of study, with African students yielding lower entry points. However, no statistically significant difference was found between the entry points of Africans in HBIs and Africans in HWIs when field of study was controlled for.

According to the system for evaluating entry points used by Admissions at UCT[7] for example, 'lower-end' students are those with fewer than 27 entry points, while better students have more than 27 points (Van Walbeek, 2004). From the data it can be observed that the mean performance at the Matriculation level of whites and Indians/Asians was better than that of Africans and coloureds: for whites and Indians/Asians the total mean entry points were above 27, indicating stronger performance at the Matriculation level; whereas for Africans and coloureds the total mean entry points were below 27. The data ultimately suggest that a discrepancy exists in the academic performance in Matriculation across racial groups even when controlling for field of study. These differentials in turn may be indicative of a lack of academic preparedness amongst some students at the time of enrolment in higher education, which may engender the observed discrepancies in the graduation rates of the different cohorts.

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[7] Note that the University of Cape Town (UCT) is not included in this study.

4. FROM HIGHER EDUCATION TO THE LABOUR MARKET: A Snapshot Of Trends

In this section of the chapter we examine the labour market outcomes of the cohort of graduates and non-completers in the study.

4.1 Unemployment

As a point of departure, Tables 7 and 8 below show unemployment rates for the sample.[8] It is important to note that because of the design of the survey questionnaire, there may be an upward bias in the unemployment rates presented below.[9]

The tables below show the estimated unemployment rates under the broad definition of unemployment, which include the 538 individuals (4.3 percent of the non-working sample) who had given up searching for a job (discouraged workers). The estimates indicate that overall, the unemployment rates are much higher for non-completers than for graduates (a discrepancy is observed for whites as explained further on), and for Africans than for whites. The estimated unemployment rates for individuals from HWIs were significantly lower than for those from HBIs, under both the broad and the narrow definitions of unemployment. The largest discrepancy exists between the unemployment rates for African graduates and non-completers at HBIs (40 percent and 48 percent respectively) relative to those of their White counterparts at HWIs (10 percent and four percent).

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[8] Unemployment rates were calculated by first determining the economically active population (EAP) for each group by summing up the number of employed and unemployed within that group. The total number of unemployed in that group was than divided by the EAP: Unemployment rate for race *r* at institution *i* for a graduate or non-completer;

$$g = \left(\frac{\sum unemployed_{r,i,g}}{\sum EAP_{r,i,g}} \right) * 100$$

[9] In the survey questionnaire, the unemployed were identified on the basis of their present situation. Those not working at the time of the survey were asked to identify whether they were searching for a job (67.6 percent), had given up looking for a job (4.2 percent), did not need to work (2.3 percent), or were studying (25.9 percent). Although the survey identifies the unemployed as those who were not working at the time that they were surveyed, for the purposes of this study we exclude those who were either studying or indicated that they did not need to work from the sample of the unemployed. It must be noted that unlike the Labour Force Surveys, which account for those who have a job they will return to, those who have worked in the last seven days, and those who have held previous occupations, this survey only takes into account those who were not working at the time of the implementation of the survey. Thus, there may be an upward bias in our estimated unemployment rates.

Table 7: Unemployment rates by institution and race, broad definition (standard errors in parentheses)

Institution	Race								Total
	African		Coloured		Asian		White		
	G	NC	G	NC	G	NC	G	NC	
Fort Hare	0.56 (0.070)	0.71 (0.054)	---	---	---	---	---	---	0.67 (0.044)
Stellenbosch	**0.55 (0.216)**	--	0.15 (0.093)	0.07 (0.082)	---	---	0.12 (0.042)	0.03 (0.031)	0.13 (0.035)
Univ. of the North	0.42 (0.061)	0.59 (0.028)	---	0.50 (0.355)	---	---	---	---	0.57 (0.025)
Western Cape	0.42 (0.081)	0.36 (0.064)	0.14 (0.084)	0.27 (0.056)	0.21 (0.177)	---	---	---	0.30 (0.037)
Witwatersrand	**0.29 (0.085)**	**0.50 (0.053)**	---	0.62 (0.205)	0.16 (0.136)	0.11 (0.080)	**0.07 (0.042)**	**0.08 (0.075)**	0.23 (0.033)
Peninsula Technikon	0.51 (0.061)	0.48 (0.052)	0.23 (0.070)	0.35 (0.088)	---	---	---	---	0.41 (0.033)
Technikon Pretoria	**0.38 (0.027)**	0.37 (0.021)	---	0.17 (0.136)	---	---	**0.06 (0.031)**	0.05 (0.025)	0.27 (0.019)
Apartheid classification of institution									
Historically White	0.42 (0.050)	0.49 (0.039)	0.21 (0.058)	0.32 (0.078)	0.11 (0.074)	0.15 (0.131)	0.10 (0.032)	0.04 (0.030)	0.27 (0.021)
Historically Black	**0.40 (0.024)**	**0.48 (0.016)**	0.13 (0.078)	0.26 (0.053)	---	0.11 (0.108)	**0.06 (0.031)**	**0.05 (0.025)**	0.35 (0.016)
Total	**0.41 (0.023)**	**0.48 (0.015)**	0.18 (0.047)	0.28 (0.045)	0.14 (0.102)	0.06 (0.048)	**0.09 (0.023)**	**0.05 (0.019)**	0.32 (0.012)

Source: Authors' own calculations using data from HSRC (2005).
Notes: 1. Standard errors are reported in brackets and are corrected for by person weights. Bold typeface indicates a significant difference at 5 percent of Africans with whites.
2. Data here are calculated on the weighted sample, weighted according to stratification by field of study, gender, race, institution, for graduates and non-completers.
3. ---Missing values indicate that rates could not be calculated because of small sample size.
4. Rates are calculated as the percentage of the economically active population (EAP). The EAP is defined as the total number of the employed and unemployed in that cohort. The broad definition includes the discouraged work-seekers, that is, those who have given up searching for work. The unemployed excludes those who do not need to work, and those who are still studying.
5. NC = non-completers, G = Graduates

While the disparity observed in the table above between the unemployment rates of graduates relative to non-completers is expected, what is disturbing is the disparity in the unemployment rates of African and white graduates, and of Africans from HWIs relative to those from HBIs. For instance, African graduates from the University of the Witwatersrand have an unemployment rate (29 percent) that is 27 percentage points lower than their counterparts from the University of Fort Hare (56 percent). Possibly the most worrying estimate is that the unemployment rate of Africans from HWIs (49 percent and 42 percent for non-completers and graduates respectively) remains significantly higher than that of whites at HWIs (four percent and 10 percent). According to our sample, this difference stands at 32 percentage points for graduates and 45 percentage points for non-completers. This is initial evidence that even when controlling for the institution, Africans and whites have distinctly different probabilities of finding employment.

An anomaly is observed in the estimated unemployment rate of white graduates and non-completers. Although the unemployment rates for white non-completers appear to be higher than those for graduates, this difference was not statistically significant at five percent. This anomaly may be, in part, a function of the small sample of white non-completers.[10] However, the unemployment rates presented above should be treated with caution. It is possible that these differences in unemployment rates between Africans and whites, and between Africans across institution type, could be attributed to field of study rather than to race.

Table 8 below presents re-estimated broad unemployment rates for African and white graduates and non-completers, this time disaggregated by field of study and institution.

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[10] Out of the total sample of 7,443 whites enrolled in HWIs, 88% were graduates.

Table 8: Unemployment by field of study, broad definition (estimates and standard errors)

Institution type (*Apartheid* classification)	Historically black			Historically white					
Race	African			African			White		
Field	G	NC	Total	G	NC	Total	G	NC	Total
Business/Commerce	0.48 (0.045)	0.57 (0.038)	**0.53** **(0.029)**	0.46 (0.106)	0.37 (0.085)	0.42 (0.072)	0.14 (0.126)	---	**0.10** **(0.093)**
Education	0.09 (0.046)	0.10* (0.041)	0.10 (0.031)	0.24 (0.141)	0.51* (0.157)	0.36 (0.117)	---	---	---
Humanities	**0.58** **(0.032)**	0.63 (0.026)	**0.61** **(0.020)**	0.58 (0.081)	0.58 (0.075)	**0.58** **(0.055)**	0.13 **(0.050)**	---	0.09 **(0.043)**
SET	0.37 **(0.063)**	0.54 (0.029)	0.48 (0.028)	0.33 **(0.078)**	0.52 (0.059)	0.41 (0.050)	0.05 (0.031)	0.17 (0.112)	0.07 (0.031)
Other	0.42 (0.082)	0.49 (0.042)	**0.46** **(0.039)**	0.35 (0.262)	0.36 (0.116)	0.36 (0.106)	0.19 (0.106)	---	**0.14** **(0.089)**
Total	0.40 (0.024)	0.48 (0.016)	**0.45** **(0.134)**	0.42 (0.050)	0.49 (0.039)	**0.45** **(0.032)**	0.10 (0.032)	*0.04* (0.030)	**0.09** **(0.026)**

Source: Authors' own calculations using data from HSRC (2005).
Notes: 1. Standard errors are reported in brackets and are corrected for by person weights. Bold typeface indicates significance at five percent level of Africans with Whites. * Significance at the five percent level for Africans in HBIs and Africans in HWIs.
2. Data here are calculated on the weighted sample, weighted according to stratification by field of study, gender, race, institution, for graduates and non-completers.
3. --- Missing values indicate that rates could not be calculated because of insignificant sample size.
4. Rates are calculated as the percentage of the economically active population (EAP). The EAP is defined as the total number of the employed and unemployed in that cohort. The broad definition includes discouraged work-seekers, that is, those who have given up searching for work. The unemployed excludes those who do not need to work, and those who are still studying.
5. NC = non-completers; G = Graduates
6. Unemployment rates for whites at HBIs were excluded from the table because of the small number of whites enrolled in those institutions not permitting the calculation of rates.

The information presented above shows that even when we control for field of study and institution type, white unemployment rates are overall significantly lower than unemployment rates for Africans for all fields, with the exception of Education, for which the unemployment rates for whites could not be estimated because of the small number of unemployed whites in education. For example, in the case of graduates studying Business by race, per 100 Africans who studied Business, 53 are unemployed while the figure for whites is only 10. Indeed, when looking at graduates only, Africans from HBIs in SET fields experience an unemployment rate more than seven times that of whites (37 percent compared with 5 percent), and this difference was statistically significant. Furthermore, within the same field, barring Education, the total unemployment rates for Africans who studied at HWIs are lower than those of their counterparts who studied at HBIs, and these differences were statistically significant at five percent. For Africans enrolled in Business fields, the unemployment rate for those who attended HWIs (42 percent) is 11 percentage points lower than the unemployment rate for those from HBIs (53 percent). It is interesting to note that while there is no significant difference in the unemployment rates of African graduates and non-completers who studied Education at HBIs (nine percent and 10 percent respectively), the difference in unemployment rates for their HWI counterparts is large (24 percent and 51 percent respectively), suggesting a large premium for graduating from an HWI.

Given the above estimates it is clear, in the first instance, that HBIs are much poorer in ensuring success in the labour market for their client base than HWIs, even when controlling for field of study and race. Ultimately however, perhaps the most stinging indictment yet of employment practices in the domestic economy is that, on the basis of this evidence, even when type of institution and field of study are controlled for, African graduates are finding it distinctly harder to secure employment than their white counterparts.

The continued significant differential in unemployment rates for Africans and whites at HWIs, even when we control for field of study, is early evidence of at least two possible determinants of the labour market outcomes that will be investigated in our multivariate analysis. Firstly, employer discrimination must feature as a key factor in explaining these estimates, and we will attempt a more formal determination of this in our analysis section. Secondly, the estimated unemployment rates for white non-completers, which are significantly lower than

those of African non-completers, suggest the existence of informal networks improving both search behaviour and the probability of finding employment for this cohort.

4.2 Earnings

The second labour market outcome to be investigated here is earnings. Table 9 below shows the mean monthly earnings for graduates and non-completers disaggregated by gender.

Table 9: Nominal mean monthly earnings for graduates and non-completers

| Race | Male | | Female | | Total |
	Graduates	Non-completers	Graduates	Non-completers	
All Races	15,195 (32,679)	5,136 (7,701)	7,982 (16,376)	5,962 (11,976)	9,149 (21,535)
African	13,072 (29,322)	5,163 (12,208)	9,285 (22,112)	5,909 (13,669)	8,492 (21,002)
Coloured	**14,949** **(32,173)**	4,182 (4,046)	5,905 (4,988)	3,886 (2,853)	7,393 (17,578)
Asian/Asian	25,597 (55,837)	5,726 (6,423)	7,091 (3,868)	7,924 (8,374)	16,122 (41,021)
White	**16,679** **(32,993)**	5,363 (3,066)	7,373 (11,209)	7,825 (6,202)	10,249 (21,342)

Source: Authors' own calculations using data from HSRC (2005).
Notes: 1. Standard errors are reported in brackets and are corrected for by person weights. Bold typeface indicates significance at five or 10 percent level of Africans with Whites. * Significance at the five or 10 percent level of Africans in HBIs with Africans in HWIs.
2. Data here are calculated on the weighted sample, weighted according to stratification by field of study, gender, race, institution, for graduates and non-completers.
3. --- Missing values indicate that rates could not be calculated because of insignificant sample size.

While the mean earnings estimate for African males is lower than that of white graduates, this difference was not significant at the 10 percent level. The high standard deviations for graduates relative to non-completers show the high dispersion in earnings among graduates. The mean monthly wage for a female graduate is R7,982 whereas for a male graduate the corresponding estimate is more than double, at R15,195. This suggests a large gender bias in the allocation of wages. Indeed, while the mean monthly earnings for female graduates and non-completers are similar (R7,982 and R5,962 respectively), the mean monthly earnings of males graduates (R15,195) are almost three times the earnings of male non-completers (R5, 136), suggesting a much starker male premium for graduates relative to non-completers.

The estimates presented in the preceding table revealed that the overall mean monthly earnings for Africans are lower than those of whites. In order to control for differences in mean monthly earnings due to field of study and nature of employment, as well as to obtain a more nuanced picture of any differences in earnings between Africans and whites by institution, earnings were re-estimated by field of study, sector and occupation. The table below presents estimates of mean monthly earnings by field of study. It must be noted that whites constituted less than two percent of the sample that studied Education. Thus the earnings estimates for that field should be treated with caution.

Table 10: Nominal mean monthly earnings for Africans and whites, by field

| Field | Historically black African | | Historically white African | | White | |
	Graduate	Non-completer	Graduate	Non-completer	Graduate	Non-completer
All fields	11,980 *(1,974)*	6,098 *(660)*	10,797 *(1,510)*	**4,016** ***(703)***	13,151 *(1,409)*	6,594 *(552)*
Business/Commerce	7,811 *(4,410)*	5,710 *(2,585)*	6,849 *(1,063)*	4,717 *(1,508)*	13,515 *(2,708)*	7,001 *(926)*
Education	18,801 *(5,602)*	**8,294** ***(1,446)***	10,066 *(1,742)*	2,250 *(742)*	5,272 *(1,383)*	2,476 *(1,132)*
Humanities	**9,184** ***(1,982)***	**3,587** ***(321)***	13,570 *(4,725)*	4,128 *(1,839)*	10,186 *(2,331)*	5,577 *(272)*
Science, Engineering, Technology	11,882 *(2,244)*	4,768 *(371)*	11,116 *(2,585)*	3,131 *(562)*	14,397 *(2,077)*	7,574 *(1,908)*
Other	3,821 *(748)*	**6,508** ***(1,575)***	14,669 *(10,901)*	6,022 *(2,789)*	16,630 *(6,064)*	7,199 *(62)*

Source: Authors' own calculations using data from HSRC (2005). Income calculated using uniform distributions.
Notes: 1. Standard Deviations shown in parentheses. Bold typeface indicates significance at five percent or 10 percent level of Africans with whites. No significant difference at five percent of Africans from HBIs with Africans from HWIs.
2. Missing values indicate that the number of whites in the sample was too small or equal to zero.
3. Estimates corrected for by person weights and stratification by graduation, gender, field of study, institution, and race.

The table above suggests that there are disparities in the earnings of the different cohorts within the same field. However, the differences in earnings estimates, though large, were rarely statistically significant. Yet certain results do emerge. In the field of Humanities, the earnings of white graduates and non-completers are significantly higher than those of their African counterparts. Furthermore, within that field, Africans from HWIs earn more than their counterparts from HBIs (R13,570 and R4,128 compared with R9,184 and R3,587 for graduates and non-completers respectively).

Table 11 below augments our analysis of wages by race and institution type by further disaggregating monthly wages to control for sector and occupation skill level.[11] From the earnings information, certain trends are evident:

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[11] Sector was grouped into Primary, Secondary and Tertiary sectors, and Occupation was classified by skill level. The estimates for individual sectors and occupations are not shown because of the relatively small portion of the sample in certain sectors and occupations, that did not allow for reliable conclusions to be drawn from the individual estimates. Primary sectors are Agriculture, and Mining and Quarrying. Secondary sectors are Manufacturing, Utilities, and Construction. Tertiary sectors are Wholesale and Retail Trade, Transport, Storage and Communication, Financial and Business Services, land Community, Social and Personal Services. Occupations were converted to level of skill, in accordance with the skill level reference used in the South African Standard Classification of Occupations (SASCO) released by StatsSA. Skilled occupations were defined as Managers, Technicians, and Professionals. All other occupations were semi-skilled, with the exception of Elementary Occupations, which were classified as unskilled.

Table 11: Nominal mean monthly earnings for Africans and whites, by sector and occupation

Sector and occupational skill level	Historically Black African		Historically White			
			African		White	
	Graduate	Non-completer	Graduate	Non-completer	Graduate	Non-completer
Sector						
Primary sectors	13,213 *(7,018)*	1,934 *(657)*	2,645 *(1,251)*	3,776 *(588)*	20,786 *(6,221)*	6,161 *(1,710)*
Secondary sectors	7,740 *(1,422)*	4,557 *(1,857)*	9,525 *(2,351)*	4,683 *(938)*	12,567 *(4,084)*	7,038 *(1,072)*
Tertiary sectors	11,922 *(1,986)*	4,027 *(790)*	10,218 *(1,454)*	6,719 *(893)*	13,282 *(1,582)*	6,414 *(502)*
Occupation skill level						
Skilled	**14,307** ***(2,809)***	7,893 *(1,036)*	**13,014** ***(1,969)***	5,991 *(1,540)*	14,301 *(1,597)*	7,009 *(847)*
Semi-skilled	8,433 *(1,973)*	3,416 *(270)*	3,376 *(586)*	3,609 *(627)*	5,962 *(1,070)*	639 ---
Unskilled	1,416 *(494)*	1,126 *(234)*	11,431 *(0)*	1,077 *(184)*	2,691 *(471)*	5,961 ---

Source: Authors' own calculations using data from HSRC (2005). Income calculated using uniform distributions.

Notes: 1. Standard Deviations shown in parentheses. Bold typeface indicates significance at 5 percent level of Africans with whites. * indicates significant difference at five percent or 10 percent level of Africans from HBIs with Africans from HWIs.
2. Missing values indicate that the number in the sample was too small or equal to zero.
3. Estimates corrected for by person weights and stratification by graduation, gender, field of study, institution, and race.
4. Tertiary sectors exclude other or unspecified categories.

The estimates presented in Table 11 above suggest that when controlling for occupation and sector, the key differential is invariably that between Africans at HBIs and Africans at HWIs. Little significant earnings differential is present between Africans and whites at HWIs when controlling for type of employment. This result notably, in contrast to earlier evidence, alludes to significant contrasts in employment probabilities for those two cohorts.

As expected, wages of skilled workers are significantly higher than the wages of lower skilled workers, and graduates have wages that are significantly higher than those of non-completers in most cells. However, care must be taken when interpreting the data since certain estimates, such as those for the mean wage of white non-completers in unskilled occupations (which are higher than the estimate for white graduates), may not be very reliable because of the small sample size in that cell (only five percent of the 5,598 whites in the sample were working in unskilled occupations).

The determinants of earnings will be further investigated in our multivariate analysis that follows, in order to obtain a more accurate assessment of the determinants of income for the sample.

Outcomes in the labour market suggested, as expected, a poorer performance of non-completers relative to graduates, consistent across race, institution and field of study. When controlling for field of study, unemployment rates are highest for Africans who studied at HBIs in the aggregate sample. Perhaps the most worrying estimate however, remains the higher unemployment rates for Africans relative to whites at HWIs, even when controlling for field of study. This result will be further explored below. Finally, results showed little evidence of an earnings differential between Africans and whites from HWIs, with most of the gap present among Africans at HBIs relative to HWIs. This result is also examined in the multivariate analysis that follows.

5. GRADUATION, EMPLOYMENT AND EARNINGS: A Multivariate Analysis

The descriptive analysis showed, in a discrete manner, how different variables may impact on whether graduates are employed in the labour market and on their level of earnings. In practice however, a wide range of variables simultaneously interact to determine these outcomes. A simple descriptive analysis cannot provide information about the individual

contributions of these variables. For example, an analysis by race of say graduation and non-completion rates would, by design of course, be unable to account for how age, location and gender simultaneously also influence these rates. The standard methodological solution is to incorporate the variables identified in the descriptive analysis into an econometric model. This model simultaneously estimates the marginal contributions of each of these variables on employment and earnings.

Our model is set up in three stages and deals sequentially with the determinants of graduation, employment and wages. First, we begin with the full sample of survey participants and estimate a graduation probability model. Next, utilizing the full sample of graduates and non-completers, an employment probability model is estimated. Finally, we estimate an earnings function using the reduced sample of those who succeeded in finding employment.

5.1 Econometric approach

Two probits[12] will be estimated, followed by an Ordinary Least Squares linear regression model. The first probit will investigate the factors that influence the likelihood of graduating. The probit model is used to determine whether these factors do indeed change the likelihood of graduating, as well as quantifying the marginal effects of the variables. The second probit will investigate the factors that may change the probability of finding employment.

The dependent variable in our first model is a dummy variable, which is equal to 1 for graduates and 0 for non-completers. Since the dependent variable was categorical, a probit model was used to estimate the probability of graduating. The equation we wished to estimate took on the following form:

$$\Pr(Y = 1 \mid X = x) = \phi(x'\beta)$$

where Y was the binary dependent variable equal to 1 for graduates and 0 for non-completers, X a vector of regressors, β the parameters to be estimated, and ϕ the standard normal cumulative distribution function. The independent variables included both categorical and continuous variables, consisting of household variables such as parental income and parental education, individual characteristics (age, gender, race, home language etc.), variables measuring socio-economic status, characteristics of the school attended (type of school, grades achieved in the Senior Certificate Examination etc.) and characteristics of the HEI in which the student was enrolled.

The employment probit uses the same approach as the graduation probit. The dependent variable is equal to 1 if the individual is employed and 0 if unemployed. In the employment equation, some of the household variables are dropped. The explanatory variables included are those containing information about the personal characteristics of the job seeker (age, qualification, field and province).

Our second estimation, a semi-logarithmic earnings function, is based on a continuous and not categorical dependent variable. A normal OLS estimation approach will therefore be used. The independent variables include sectoral and occupational dummies, the log of monthly hours, experience (age squared) as well as the individual characteristics of the job-seeker included in the employment equation.

The estimates derived in the employment earnings models may be affected by selection bias given that they are both based on non-random, reduced versions of the original sample of potentially employable graduates and non-completers.[13] When estimating a wage equation, only the wages of working individuals may be observed. But the probability of working may be correlated with the wage. The Ordinary Least Squares method, if used in this case, would suffer from omitted variable bias, namely through the impact of our selection procedure, and

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[12] A probit model estimates the factors that influence the probability that an event A may occur, where $0 \leq P(A) \leq 1$.

[13] This problem was first identified and subsequently solved by Heckman (1979).

would therefore yield biased estimates. Thus, to control for the possibility of sample selection bias, a probit model will be used to derive the employment probability estimates. The Heckman two-step approach will be adopted.[14] Once the employment-unemployment probit is estimated, the inverse Mills ratio (lambda) estimate will be included in the earnings equation. The inclusion of this lambda in the earnings equation allows us to control for possible selection bias by making the earnings equation conditional on selection into employment. To allow for the possibility that the selection into employment and the determination of earnings are simultaneous rather than sequential processes, a second set of estimates for both the employment and the earnings equations will then be derived using a one-step maximum-likelihood model.[15]

5.2 Model results

Tables 12, 13 and 14 present the influence of the different covariates on the probability of graduation, employment, and the level of earnings of the employed.[16] For the covariates which are dummies, the following are the referent variables:

- Race: White
- Gender: Male
- Institution type: Historically White
- University or technikon: University
- Type of qualification (Degree or Certificate/Diploma): Certificate/Diploma[17]
- Field: Science, Engineering and Technology (SET)
- School attended: Urban
- Age: 16-25
- Province: Western Cape
- Occupation: Elementary workers
- Sector: Manufacturing

Referents were chosen on the basis of their share in the sample. The results from the graduation probit are shown in Table 12 below:

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[14] Greene (1993); Breen (1996); Bhorat and Leibbrandt (2001).

[15] Bhorat and Leibbrandt (2001).

[16] All estimates derived in the following sections are from the weighted sample. The weights were constructed to account for race, gender, institution and field, for graduates and non-completers.

[17] Degree qualifications were defined as BTech, Bachelors, Honours, Masters and Doctoral degrees. Certificate/diploma qualifications were taken as a University Certificate/Diploma, National Certificate, National Higher Certificate, National Diploma, or Postgraduate Certificate/Diploma type qualification. Although we would expect there to be co-linearity between the technikon and certificate/diploma variables, as well as between the university and degree qualifications, a pure proxy effect did not exist: 39.1 percent of those enrolled at technikons were enrolled in degree-type qualifications while a significant number of individuals at universities were enrolled in certificate/diploma-type qualifications (28.5 percent). Thus, both the type of qualification (degree versus a certificate/diploma) and a technikon dummy were included in the probits.

Table 12: Results from graduation probit

Dependent variable: Probability of graduation	x-bar	Marginal effects			
		I	II	III	IV
Individual characteristics					
African	0,5234	-0,1097***	-0,1258*	---	-0,0852
Coloured	0,1100	-0,1518***	-0,1292	---	-0,1410
Indian/Asian	0,0265	-0,3720*	-0,2765**	---	-0,3463*
Female	0,5730	-0,0759***	-0,0747***	---	-0,0599
African-HB	0,3840	---	---	-0,4257*	---
African-HW	0,1394	---	---	-0,3669*	---
Coloured-HB	0,0533	---	---	-0,3702*	---
Coloured-HW	0,0567	---	---	-0,4116*	---
Asian-HW	0,0209	---	---	-0,5221*	---
Other-HB	0,1702	---	---	-0,4354*	---
Scholarship/Loan	0,4919	0,1726*	0,1462*	0,1779*	0,1462*
Lectured	0,9439	-0,0601	-0,0914	0,0837	-0,0914
HBI	0,0674	-0,1342*	-0,1437*	---	-0,1545*
Technikon	0,5216	-0,0453	-0,0547	0,0486	-0,0608
Degree qualification	0,5433	0,0820***	0,0879**	0,0730***	0,0905***
Humanities	0,2901	-0,0571	-0,0437	-0,0631	---
Education	0,0935	-0,2133*	0,2136*	0,2016*	---
Commerce	0,1878	-0,0734	-0,0692	-0,1054	---
Other field	0,1149	-0,1742	-0,1782	-0,2012	---
Schooling characteristics					
Rural school attended	0,0663	-0,1726**	-0,1708**	-0,2359*	-0,1708**
Entry points	4,4356	-0,0134	0,0093	-0,0133	0,0093
Mathematics scores	2,6182	0,0185***	0,0191***	0,0155	0,0191***
Household characteristics					
Years of parental education	5,077	-0,0297	-0,0315	-0,0284	-0,0315
Parent who graduated	0,4540	0,1076	0,1164	0,1207	0,1164
Home language is English	0,1870	0,1529*	0,1491	0,1396**	0,1491*
Siblings with tertiary degree	0,4797	0,0913**	0,0840*	0,0990*	0,0840**
Household income	8,5876	0,0491*	0,0432**	0,0421**	0,0425**
Siblings studying in an HEI	0,3684	-0,0302	-0,0281	-0,0330	-0,0281
Tuition paid by parents	0,5180	0,0044	-0,0325	-0,0014	-0,0325
Observed probability		0,5689	0,5689	0,5689	0,5689
Predicted probability (at x-bar)		0,5895	0,5874	0,5994	0,5874
Number observed		1,673	1,673	1,673	1673
Chi^2		188*	171*	165	171*
Pseudo R^2		0,1498	0,1315	0,1665	0,1315

Source: Authors' own calculations using data from HSRC (2005).
Notes: 1. *Significant at the one percent level.
          2. **Significant at the five percent level.
          3. ***Significant at the 10 percent level.

In Specification I, all relevant variables were included. In the second specification, the dummy for HBIs was excluded, along with the "English is home language" variable, to account for the possibility that those variables were masking the effect of other variables on the probability of graduating because of a correlation with the race dummies. In the third specification, dummies were created to capture the effects of both race and institution type (whites at HWIs were chosen as the referent. Whites at HBIs and Asians at HBIs were excluded because of the insignificant sample sizes of those cohorts). In the last specification, field of study was excluded. Specification III is our preferred specification since it provides a more detailed assessment of individual effects on the probability of graduating within each race group on the basis of institution without masking these effects.

From the results it is clear that both race and gender are highly significant in determining whether or not a student graduates. The dummy variables for Africans, coloureds, and Indians were all significant and negative, suggesting that these population groups have a lower probability of graduating than whites, even when controlling for household effects, type of institution and field of study. The dummy variable for females was also negative and significant, suggesting that females have a lower probability of graduating than males. The key result, made clear in examining Specification III, is that Africans at HWIs and at HBIs

have a lower probability of graduating than their white counterparts, controlling for performance in Matriculation and field of study.

The results reveal that household variables are, to an extent, important in determining how likely an individual is to graduate. Household income, speaking English as a home language, and having a sibling who had completed a tertiary degree all increase the probability that a student will graduate. The household income variable is significant and the positive coefficient suggests that the greater the value of parental income, the more likely the student is to graduate. However, the dummy variable for whether or not the student's tuition was paid by parents as opposed to being derived from another source was insignificant.

The fact though that finances do play a role in affecting the likelihood of graduating is reinforced by the significant and positive coefficient for the scholarship/loan variable. Thus, students who receive a scholarship or loan to cover their tuition expenses are more likely to graduate than those who do not receive any state funding.

Students with a sibling who had completed a tertiary degree have a higher probability of graduating. Surprisingly, the parental education variable was not significant at even the 10 percent level, suggesting that whether or not a student's parents had secured a tertiary degree did not affect the probability of graduation.

The argument that socioeconomic background may be of some importance in determining graduation is strengthened by the significant coefficient on the 'Home language is English' dummy variable. This suggests that students speaking English as a home language have a higher probability of graduating than students for whom English is a second language, even when controlling for race. This is an interesting finding since most HEIs in South Africa of course use English as the medium of instruction. Cosser (2003) finds that almost 95 percent of students are taught in English, yet only 10 percent speak English at home. It is important to note however, that the fact that six percent of Africans in the sample reported English as their home language does not render this a pure proxy effect for white students.

Schooling characteristics also play an important role in impacting on the probability of graduating. The location of the school attended, captured by the rural dummy variable, was significant. This suggests that students who attended a rural school for Matriculation faced a lower chance of completing their degree than students who attended an urban school.

Matriculation performance was also shown to be important. Scores in mathematics at the Matriculation level are important in influencing the probability that a student will graduate: the higher a student scores in mathematics at the Matriculation level, the higher the probability that he/she will complete a degree programme. However, the 'entry points' variable that captured the aggregate Matriculation performance in subjects excluding mathematics (performance in English plus four other best subjects) was not significant, indicating that the screening process used in determining eligibility for admission into tertiary education may not be completely reliable. Performance in mathematics in Matriculation is therefore important in determining performance in tertiary institutions (but not necessarily performance in other subjects).

In addition to individual, household, and schooling characteristics, the tertiary institution variables are also important. The dummy variable for HBIs is significant, and the negative coefficient suggests that students who attended an HBI have a lower probability of graduating compared to students who attended an HWI. The field of study[18] that the student pursues at the HEI is also an important determinant of graduating. The SET field was selected as the referent since a large share of the sample was enrolled in the SET field. The field dummy variable for Education was significant. Students enrolled in Education have a higher probability of graduating that those enrolled in the SET field. This may be a reflection of the

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[18] Out of approximately 29,000 students in the sample, 17 percent were enrolled in Business, 12 percent in Education, 32 percent in Humanities and 28 percent in SET. For Africans, the enrolment by field was as follows: 18 percent in Business, 18 percent in Education, 33 percent in Humanities and 24 percent in SET. For whites, enrolment was as follows: 13 percent in Business, two percent in Education, 30 percent in Humanities and 36 percent in SET.

higher HEI requirements for students who wish to enrol in SET programmes. For instance, enrolment in SET programmes may require higher scores in Mathematics and higher entry points.

The above results suggest that even when controlling for a variety of detailed household and institutional factors, race continues to be a significant determinant of the probability of a student graduating. In addition however, even with a variety of individual and household controls in place, it is clear that HBIs have a significantly lower probability of producing graduates relative to HWIs. These two results are both powerful and very worrying within the context of both higher educational and labour market policies in South Africa.

6. THE DETERMINANTS OF LABOUR MARKET OUTCOMES: Employment and Earnings Equations

Having considered the determinants of graduation, we proceeded to investigate the factors affecting labour market outcomes. As with the graduation probit, a number of specifications were included for the employment probit. The estimates below were calculated using the broad definition of unemployment and include discouraged work-seekers (1.4 percent) in the sample.[19] Once again, Specification III is preferred since it provides a more detailed assessment of the individual effects on the probability of being employed within each race group on the basis of institution, without proxy variables.

The results from the employment probit are shown in Table 13.

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[19] The employment equations were re-estimated using the narrow definition of unemployment. However, there was no significant difference in the results from the employment probit under the broad and narrow definitions.

Table 13: Results from employment probit

Dependent variable: Probability of Employment	x-bar	Marginal effects			
		I	II	III	IV
Individual characteristics					
Graduated	0,5368	0,0037	0,0007	0,0084	-0,0002
African	0,5692	-0,2811**	-0,2865**	---	-0,2666**
Coloured	0,1188	-0,0713	-0,0607	---	-0,0741
Indian/Asian	0,0235	0,0639	0,0903	---	0,0826
Female	0,5437	-0,1681**	-0,1650**	-0,1658**	-0,1568
HBI	0,6376	0,0423	---	---	0,0454**
Technikon	0,5657	0,0719*	0,0708*	0,0594*	0,0636*
Degree qualification	0,5288	0,0330	0,0366	0,0307	0,0221
Africans from HBIs[20]	0,4241	---	---	-0,2248**	---
Africans from HWIs	0,1451	---	---	-0,2647**	---
Coloureds from HBIs	0,0602	---	---	0,0324	---
Coloureds from HWIs	0,0587	---	---	-0,0505	---
Indians/Asians from HWIs	0,0148	---	---	0,1003	---
Other from HBIs	0,1533	---	---	0,1164	---
Humanities	0,2921	-0,0265	-0,0190	-0,0274	---
Education	0,0931	0,2145**	0,2168**	0,2127**	---
Commerce	0,1962	0,0520	0,0540	0,0554	---
Other field	0,1195	0,0642	0,0724	0,0641	---
Mathematics scores in Matriculation	2,3807	0,0251**	0,0243**	0,0260**	0,0275**
Used social network[21]	0,2966	0,0232	0,0253	0,0199	0,0318
26-35	0,3663	0,0688**	0,0678**	0,0672**	0,0878**
36-45	0,0803	0,1991**	0,2018**	0,01995**	0,2487**
46-55	0,0171	0,1854**	0,1882**	0,1845**	0,2295**
Eastern Cape	0,0675	-0,1545**	-0,1440**	-0,1597**	-0,1948**
Free State	0,0304	-0,0258	-0,0106	-0,0263	-0,0569
Gauteng	0,3576	0,0299	0,0476	0,0234	-0,0234
KwaZulu-Natal	0,0269	-0,0110	-0,0034	-0,0214	-0,0308
Limpopo	0,0993	-0,1651**	-0,1386**	-0,1645**	-0,1830**
Mpumalanga	0,0642	-0,0258	-0,0005	-0,0258	-0,0363
Northern Cape	0,0212	0,0662	0,0676	0,0631	0,1312
North West	0,0429	-0,0937	-0,0732	-0,0941	-0,0742
Household characteristics					
English is home language	0,1760	0,0496	---	0,0559	0,0428
Parent employed	0,6608	0,0064	0,0090	0,0076	0,0013
Parent graduated	0,4099	0,0559	0,0090	0,0561*	0,0559
Observed probability	---	0,6934	0,6934	0,6934	0,6934
Predicted probability	---	0,7582	0,7572	0,7597	0,7545
Number observed	---	2965	2,965	2,965	2,965
Chi^2	---	468**	457**	495**	409**
Pseudo R^2	---	0,2444	0,2427	0,2460	0,2217

Source: Authors' own calculations using data from HSRC (2005).
Notes: 1. **Significant at the one percent level.
          2. *Significant at the five percent level.

It remains disturbing that even within a multivariate context, race and gender are significant determinants of employment. The key result here, made clear in Specification III, is that, controlling for other factors, Africans at HBIs and HWIs have a lower probability of securing employment relative to whites at HWIs. In this specification of the employment probit, the dummy for Africans at HWIs is significant and negative. Hence the result suggests that even when we control fully for differences due to the quality of education and field, Africans at HWIs still have a lower probability of finding employment than whites at these institutions.

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[20] Whites at HWIs were chosen as the referent. Indians/Asians and whites at HBIs were included in the 'Other from HBIs' category. They constituted 1.4 and 0.05 percent of the sample at HBIs respectively.

[21] Thirty per cent of the employed had found their job through a personal contact. Furthermore, a significantly higher proportion of whites than Africans had made use of a social network in the job search process. Since the dataset contained information on the job search methods used for both the unemployed and the employed in the sample, a dummy variable was created that was 1 if the individual used a personal contact, or social network, and 0 if another method of job search was employed. Other search methods included advertisement, direct application, employment agencies, and recruitment at the HEI.

Indeed, the dummy variables for race and gender are significant across all specifications of the employment probit. Being African lowers the probability of finding a job relative to being white, and being female lowers the probability of finding employment relative to being male, even when controlling for a range of individual characteristics including field of study and institution type.

The results from Specification III, albeit worrying, may not be solely the result of discrimination in the labour market. There could be other variables on the basis of which the selection process in employment is made, such as student performance in the HEI. One of the determinant factors may be the grades obtained at the HEI. Since the dataset did not contain information on grades obtained at the tertiary institution, and since Mathematics scores in matriculation were shown to be a significant determinant of graduation, this variable was included in the employment probit as a proxy for performance in subjects in HEI.

Performance in Mathematics at the matriculation level was found to be significant across all specifications, suggesting that those who had higher Mathematics scores in the Senior Certificate Examination had a higher probability of finding employment. This proxy for relative performance at the HEI could arguably be a factor influencing employer decisions in the hiring process. Employers may thus be using grade performance, in addition to whether an individual is a graduate or not, in their hiring process. However, even when controlling for grades obtained, Africans at HWIs and HBIs were still found to have lower employment probabilities than their white counterparts.

While household level characteristics were shown in the previous chapter to be an important determinant of graduation, the results show that they are not significant in influencing the probability of employment. Some of the household variables that were included in the graduation probit, such as 'household income', were excluded from the employment probit. Among the household level variables included were a dummy variable for parents with a tertiary qualification and a dummy variable for individuals with at least one employed parent. The results show however, that individual characteristics such as race, gender and age are more important in determining employment outcomes than are household variables.

Surprisingly, the graduation dummy was insignificant. This suggests that whether an individual completes a tertiary qualification or drops out during the course of his/her studies does not have any bearing on the probability of finding employment. This may be attributed to the fact that the non-completers in our sample have completed some years of tertiary education and perhaps also acquired some soft skills while at the HEI, which may give them some employability advantage over those without any tertiary education.

Another important result is that field of study plays a central role in determining labour market outcomes. A rather unexpected result is that students who specialized in Education have a higher probability of finding employment relative to those who studied in SET fields. However, the results for Education may be due to a sample size effect: Africans constitute a dominant share in the sample of those who studied Education (92 percent of the 3,555 enrolled in Education in the sample were African). Indeed, less than two percent of whites in the sample studied Education. The higher probability of finding employment for those in Education relative to those in SET fields may be explained further by the fact that, in our sample, for those enrolled in SET fields, a large share were non-completers (44 percent for the whole sample, and 54 percent of those from HBIs). Put simply, lower throughputs in SET have a significant bearing on the labour market outcomes for this cohort of non-completers.

A possibly policy-relevant result is that the technikon dummy variable was found to be positive and significant across all four specifications, suggesting an increased probability of finding employment for individuals who studied at technikons rather than at universities.

The fourth specification, in which field of study was excluded, serves to show how field of study masks the effect of the race and institution type dummies on employment and earnings. In the employment probit, when field is excluded, the dummy for HBIs becomes significant. However, this specification is subject to omitted variable bias since race masks the effect of field on employment.

As expected, the age dummy variables for the older age groups were significant across all specifications of the employment probit. In addition, all significant coefficients for the age variables have a positive sign, suggesting that the probability of employment increases with age, thus highlighting the national problem of youth unemployment (the youngest cohort, 16-25) in the labour market.

The results obtained show that, given labour demand needs and a certain level of human capital, race still influences the probability of finding employment. Even when fully controlling for type of institution and degree, Africans at HWIs have a lower probability of finding employment than whites. There are two possible reasons for this differential in employment probabilities for Africans and whites at HWIs. The first is that employers continue to discriminate against prospective African candidates. The second is that there are other characteristics on the basis of which employer decisions are made that we cannot control for because of the limitations of the information in our dataset.

Table 14 presents the results from the earnings equation. The earnings function was estimated using only the employed (graduates and non-completers) in the sample. The dependent variable in the earnings function was the log of total monthly wage. Since the earnings equation used only the employed in the sample – that is, 56.6 percent of the sample of 29,158 graduates and non-completers – the employment probit and the earnings function were, as noted above, estimated together using the Heckman approach (1979) to account for selection bias. As with the employment probit, the preferred specification here is Specification III.

Table 14: Earnings equation

	Coefficients			
	I	II	III	IV
Graduated	0,1938**	0,2105**	0,1813**	0,2507**
African	0,2241	0,2089	---	-0,2858**
Coloured	0,0368	0,0266	---	-0,0816
Indian/Asian	-0,0899	-0,0649	---	-0,0564
Female	-0,1110	-0,1134	-0,1261	-0,3276**
HBI	-0,0947	---	---	-0,1379
Technikon	-0,2127**	-0,2427**	-0,1617*	-0,1072
Degree qualification	0,1222*	0,1707*	0,1257*	0,1783**
Africans from HBIs	---	---	0,0341	---
Africans from HWIs	---	---	0,0909	---
Coloureds from HBIs	---	---	-0,0988	---
Coloureds from HWIs	---	---	-0,0574	---
Indians/Asians from HWIs	---	---	-0,3028	---
Other – HBIs	---	---	-0,2470*	---
Home language is English	0,0325	---	0,0248	0,0904
Humanities	-0,1370	-0,1470	-0,1379	---
Education	-0,7135**	-0,6214**	-0,6980**	---
Commerce	0,0061	0,0063	-0,0001	---
Other field	-0,2694**	-0,2885**	-0,2708**	---
Eastern Cape	0,3001*	0,2809*	0,3133*	---
Free State	0,0577	0,0253	0,0738	0,1153
Gauteng	0,2352**	0,2103*	0,2666*	0,2867**
KwaZulu-Natal	0,6636**	0,6525**	0,6855**	0,6511**
Limpopo	0,4492**	0,4011**	0,4621**	0,2992*
Mpumalanga	0,2858	0,2425	0,2942	0,3118*
Northern Cape	0,2385	0,1979	0,2537	0,1641
North West	0,3119*	0,2791	0,3192	0,1849
Agriculture	0,0156	0,0045	0,0171	0,0351
Mining	0,5313**	0,5406**	0,5194**	0,5988**
Electricity	0,3942**	0,4047**	0,3988**	0,5082**
Construction	-0,0250	-0,0310	-0,0245	-0,0171
Wholesale trade	-0,5054**	-0,5001**	-0,5053**	-0,5301**
Transport	0,1152	0,1171	0,1200	0,0840
Finance	0,1201	0,1248	0,1200	0,1241
Community/social services	0,0721	0,0693	0,0699	0,0398
Managers	0,8002**	0,7876**	0,8167**	0,7892**
Professionals/technicians	0,6051**	0,5952**	0,6222*	0,5869**
Clerks	0,1981	0,1894	0,2122	0,2031
Service and sales workers	0,2122	0,2010	0,2367	0,2086
Skilled agricultural workers	0,4957**	0,4665*	0,5078**	0,5011*
Craft and trade workers	0,1418	0,1356	0,1543	0,1005
Operators and assemblers	0,4325*	0,4295*	0,4562*	0,4817*
Experience	0,0784**	0,0772**	0,0784**	0,0885**
Experience squared	-0,0013*	-0,0012*	-0,0013*	-0,0014*
Log of hours per month	0,3505**	0,3512**	0,3463**	0,3376**
Constant	5,9631**	5,9719**	6,0148**	5,6792**
Lambda[22]	-1,0098**	-1,0094**	-0,9792**	0,0025*
Number observed	1,588	1,588	1,588	1,588
F	17,26**	17,65**	16,86	16,94
R^2	0,3935	0,3912	0,3947	0,3702

Source: Authors' own calculations using data from HSRC (2005).
Notes: 1. **Significant at the one percent level.
          2. *Significant at the five percent level.
          3. The monthly wages were estimated from the bracket estimates provided in the dataset.

Unlike in the employment process, in the earnings stage of the selection process demographic variables are no longer significant. When controlling for field of study, there is no

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[22] In the earnings equation, the coefficient for lambdas was significant in the first three specifications at the one percent level, indicating that there was selection bias that was corrected for. Lambda represents the inverse Mills ratio, and provides a measure of the selectivity bias in the sample. The significant result suggests that there was sample selection bias which needed to be corrected for (Bhorat and Leibbrandt, 2001). Put differently, the employed earners in this sample do not look like a random sample chosen from our original sample of graduates and non-completers. Thus the significance of lambda vindicates the selection procedure utilized here.

differential in earnings on the basis of race, gender,[23] and institution. This result is encouraging and may suggest that although race and gender may negatively impact on the probabilities of graduation and employment, once individuals are in the labour market and employed, there is no premium in earnings for those who had an advantage at the point of labour market entry. This implies that a sorting process takes place at the employment stage, and that for those who pass through the selection process, there is no differential in earnings.

As with the employment probit, field of study and qualification type are important determinants of earnings. The earnings estimates show, however, that those who studied Education earn between 62 percent and 71 percent less than those with SET qualifications. The importance of field of study in determining labour market outcomes is clearly seen in Specification IV, where field is excluded and the race variables become significant. The results from that specification are subject to omitted variable bias, indicating that the race variables mask the effect of field on earnings. The type of qualification obtained is also an important determinant of earnings. Those who obtained a university degree earn significantly more than those who completed a diploma/certificate from a technikon. Thus, while the results from the employment equations previously presented indicated that those who studied at a technikon are at an advantage in the employment stage compared to their counterparts from universities, the earnings results here indicate a trade-off. Although it may lead to a higher probability of finding employment, a technikon education ultimately carries a lower earning potential than a university degree.

Thus our significant results for field and qualification type in determining earnings and employment reinforce the finding that there are clear differences in the employment prospects of graduates with different types of qualifications (degrees or diplomas, university or technikon qualifications) or of graduates in different fields of study. The fact that HBIs have 'disproportionate numbers of students graduating in fields with lower employment prospects' has been noted (Moleke, 2005: 5). Indeed, in our sample, 45 percent of the 7,403 students who studied at HBIs studied Humanities and Commerce. At HWIs the dominant share of students studied in SET fields (37 percent). Thus our results for the earnings equations are encouraging as they show that when controlling for field of study, there is no differential in earnings on the basis of race, gender and institution type.

An interesting result is that, while graduation was not found to be significant in the employment results, it is a significant determinant of earnings. Those with a tertiary qualification earn between 18 and 25 percent more than those who have not completed the programme leading to their degree, even when we control for occupation and sector.

As expected, results for the occupational dummies show that within the skilled occupations – that is, Managers as well as Professionals and Technicians – individuals are likely to earn between 59 and 82 percent more than those working in unskilled occupations (Elementary occupations in the manufacturing sector). Approximately 70 percent of the sample was working either as Managers or Professionals, and thus the conclusions that can be drawn from the other occupational dummies are limited.

The 'Experience' variable indicates that an additional year of experience generates a return to earnings of about eight to nine percent. The negative and significant coefficient for the experience squared variable indicates diminishing returns to experience. The log of hours worked is also significant. A one percent increase in hours worked increases earnings by about 34 to 35 percent. This finding is interesting, since the mean sample is working about 35 hours per week. This finding is not contingent therefore, on the presence in the sample of a significant number of part-time or infrequent workers.

Ultimately then, one of the key results here is that, as was suggested in the descriptive evidence above, race, gender and institution type are significant determinants of earnings for

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[23] An interesting discrepancy is observed when gender becomes statistically significant at one percent if the employment and earnings equations are re-estimated using the field of study that was self-reported in the questionnaire by respondents. However, the fields of study used here were chosen to be the fields determined by the HSRC on the basis of university records, since this was taken to be more reliable than self-reported information.

graduates and non-completers. The evidence presented suggests therefore that a sorting process takes place at the employment stage that generates race and gender differentials. These differences are then completely eroded within the sample of wage earners.

7. **CONCLUSION**

The results from our analyses indicate that race continues to be a significant determinant in South Africa of the probability of outcomes such as graduation and employment, and this remains the key variable in this study even when controlling for institution type and field of study. However, when the African sample of approximately 18,000 individuals is reduced to 46 percent to estimate an earnings function of the employed, no differential in earnings is apparent on the basis of race. Thus individuals are selected into employment on the basis of a number of characteristics; but once over the entry-into-employment hurdle, the race-based differences are eroded.

Another important finding is that while socio-economic variables are important in determining graduation and success in the labour market, they are not crucial. For example, household income and attending a rural school were found to have a significant impact on the probability of graduating, but other variables such as parental education were insignificant in the graduation probit. Indeed, individual rather than household variables were more important in determining labour market outcomes such as employment and earnings.

REFERENCES

Bhorat, H. & Leibbrandt, M. (2001). "Modelling vulnerability in the South African labour market." In Bhorat, M., Leibbrandt, M., Maziya, M., van der Berg, S. & Woolard, I. (eds.), *Fighting Poverty: Labour Markets and Inequality in South Africa.* Cape Town: University of Cape Town Press. pp.107-129.

Breen, R. (1996). *Regression Models: Censored, Sample Selected, or Truncated Data*. Thousand Oaks, CA: Sage.

Cosser, M. (2003). "Graduate tracer study." In Cosser, M., Badroodien, A., McGrath, S. & Maja, B. (eds.), *Technical College Responsiveness: Learner Destinations and Labour Market Environments in South Africa*. Cape Town: HSRC Press. pp.27-55.

DoE (Department of Education) (2001). National Plan for Higher Education. Pretoria.

DoE (2005). Higher Education Management Information System (HEMIS). April.

Greene, W.H. (1993). *Econometric Analysis*. 2nd ed. New York: Macmillan Publishing Company.

Heckman, J. (1979). "Sample selection bias as a specification error." *Econometrica* 47: 153-161.

HSRC (Human Sciences Research Council) (2005). Data-set for the Student Retention and Graduate Destination study. Pretoria.

Moleke, P. (2005). "Inequalities in higher education and the structure of the labour market. HSRC Occasional Paper." Cape Town: HSRC Press.

StatsSA (Statistics South Africa) (2006). Occupational Classification. Retrieved May 2006 from: http://www.statssa.gov.za/additional_services/Codelists/Occupational.pdf, Pretoria.

Van Walbeek, C. (2004). "Does lecture attendance matter? Some observations from a first-year economics course at the University of Cape Town." *South African Journal of Economics* 72(4): 861-883.

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