The Role of Post-school Education and Training Institutions in Predicting Labour Market Outcomes

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2017

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INTRODUCTION

Attainment of higher education significantly increases earnings. In South Africa, individuals with a higher education level have better employment prospects and are rewarded with higher earnings (Branson & Leibbrandt 2013). Although labour force participation has significantly increased in post-apartheid South Africa, the average participation rate has been low at barely 50%. In the last decade, the labour market has been largely characterised by high unemployment rates averaging 25%[1] (StatsSA 1998, 2013). The graduate unemployment rate has, however, been lower. For instance, in 2013 it was 5.2% for university degree graduates, 12.6% for other tertiary diplomas, and 30.3% for individuals with less than a Grade 12 diploma (Statistics South Africa 2013). Research shows that the unemployment rate declines with the level of education attained; the general consensus in the South African literature is that higher education levels are highly rewarded in the labour market, and the probability of employment increases with education level (Branson & Leibbrandt 2013; Banerjee et al. 2008; Pauw et al. 2008; Dias & Posel 2007). An analysis of higher education labour market outcomes that looks at employment and earnings is a necessary component for understanding the relationship between human capital accumulation and the labour market.

Earnings in South Africa differ by age, race, gender and education level attained, among other factors. For South Africans with tertiary education, both male and female, the returns to education are high and have been increasing over time (Branson & Leibbrandt 2013). However, increased premiums at the top wage distribution favour Whites, a phenomenon that is likely to be driven by education quality differentials by race (Burger & Jafta 2006). Fortunately, these racial differences are on the decline (Branson & Leibbrandt 2013; Bhorat & Mayet 2012). Skill level, often measured by education level attained, is a more important determinant of wage relative to occupation (Burger & Jafta 2006). Burger and Woolard (2005) argue that skills inflation may be manifesting in increased selectivity in the employment of graduates, by criteria such as tertiary education qualification and institution attended. The history of segregation, even at higher education institutions of learning, has resulted in institutional quality differentials. Institutions of higher learning designated for Whites were advantaged in terms of resources and offered a larger selection of courses relative to those designated for Blacks.[2] In the past two decades, there have been substantial efforts to close the gap in quality in these institutions, and new institutions (both public and private) have been established to meet the increased demand for higher education. The questions of whether there is an earnings premium linked to the type of institution attended (as defined by type of diploma offered by the institution, that is, university or college) and whether employment differs by the institution attended, are relevant in an analysis of the higher education labour market outcomes.

In this paper, we examine the role played by higher education institutions in two higher education labour market outcomes, namely the probability of employment and earnings. We use the first three

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1   By narrow definition of unemployment.

2   Blacks refer to Africans, Coloureds and Indians/Asians.

waves of the National Income Dynamic Study (NIDS) to describe the interaction between the labour market outcomes and institution of higher education attended. Using a Heckman two-stage model, we find that attending a university increases an individual's chances of employment by 7–10 percentage points relative to attending a college, and the premium to attending a university is twofold. This is an indication that, in addition to a possible perception of higher productivity, university diplomas give a positive signal to employers who, in return, offer higher wages to university graduates than to college graduates. A brief review of literature on factors that influence employment and earnings follows in the next section.

1. FACTORS THAT INFLUENCE EMPLOYMENT AND EARNINGS: SOME EVIDENCE

The end of apartheid opened up opportunities for the majority of South Africans to undertake higher education in fields of study previously not available to them. This meant an increased demand for places in the 35[3] public universities and technikons, leading to competitive selection into these institutions. Currently, there are more than 50 further education and training (FET) public institutions, and the number of privately funded higher education institutions is growing. The participation rate in higher education by race and gender has therefore diversified. For instance, in 2002, more Africans (60%), Coloureds and Indians entered these institutions, 54% of whom were women (Council on Higher Education 2004). However, although over 50% of Whites and Indians enter higher education institutions annually, the increase in enrolment numbers in the African and Coloured communities has been low at 11% and 7% respectively (Council on Higher Education 2004). The poor quality of primary and secondary schooling, and poverty, among other factors, have been blamed for this low enrolment amongst Africans and Coloureds. The participation rate in the higher education labour market has increased amongst these groups in spite of the low enrolment rates.

In general, the increase in labour force participation in post-apartheid South Africa has been associated with factors such as the labour legislative regime and the decreasing marriage rate for women (see Branson & Leibbrandt 2013 for details). In South Africa, as predicted by the theory of human capital, the unemployment rate is highest in the population of individuals with lower levels of education. The high unemployment rate is blamed in part on the presence of a skills mismatch. Bhorat and Mayet (2012) show that in the period between 2001 and 2007, employment of skilled labour increased by 0.3 percentage points relative to that of unskilled labour. The authors interpret this increase as a signal that labour demand in South Africa is driven by skills-biased technical change. Different stakeholders have raised concerns about a skills mismatch. Some firms' concerns in this regard have been that graduates do not have the required skills (Pauw et al. 2006). Furthermore, there is consensus that the quality of education offered in the different education institutions in South Africa differs. Poor preparation of learners for tertiary education and entry into the labour market, as well as a lack of experience, have therefore been blamed for graduate unemployment (Pauw et al. 2006, 2008). However, at an institutional level, the skills mismatch in part may stem from a mismatch in the courses offered at tertiary institutions and skills demanded by the market. Unfortunately, the demand for specific skills by firms has led to higher unemployment rates amongst graduates in some fields of study such as the education, training and development fields (Burger & Woolard 2005).

There is evidence of racial differences in earnings for individuals with similar education qualifications. Branson and Leibbrandt (2013) found that earnings for Africans with tertiary education increased at a higher rate than the national rate, while Bhorat and Mayet (2012) found that Africans are disadvantaged in both earnings and the likelihood of securing employment. However, Bhorat and Mayet's results show convergence in the premium for tertiary-

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3   This number has reduced to 23 through mergers and campus incorporation.

educated workers, which they infer to be an indication of an increasing value for African workers with tertiary education in the labour market. Both unemployment and wages are age and gender biased. More women and the young are unemployed, and earn lower wages, than men and older South Africans. Women comprise more than half of the unemployed (Burger & Woolard 2005) and the unemployment rate decreases with age – albeit at a decreasing rate (Kingdon & Knight 2004). The high and persistent rate of unemployment has been a major concern for policy-makers, and has attracted research efforts into the likely causes and possible solutions. Kingdon and Knight (2007) and Burger and Woolard (2005), associate the persistent unemployment rate with the low rate of absorption of the labour force by the formal sector. This low rate of absorption is particularly more harmful to the young (Burger & Woolard 2005).

In an effort to attract workers to certain areas, wages offered have often been differentiated by region. Branson and Leibbrandt (2013) find that the higher education premium is higher for workers in rural areas than in urban areas. The authors associate these higher wages with the scarcity of skilled workers in rural areas. The rate of unemployment also varies by region. This rate is higher in rural areas than in urban areas of South Africa – however, this gap narrowed between 1995 and 2002 (Burger & Woolard 2005).

Unions have also been seen to influence wages. The role of unions in both employment and earnings is arguably significant in South Africa. Trade unions, bargaining councils and firms have also been blamed for causing labour market rigidities which, in turn, have led to increased unemployment (Kingdon & Knight 2007). Burger and Woolard (2005) argue that the extension of bargaining council agreements that demand relatively higher wages, discourage the start-up of small businesses. In an analysis of the wages of unionised male workers, Banerjee et al. (2008) found that the union wage premium increased between 1995 and 2004. A variety of factors influence employment and earnings. In the next section we outline the empirical approach taken to estimate the role of institution of higher education among other factors.

2. ECONOMETRIC ESTIMATION

To estimate returns to higher education, occupation and institution attended, we consider a Mincerian regression as follows:

$$lnw_i = \alpha_0 + \alpha_1 edn_i + \alpha_2 occn_i + \alpha_3 instn_i + \alpha_4 X_i + \mu_i \quad (1)$$

where for individual i, lnw indicates the logarithmic wages earned, edn indicates the level of education attained, $occn$ indicates current occupation (which is a measure on its own) and a likely proxy for field of study, $instn$ indicates institution attended by type (university or college), X is a vector of other individual and background characteristics, and μ_i is a residual that we assume to be normally distributed with a mean of zero and constant variance; that is, $\mu_i \sim N(0, \sigma^2)_i$. See the appendix for a full definition of all the controls.

The fact that we only consider individuals with positive wages in the estimation of equation 1 is a limitation. This is because the individuals considered are those employed; hence, the unemployed individuals are selected out. This selection is a likely source of bias. It is possible that the unobserved characteristics that influence the probability of employment are correlated with unobserved characteristics that influence a worker's productivity (wages), such as ability or motivation. The residual in the Mincerian regressions is therefore likely to be correlated with the included controls, yielding us inconsistent estimates. To mitigate against this bias, we estimate Heckman's (1979) model by first considering selection into employment, which we define as follows:

$$S_i = y'Z_i + \mu_i \quad (2)$$

Where S_i^* is a latent variable indicating the difference between individual i's reservation wage and the market wage offered to the individual, and Z_i is a vector of variables that affect S_i^*. We do not observe S_i^*, but we do observe whether the individual is employed ($S_i = 1$) or not ($S_i = 0$). We therefore consider an analysis of the probability of employment defined as:

$$S_i = \beta_0 + \beta edn_i + \alpha_2 instn_i + \alpha_3 X_i + \beta^4 sgrant + \varepsilon_i \quad (3)$$

where for individual i, S_i indicates whether an individual is employed or not, and $sgrant$ indicates whether the individual lives in a household where at least one member receives at least one of the five[4] government social grants. This is our exclusion restriction variable. Evidence suggests that presence of a social grant holder in a household influences other household members' employment probability. Ardington et al. (2007) find that having a state old-age pension recipient in a household increases employment amongst prime-aged household members, and Surender et al. (2010) find that social grant recipients still aspired to paid work. Therefore, government social grants have some influence on employment of household members. However, the presence of a social grant recipient in a household is unlikely to influence a worker's productivity; hence, we assume that it has no direct influence on wages earned. In equation 3, ε_i is the residual, which we assume to be normally distributed with a mean of zero and a variance equal

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4   These include the state old-age pension, disability grant, child support grant, foster child grant, and care dependency grant.

to 1; that is, $\varepsilon_i \sim N(0,1)$. All the other controls are as defined above and in the appendix.

As noted above, the estimates of α in equation 1 are biased due to the non-zero correlation between ε_i and μ_i; that is, *corr (μ_i, ε_i) ≠0*. To account for selection and avoid biased and inconsistent estimates, we estimate a Heckman (1979) model assuming a bivariate normal distribution and correlation. Given the inclusion of the inverse Mill ratio in the estimation of earnings regression, and the fact that a substantial number of the controls are in both selection and the main model, we consider unconditional marginal effects for the earnings model. The calculations of these marginal effects

follow Hoffmann and Kassouf (2005) and are estimated as follows:

$$\frac{\partial lnE(w_i)}{\partial X_{ik}} = \partial_k - \frac{\Upsilon_k}{\sigma_\mu} \; \alpha_\lambda \, \delta_i + \left[\phi\left(\frac{y'Z_i}{\sigma_\mu}\right) \phi\left(\frac{y'Z_i}{\sigma_\mu}\right) \frac{y_k}{\sigma_\mu} \right] \quad (4)$$

where the first two parts of equation 4 give the effect associated with changes in wages for the employed graduates, and the last term gives the effect associated with changes in the probability of graduates being employed. A description of the data, summary statistics and empirical results follows.

3. DATA

The study uses the National Income Dynamic Study (NIDS), which is a nationally representative household- and individual-level panel that commenced in 2008 and is undertaken every two years. The most recent wave we considered was surveyed in 2012 (Southern African Labour and Development Research Unit (SALDRU), 2013). NIDS focuses on household composition and structure, education, labour market participation and economic activity, health, and agriculture among other socio-economic areas (Leibbrandt & De Villiers 2009). These areas are covered in four questionnaires: household, individual adult, individual proxy, and child. In arriving at the households' sample, NIDS employed a stratified two-stage cluster sample design. The Wave 1 response rate was 69%; that is, across South Africa 7 305 households and 28 225 individuals responded (Leibbrandt & De Villiers 2009). Wave 2 was conducted between 2010 and 2011. The attrition rate was 19% from Wave 1, excluding those who died or moved out of scope (Brown & Woolard 2012). Wave 3 was administered in 2012, and had a 16% non-response rate from Wave 2. Post-stratification weights are applied in the analysis.

In all three waves, we focus on the sample of adults aged 24 to 64 who have attained any level of post-Grade 12 education. Using the NIDS secure data information on the name of the institution where individuals attained their highest education level, we group these institutions into two categories, namely university or college. We also match the name of the institution and the year in which the individual acquired his or her highest education qualification to the subsidy allocated to the institution by the government in its annual budgetary allocations.[5] The response on occupation (our proxy for field of study) is only available for individuals who are employed; hence, we only include it in the earnings regression.

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5   This data is available from the South African treasury website: http://www.treasury.gov.za/documents/national%20 budget/default.aspx

4. DESCRIPTIVE STATISTICS

Table 1 presents the summary statistics of the estimation samples separately for each wave. The average monthly real wages[6] range between R9 000 and R10 000. The employment rate amongst graduates is high, at an average of at least 75% across the waves. The average years of schooling[7] is 14, indicating that the majority have at least two additional years of schooling post-Grade 12. The majority of the respondents across the waves are African, women, married professionals, have a written employment contract, and live in urban formal areas. The proportion of respondents living in

households with at least one household member receiving at least one of the five social grants has been increasing by at least 4 percentage points between waves – from 16% in 2008 to 27% in 2012. Important to this analysis is the premium based on the higher education institution attended, that is, returns to attending a university versus a college. The statistics indicate an equality in share of institution attended, between university and college, except in Wave 3 where a slightly higher percentage attended university (55%).

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6   We use CPI to deflate the values and take 2005 as the base year.

7   NIDS asks for the highest level of education attained. We define a year of schooling to be equivalent to one grade or one level of education attained. The conventional years taken to complete each level of education of diploma are considered in calculating the years of education.

Table 1: Sample summary statistics

Variables		Mean (standard errors) and proportions		
		Wave 1 (2008)	Wave 2 (2010)	Wave 3 (2012)
Monthly wage (rands)		8966.1	10115.5	9357.8
		(525.5)	(391.0)	(255.1)
Employment status (employed = 1)		0.808	0.749	0.760
Institution (university = 1)		0.495	0.496	0.449
Years of schooling		14.24	14.24	14.28
		(0.073)	(0.056)	(0.038)
Gender (female = 1)		0.602	0.594	0.589
Marital status:	Married	0.497	0.462	0.488
	Living with partner	0.031	0.055	0.043
	Widow/widower	0.036	0.023	0.029
	Divorced/separated	0.055	0.048	0.058
	Never married	0.380	0.409	0.380
Population group:	African	0.738	0.718	0.685
	Coloured	0.123	0.148	0.139
	Indian/Asian	0.026	0.026	0.028
	White	0.113	0.108	0.147
Home language:	African	0.717	0.701	0.661
	Afrikaans	0.178	0.205	0.222
	English	0.105	0.093	0.116
Experience (years)		17.69	19.04	18.41
		(0.378)	(0.443)	(0.345)
Tenure (years)		10.07	9.307	9.579
		(0.474)	(0.340)	(0.228)
Holds a second job		0.005	0.0126	0.0140
Occupation:	Government	0.062	0.093	0.082
	Professional	0.518	0.427	0.469
	Technician	0.078	0.064	0.073
	Semi-skilled worker	0.327	0.341	0.330
	Unskilled worker	0.013	0.074	0.045
Employment contract type (written = 1)		0.874	0.934	0.936
Medical deduction		0.546	0.511	0.485
Pension deduction		0.710	0.673	0.633
Unemployment Insurance Fund deduction		0.676	0.639	0.591
Trade union member		0.560	0.528	0.551
Home location:	Rural formal	0.049	0.044	0.046
	Tribal authority areas	0.188	0.223	0.193
	Urban formal	0.733	0.696	0.728
	Urban informal	0.028	0.036	0.032
Home province:	Western Cape	0.096	0.175	0.162
	Eastern Cape	0.057	0.065	0.066
	Northern Cape	0.075	0.068	0.073
	Free State	0.091	0.062	0.070
	KwaZulu-Natal	0.186	0.173	0.173
	North West	0.062	0.085	0.075
	Gauteng	0.246	0.200	0.208
	Mpumalanga	0.089	0.074	0.079
	Limpopo	0.094	0.096	0.091
Member receives a social grant		0.160	0.229	0.269
Sample size		764	641	1110

Source: Authors' calculation based on NIDS

5. THE INTERACTION OF INSTITUTION ATTENDED AND LABOUR MARKET OUTCOMES

In this section, we look at how employment and earnings vary in the pooled sample by institution attended, gender and population group. Although almost equal shares attended university and college, to give a complete picture of the two market outcomes for each type of institution, we present them in separate sub-sections.
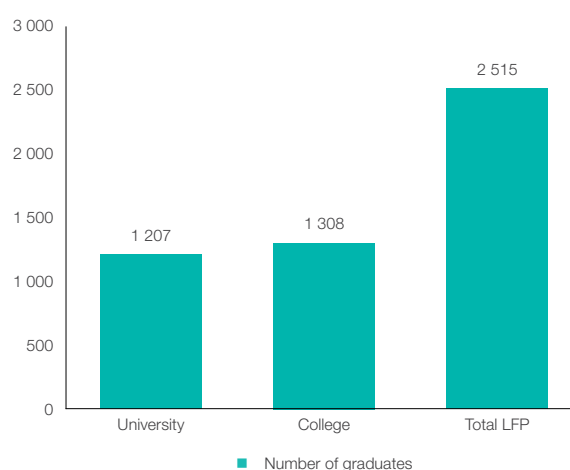
Employment

In considering employment, we include higher education graduates who are employed and those who are not employed. The employed graduates include those in either full-time or part-time employment, while the employed graduates include both the actively searching and the discouraged unemployed; that is, we consider the broad definition of unemployment. In the sample, the number of individuals who are either employed or unemployed graduates has been increasing across the waves from 40% in Wave 1 to 51% and 56% in Wave 2 and Wave 3 respectively. As indicated in Table 1, graduate employment in the sample averages more than 75% across the waves. Figure 1 presents both employed and unemployed graduates from the pooled sample by institution attended. The figure indicates that the share is higher for college graduates, at 52%, as compared with 48% for university graduates. The lower share of university graduates is likely an indication of low number of university graduates, and could be disconcerting given that university graduates are more skilled than college graduates, and that South Africa has a high skills deficit.

Similarly, both employment and unemployment shares differ between university and college

graduates. Figure 2 shows the share of graduates employed relative to those unemployed, by the type of institution attended. From the figure, the share of the unemployed is lowest amongst university graduates at 18% (217) as compared with 30% (392) of college graduates, and the share of the employed is also highest amongst university graduates at 82%. From Figure 1 and 2, it is interesting to note that although the number of labour force participants is higher amongst college graduates, more university graduates are employed than college graduates.

Figure 1: Labour force participants by higher education institution attended

The share of employment amongst graduates with similar or identical qualifications has been shown to vary by gender. Figure 3 shows the share of graduates employed relative to those unemployed, by gender and the type of institution attended. From the figure, overall, a higher proportion of female graduates from either university or college is unemployed relative to male graduates. The share

Figure 2: Employment share by higher education institution attended

Employment share

■ Share of unemployed ■ Share of employed
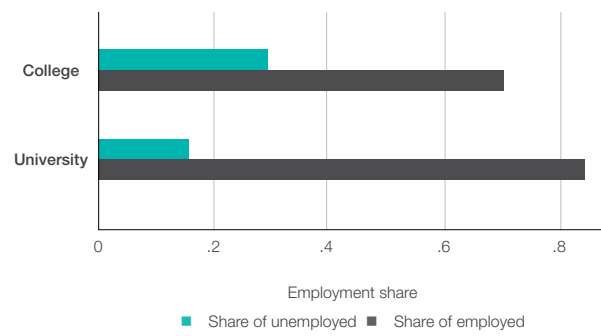
Figure 3: Employment share by gender and higher education institution attended

Employment share

■ Share of unemployed ■ Share of employed

Figure 4: Employment share by population group and higher education institution attended

Employment share

■ Share of unemployed ■ Share of employed
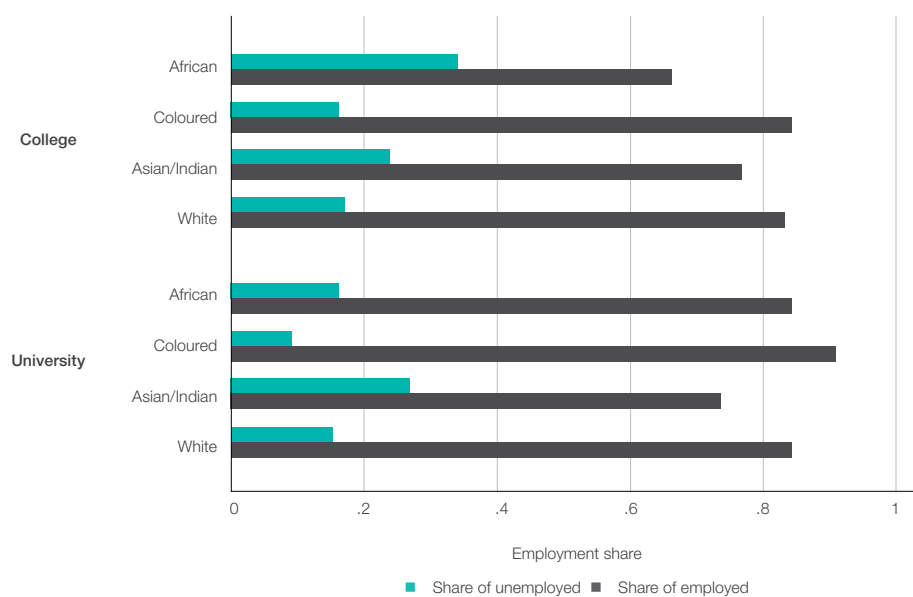
of unemployment is highest amongst female college graduates, at 27%, while the share of employment is highest amongst male university graduates, at an average of 84%. Interestingly, the share of employment is higher amongst female university graduates relative to male college graduates – a possible indication that the labour market has a preference for university graduates regardless of their gender.

The pattern of unemployment amongst tertiary education graduates also varies by race. Figure 4 presents the share of employed graduates relative to that of unemployed graduates, by race, from the two types of institutions. The share of unemployed college graduates is highest amongst Africans, at 38%, while amongst university graduates it is highest amongst Asians, at 28%. The share of unemployed graduates is lowest amongst Coloured university graduates, at 10%, and – interestingly, for both college and university graduates – Coloureds have the highest share of employment, at 85% and 90% respectively, followed by Whites, at 85% for both types of institutions.

Earnings

The distribution of monthly real wages earned by graduates from universities and colleges varies

substantially. Figure 5 shows the distribution of wages by institution attended against the distribution of wages for the pooled sample. The figure shows the distribution of wages earned by the two groups to be almost symmetrical, except that wages earned by university graduates are slightly skewed to the right. The highest wages earned by college graduates are below the highest wages earned by university graduates – a likely indication that university graduates have higher wages on average. Considering that universities and colleges do offer similar qualifications in some fields of study, in the form of diplomas and certificates, one can infer this to be a possible indication of a persistent market perception that university graduates are more productive and are consequently offered higher wages than college graduates with similar qualifications.

The distribution of wages by institution attended and gender is shown in Figure 6, with confidence intervals indicated. It is evident from the figure that female graduates from both colleges and universities earn lower wages than their male counterparts. The average wage for female college graduates was R6 634 per month, which is 33% below that of male college graduates, 88% below that of male university graduates, and 59% below that of female university graduates. Male university

Figure 5: Wages earned by higher education institution attended

Wages are in real Rand value
Sample of age group 24 to 64 with college education
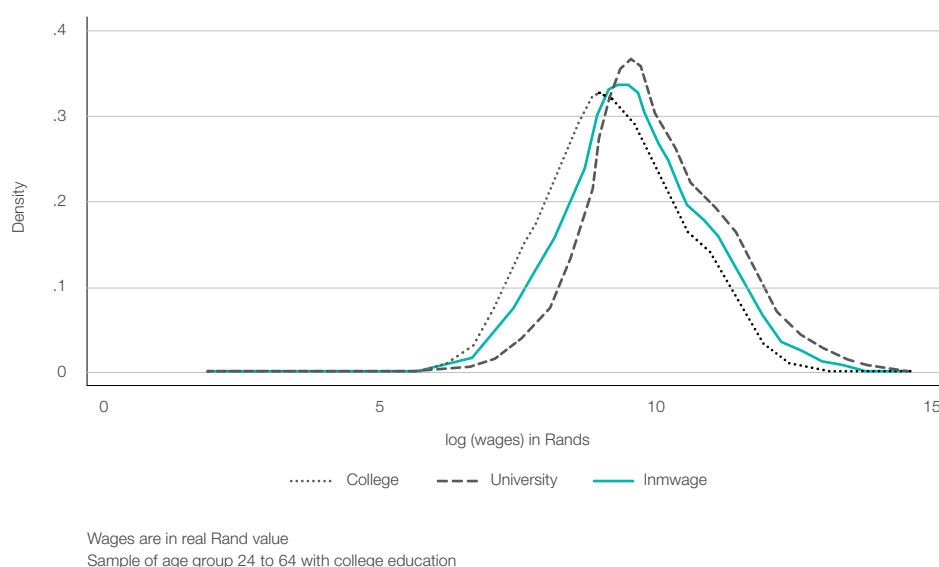
Notes: Wages are in real rand value; sample of age group 24 to 64 with college education

Figure 6: Mean wages by gender and higher education institution attended
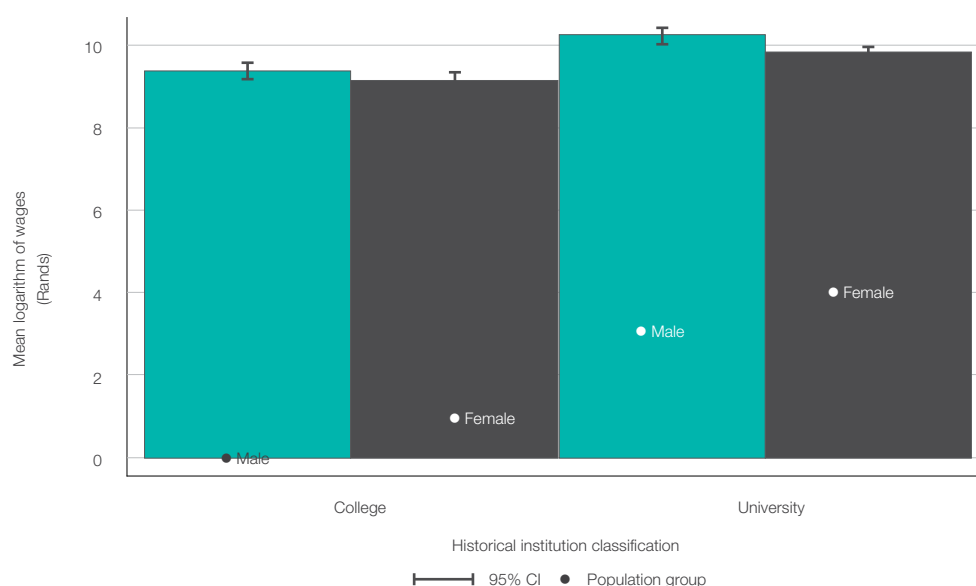
Source: NIDS Wave 1, 2 and 3 sample of those aged 24 to 64 and employed

Figure 7: Mean wages by population group and higher education institution attended
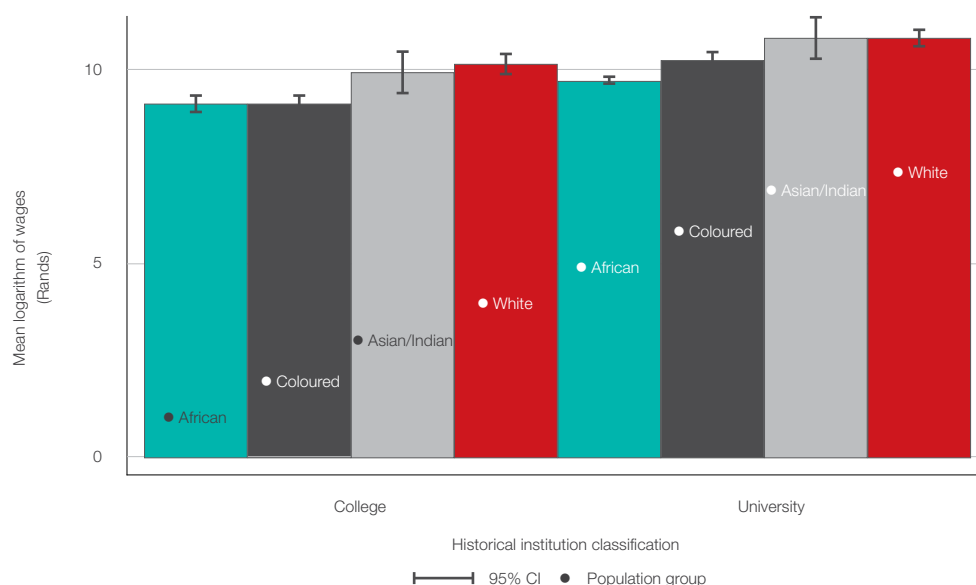
Source: NIDS Wave 1, 2 and 3 sample of those aged 24 to 64 and employed

graduates are the highest earners, followed by female university graduates. Female college graduates are the lowest earners.

The distributions of monthly wages earned by college and university graduates by population groups are shown in Figure 7. The figure shows that wages differ along racial lines. Across the board,

Whites and Indians/Asians, on average, earn higher wages relative to Coloureds and Africans. On average, African and Coloured college graduates earn the least – an average of R4 915 per month, which is 63% and 87% below that of Indian and White college graduate wages respectively, and 94% and 93% below that of Indian and White university graduate wages respectively. It is
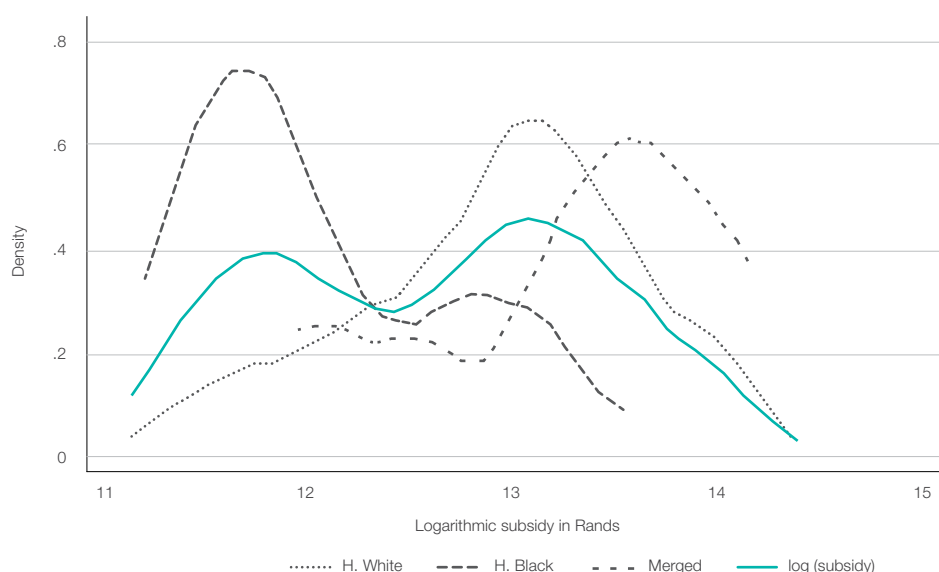
Notes: Subsidy figures compiled from annual budget allocation; sample of those with some college education in NIDS; n=256

interesting to note that Coloured university graduates earn about as much as White college graduates. From these statistics, one can infer that graduates' earnings are racially biased, particularly against Africans and Coloureds and in favour of Indians and Whites.

Subsidy allocated to public institutions of higher learning

In an effort to support public provision of quality tertiary education, the South African government has been allocating a subsidy, each year, to public institutions of higher learning. In the past, expenditure allocations were made to technikons, universities of technology and universities; however, starting in 2013/2014, budget allocations are also made to FET colleges. The subsidies to universities are unconditional transfers allocated based on 'research outputs, teaching inputs and outputs, and contextual factors such as the number of students enrolled at an institution' (Republic of South Africa 2013: 13). Although in the past some financial support was given to teacher training, technical, agricultural and nursing colleges, we have not been successful in finding this data, which therefore limits us to a sample of 256 individuals who attended

technikons, universities of technology and universities. Due to this small sample size, we do not control for the subsidy value in our regression analysis. In Figure 8, therefore, we simply present the distribution of subsidies to technikons, universities of technology and universities as historically classified for the financial period 1998/1999 to 2012/2013. The distributions in Figure 8 are as per the graduates in our sample who attended the said institutions in that time period.

From Figure 8, we can see that the distribution of subsidies to historically Black[8] institutions is skewed to the right, whereas the distributions of both historically White institutions and merged institutions are skewed to the left. The distribution of the whole sample indicates a bimodal distribution. One can interpret these distributions to be an indication of persistent disadvantage for historically Black institutions. Given the rule used in the allocation, these formerly disadvantaged institutions may be unable to secure as much funding as the historically White and merged institutions, because they possibly have lower research and teaching outputs.

8   Black refers to African, Coloured, and Indian/Asian population groups.

6. EMPIRICAL RESULTS

In the estimation of returns to education as per equation 1, only individuals in employment are considered – hence, the sample considered is not a random sample. As noted above, to account for this selection we estimate Heckman's two-step selection model. In this section, we present the probit coefficients and the marginal effects from the Heckman estimation. We discuss the results in the following sub-section.

Probability of employment

In Table 2, we present first the coefficients from the probit model followed by the marginal effects from the Heckman model by wave. The inverse Mill ratios from the selection models given at the bottom of Table 2 are statistically significant for all waves – an indication of selection bias in employment. We discuss the marginal effects below.

Table 2 results show that, holding all other controls constant, an increase in years of schooling significantly increases the probability of being employed and, specifically, an additional year of schooling increases the probability of being employed by 3 to 7 percentage points. The institution attended has significant influence on the probability of employment. Holding all other controls constant, except in Wave 1 where we find no difference in probability of employment, attending a university significantly increases the chances of employment by between 7 and 10 percentage points. University graduates therefore have higher chances of securing employment than college graduates.

Experience significantly increases the probability of employment. Once selection is accounted for, a one-year increase in experience increases the probability of being employed by 3 to 4 percentage points. Having a household member who is a recipient of at least one of the five government social grants increases the probability of being employed by 9 to 16 percentage points, relative to not having a recipient household member (holding all other factors constant). This is in agreement with existing evidence that suggests that having a social grant holder in one's household increases opportunities for job search (Ardington et al. 2007; Surender et al. 2010).

The effects of gender, marital status, population group, home language, home location and home province vary across the waves. Results for most of these controls from Wave 2 and Wave 3 are largely insignificant. However, the results from Wave 1 given in column five of Table 2 indicate that: women have a lower chance of employment than men; living in either rural formal or in urban informal areas lowers the probability of employment relative to living in urban formal areas; and residents of either the Free State, North West, Mpumalanga, or Limpopo provinces have lower chances of employment relative to residents of KwaZulu-Natal. Results from all waves largely indicate that marital status, race and home language have no effect on employment probability.

The results from the three waves seem to indicate some variation in the factors that are most influential in the determination of employment, particularly once selection is accounted for. Given that the surveys were all conducted in the space of about

Table 2: Probability of employment

	Probit coefficients			Heckman marginal effects		
	Wave 1	Wave 2	Wave 3	Wave 1	Wave 2	Wave 3
Years of schooling	0.156***	0.285***	0.106**	0.0321***	0.0645***	0.0279**
	(0.0602)	(0.0868)	(0.0465)	(0.0120)	(0.0185)	(0.0121)
Institution (university = 1)	0.0492	0.450***	0.278**	0.0101	0.102***	0.0730**
	(0.151)	(0.151)	(0.115)	(0.0309)	(0.0346)	(0.0302)
Gender (female = 1)	-0.433***	-0.187	-0.0253	-0.0890***	-0.0425	-0.00664
	(0.139)	(0.139)	(0.0972)	(0.0277)	(0.0314)	(0.0255)
Marital status (married = 1)						
Living with partner	-0.347	-0.159	-0.0136	-0.0712	-0.0360	-0.00356
	(0.314)	(0.395)	(0.221)	(0.0647)	(0.0895)	(0.0580)
Widow/widower	0.240	1.152*	0.280	0.0494	0.261*	0.0736
	(0.409)	(0.618)	(0.357)	(0.0840)	(0.138)	(0.0938)
Divorced/separated	0.221	0.397	-0.0256	0.0455	0.0900	-0.00673
	(0.277)	(0.359)	(0.255)	(0.0568)	(0.0813)	(0.0670)
Never married	0.0377	-0.256	-0.239**	0.00775	-0.0579	-0.0629**
	(0.175)	(0.176)	(0.122)	(0.0360)	(0.0395)	(0.0317)
Population group (African = 1)						
Coloured	0.722	0.147	0.507	0.148	0.0333	0.133
	(0.457)	(0.693)	(0.446)	(0.0930)	(0.157)	(0.117)
Indian/Asian	-0.264	-1.619*	-0.452	-0.0543	-0.367*	-0.119
	(0.466)	(0.882)	(0.525)	(0.0956)	(0.195)	(0.137)
White	-0.244	-1.161	-0.00252	-0.0502	-0.263	-0.000660
	(0.390)	(0.750)	(0.451)	(0.0801)	(0.168)	(0.118)
Home language (an African language = 1)						
Afrikaans	0.133	0.423	-0.395	0.0273	0.0959	-0.104
	(0.418)	(0.749)	(0.444)	(0.0858)	(0.169)	(0.117)
English	-0.359	1.033	0.00260	-0.0737	0.234	0.000682
	(0.355)	(0.790)	(0.448)	(0.0729)	(0.176)	(0.118)
Experience	0.153***	0.164***	0.147***	0.0314***	0.0372***	0.0386***
	(0.0270)	(0.0278)	(0.0193)	(0.00553)	(0.00620)	(0.00488)
Experience squared/100	-0.406***	-0.386***	-0.343***	-0.0835***	-0.0876***	-0.0900***
	(0.0609)	(0.0654)	(0.0448)	(0.0125)	(0.0145)	(0.0113)
Home location (Urban formal = 1)						
Rural formal	-0.515*	0.184	-0.453**	-0.106*	0.0416	-0.119**
	(0.267)	(0.296)	(0.202)	(0.0547)	(0.0671)	(0.0530)
Tribal authority area	-0.0965	-0.230	-0.0452	-0.0198	-0.0522	-0.0119
	(0.201)	(0.189)	(0.141)	(0.0412)	(0.0431)	(0.0369)
Urban informal	-0.735**	-0.475	-0.0884	-0.151**	-0.108	-0.0232
	(0.326)	(0.363)	(0.233)	(0.0668)	(0.0824)	(0.0611)
Home province (KwaZulu-Natal = 1)						
Western Cape	-0.363	-0.0292	0.263	-0.0745	-0.00662	0.0692
	(0.280)	(0.366)	(0.229)	(0.0572)	(0.0830)	(0.0600)
Eastern Cape	0.180	-0.364	-0.332	0.0370	-0.0824	-0.0873
	(0.365)	(0.295)	(0.220)	(0.0748)	(0.0668)	(0.0575)
Northern Cape	-0.339	-0.187	-0.115	-0.0697	-0.0425	-0.0302
	(0.355)	(0.435)	(0.271)	(0.0729)	(0.0984)	(0.0711)
Free State	-0.643**	0.351	-0.208	-0.132**	0.0796	-0.0547
	(0.292)	(0.307)	(0.228)	(0.0593)	(0.0697)	(0.0599)
North West	-1.025***	-0.628**	-0.270	-0.211***	-0.142**	-0.0710
	(0.247)	(0.255)	(0.182)	(0.0505)	(0.0575)	(0.0476)
Gauteng	-0.177	0.270	0.0648	-0.0364	0.0613	0.0170
	(0.246)	(0.228)	(0.173)	(0.0504)	(0.0517)	(0.0453)

	Probit coefficients			Heckman marginal effects		
	Wave 1	Wave 2	Wave 3	Wave 1	Wave 2	Wave 3
Mpumalanga	-0.559**	-0.0411	-0.181	-0.115**	-0.00931	-0.0475
	(0.281)	(0.275)	(0.202)	(0.0574)	(0.0622)	(0.0529)
Limpopo	-0.541**	-0.354	-0.0996	-0.111**	-0.0803	-0.0262
	(0.263)	(0.245)	(0.189)	(0.0535)	(0.0553)	(0.0495)
Member receives a social grant	0.751***	0.374***	0.607***	0.154***	0.0848**	0.159***
	(0.160)	(0.145)	(0.104)	(0.0331)	(0.0332)	(0.0267)
Constant	-2.302***	-4.794***	-2.254***			
	(0.878)	(1.234)	(0.677)			
Inverse Mill ratio				-1.106***	-0.831**	-0.493**
				(0.341)	(0.380)	(0.201)
Chi-squared	258.9	258.9	128.3	128.3	418.2	418.2
Sample size(n)	767	704	1250	767	704	1250

Note: 1. Standard errors in parenthesis.

2. * indicates significance difference at different levels: * p<0.1, ** p<0.05 and *** p<0.01.

five years (that is, 2008 to 2012), it is unlikely that any structural changes took place in the labour market to warrant this variation. It is therefore possible that the variation is due to the small sample size considered. However, years of schooling, the institution attended, experience, and the presence of a household member who receives at least one of the government social grants are important factors in the determination of employment. Of particular relevance for us here is that attendance at a university relative to an FET college, when controlling for a range of factors, is associated with a higher probability of employment in the labour market. Put differently, our results seem to suggest that FET colleges impart a signal in the labour market that disadvantages their graduates relative to those from universities.

Relative returns

Given that most of the controls in the earning regression are included in the employment probit regression, we consider the unconditional marginal effects from the Heckman selection model. These unconditional marginal effects from equation 4 take into account both the percentage increase in working graduates' earnings and the percentage increase in the proportion of graduates working. They are therefore larger than the conditional marginal effects that only account for a percentage increase in working graduates' earnings – that is, earnings for those in employment. These effects are

presented in Table 3. From the table, the coefficients of the inverse Mill ratios as obtained from the selection probits in the Heckman regressions are statistically significant for each wave. This is an indication that there is selection in employment, and accounting for selection was necessary to achieve unbiased estimates. We present the effects for each wave separately.

The unconditional marginal effects show that there are positive and substantial returns to schooling, which could indicate that an increase in years of schooling significantly increases earnings. We find that a one-year increase in schooling increases wages by 37% to 111%. From the results, the type of higher education institution attended is an important determinant of wages paid. Attending a university significantly raises wages by between 126% and 206% relative to attending a college. This is a relatively high premium, particularly given that the result controls for occupation, experience and sector. This higher return could be a reflection of increasing returns to university diplomas, or changes in the composition of graduates – that is, fewer university graduates than college graduates leading to higher wages for university graduates. As expected, occupation matters in respect of average earnings. Working in government and as a professional, earns an individual higher wages compared with working as a semi-skilled worker, while working as an unskilled worker earns lower wages.

Table 3: Heckman unconditional marginal effects

Dependent variable: Logarithmic monthly wages	Unconditional marginal effects		
	Wave 1	Wave 2	Wave 3
Years of schooling	0.503***	0.747***	0.317***
	(0.154)	(0.205)	(0.116)
Institution (university = 1)	0.300	1.120***	0.814***
	(0.399)	(0.389)	(0.291)
Gender (female = 1)	-1.185***	-0.657*	-0.259
	(0.358)	(0.353)	(0.247)
Marital status (married = 1)			
Living with partner	-1.337	-0.209	-0.217
	(0.838)	(1.000)	(0.559)
Widow/widower	0.419	2.808*	0.653
	(1.077)	(1.510)	(0.901)
Divorced/separated	0.604	0.810	0.0180
	(0.728)	(0.904)	(0.644)
Never married	-0.231	-0.635	-0.655**
	(0.463)	(0.443)	(0.306)
Population group (African = 1)			
Coloured	1.844	0.0914	1.110
	(1.190)	(1.735)	(1.126)
Indian/Asian	-0.214	-3.515	-0.924
	(1.231)	(2.156)	(1.322)
White	-0.149	-2.454	0.0680
	(1.028)	(1.848)	(1.138)
Home language (an African language = 1)			
Afrikaans	0.252	1.476	-0.779
	(1.100)	(1.864)	(1.120)
English	-0.735	2.682	0.298
	(0.937)	(1.933)	(1.128)
Experience	0.333***	0.344***	0.341***
	(0.0730)	(0.0725)	(0.0482)
Experience squared/100	-0.866***	-0.784***	-0.791***
	(0.167)	(0.169)	(0.111)
Tenure	0.00921	0.0172	0.0252***
	(0.0156)	(0.0169)	(0.008)
Tenure squared/100	-0.0005	-0.0007	-0.0005**
	(0.0005)	(0.0005)	(0.0003)
A second job	0.738***	0.287	0.465**
	(0.258)	(0.574)	(0.188)
Occupation (semi-skilled worker = 1)			
Government	0.532***	0.579***	0.244***
	(0.155)	(0.189)	(0.079)
Professional	0.239**	0.303***	0.193***
	(0.104)	(0.108)	(0.0555)
Technician	0.216	0.387**	0.0936
	(0.145)	(0.159)	(0.0872)
Unskilled worker	-0.589**	0.176	-0.139*
	(0.231)	(0.357)	(0.0815)
Contract type (written = 1)	-0.231*	-0.259	-0.315***
	(0.118)	(0.174)	(0.087)
Medical deduction	-0.142	-0.274***	-0.215***
	(0.0931)	(0.102)	(0.0504)

Dependent variable: Logarithmic monthly wages	Unconditional marginal effects		
	Wave 1	Wave 2	Wave 3
Pension deduction	-0.220**	0.0176	-0.190***
	(0.108)	(0.112)	(0.0526)
UIF deduction	-0.0459	-0.058	0.0017
	(0.0889)	(0.093)	(0.045)
Trade union member	0.176*	0.151	0.0309
	(0.0980)	(0.103)	(0.0518)
Home location (urban formal = 1)			
Rural formal	-1.266*	0.317	-1.297**
	(0.712)	(0.755)	(0.513)
Tribal authority area	-0.166	-0.613	-0.134
	(0.533)	(0.487)	(0.356)
Urban informal	-1.687*	-1.242	-0.556
	(0.868)	(0.930)	(0.591)
Home province (KwaZulu-Natal = 1)			
Western Cape	-0.987	-0.305	0.707
	(0.734)	(0.923)	(0.578)
Western Cape	-0.987	-0.305	0.707
	(0.734)	(0.923)	(0.578)
Eastern Cape	0.275	-0.721	-0.832
	(0.952)	(0.751)	(0.555)
Northern Cape	-0.700	-0.559	-0.243
	(0.934)	(1.093)	(0.684)
Free State	-1.395*	0.816	-0.522
	(0.765)	(0.776)	(0.578)
North West	-2.357***	-1.384**	-0.603
	(0.660)	(0.655)	(0.460)
Gauteng	-0.368	0.614	0.325
	(0.646)	(0.579)	(0.437)
Mpumalanga	-1.165	0.189	-0.185
	(0.740)	(0.696)	(0.511)
Limpopo	-1.313*	-0.745	-0.144
	(0.692)	(0.625)	(0.478)
Inverse Mill ratio	-1.106***	-0.831**	-0.493**
	(0.341)	(0.380)	(0.201)
Sigma	1.106	1.018	0.717
Rho	-1	-0.817	-0.688
Chi-squared	258.9	128.3	418.2
Sample	473	382	716
Censored sample	147	161	267

Source: Authors' calculation based on NIDS

Note: 1. Standard errors in parenthesis.

2. The * indicates significance difference at different levels: * p<0.1, ** p<0.05 and *** p<0.01.

The results also show that women receive lower wages than men, but there is no difference in Wave 3. Marital status does influence earnings. However, the results on which marital status earns a premium seem to vary across the waves. Population group and home language are insignificant in the determination of earnings. Although this result is generally unexpected in South Africa, it is not surprising to us since we would expect both race and language to be insignificant once institution attended is controlled for, given that the majority of our sample (age group 24 to 64) mainly went to school in the apartheid era when individuals attended higher education institutions designated

for their race. It does, though, reflect a positive result in the South African context: that 20 years since the end of apartheid, for individuals with a tertiary qualification, racial discrimination seems to have been eroded.

Holding all other factors constant, more experience increases earnings. However, earnings start to decline after between 18 and 22 years. Tenure is shown not to matter in Wave 1 and 2, but in Wave 3 the results show that it increases earnings by 2.5% and that returns peak at 25 years of working in a given firm. Holding a written contract earns lower wages than holding a verbal contract. Earnings of trade union members are hardly any different from those of non-union members. This is expected, given that unions in South Africa play a significant role in low-skill sectors that employ workers who have, predominantly, not attained a higher education level. Medical and pension deductions reduce earnings, while unemployment insurance fund contributions have no effect on earnings.

Finally, holding all other factors constant, geographical area and province of residence are important in the determination of earnings. Workers in a rural formal areas and urban informal areas obtain lower earnings than workers in urban formal areas, while workers in tribal authority areas receive wages that are no different from those in urban formal areas. The influence of province of residence is minimal in Wave 2 and non-existent in Wave 3. However, Wave 1 results indicate that workers in the Free State, North West and Limpopo provinces receive significantly lower wages than workers in KwaZulu-Natal, and that there is no difference in wages received by workers in all other provinces.

CONCLUSION

Using the first three waves of the National Income Dynamics Study, we focus our analysis on employment probability and on returns to education for graduates (aged 24 to 64) of higher education institutions. We use a Heckman selection model to account for selection into employment. We find that an increase in years of schooling increases employment probability and that there is a significant premium for individuals with higher education. We find that the institution attended plays a significant role in the determination of both employment probability and earnings, as is evident in premium differentials, with university graduates as the winners. We also find that, although the results by waves are mixed, there is an indication that women are disadvantaged in both employment and earnings, and that earnings vary by occupation and by both geographical area and province. Both race and home language play no role in influencing employment chances and earnings. Our results indicate that universities are associated with a higher conditional probability of employment and massive returns to earnings. The latter is positive in that racial discrimination has been eroded but it does suggest that FET colleges require significant improvements to ensure higher employment outcomes and an increase in the returns to earnings of its graduates.

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APPENDIX

Table 4: Variable definitions

Variable	Definition
Employment status	Is the individual employed: employed = 1, unemployed = 2
Wages earned	Real monthly wages from primary occupation and wages from second job are included for individuals holding two jobs. Monthly CPI is used to convert nominal wages to real wages.
Years of schooling	The highest education level a respondent has attained.
Institution attended	Higher education institution in which highest education level was attained: university = 1, college = 0
Experience	Respondent's age in years as calculated using interview date less their date of minus years of schooling minus 6.
Gender	Respondent's gender: female = 1, male = 0
Home location	Respondent's geographical home area: rural formal = 1, traditional area = 2, urban formal = 3, rural formal = 4
Marital status	Married = 1, living with a partner = 2, widow/widower = 3, divorced/separated = 4, never married = 5
Population group (race)	Respondent's race: African = 1, Coloured = 2, Indian/Asian = 3, White = 4
Home language	Language spoken at home: an African language = 1, Afrikaans = 2, English = 3, other languages = 4
Occupation	Government official = 1, professional = 2, technician = 3, semi-skilled worker = 4, unskilled worker = 5
Home province	Household province of residence: Western Cape = 1, Eastern Cape = 2, Northern Cape = 3, Free State = 4, KwaZulu-Natal = 5, North West = 6, Gauteng = 7, Mpumalanga = 8, Limpopo = 9
Social grant	Whether respondent resides in a household where at least one household member receives at least one of the social grants: yes = 1, no = 0
Employment contract type	Type of employment contract held: written = 1, verbal = 0
Medical deduction	Respondent has monthly medical aid deduction: yes = 1, no = 0
Pension fund	Respondent has monthly pension fund deduction: yes = 1, no = 0
Unemployment Insurance Fund	Respondent has monthly Unemployment Insurance Fund deduction: yes = 1, no = 0
Trade union member	Respondent is a member of a trade union: yes = 1, no = 0

LABOUR MARKET INTELLIGENCE PARTNERSHIP

The Role of Post-school Education and Training Institutions in Predicting Labour Market Outcomes

This report offers empirical estimates of the association between the type of education institution attended, and the probability of employment and level of earnings of graduates in the South African labour market.

Using the first three waves of the National Income Dynamic Study (NIDS), we find that an increase in years of schooling increases employment probability, and there is a significant premium for individuals with higher education. Yet it is skills level, often measured by education level attained, which is a more important determinant of wage, relative to occupation. Skills inflation might be manifesting in increased selectivity in the employment of graduates, by criteria such as tertiary education qualification, and institution attended.

It is a positive fact that universities are associated with a higher conditional probability of employment and massive returns to earnings, in that racial discrimination has been eroded. But it does suggest that TVET colleges require significant improvements to ensure higher employment outcomes, and an increase in the returns to earnings of their graduates.

About the LMIP

The Labour Market Intelligence Partnership (LMIP) is a collaboration between the Department of Higher Education and Training, and a Human Sciences Research Council-led national research consortium. It aims to provide research to support the development of a credible institutional mechanism for skills plannning in South Africa. For further information and resources on skills planning and the South African post-school sector and labour market, visit http://www.lmip.org.za.

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