



GRADUATE UNEMPLOYMENT

Does Field of Study Matter?

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Abstract.

Skills shortage with graduate unemployment at face value appear as a contradiction in terms. However, this is emblematic of the South African economy. Albeit that the South African government invests a tremendous amount of resources towards the massification of higher education a significant proportion of graduates cannot find success in the labour market. Chief amongst the reasons why the South African government has taken this human capital investment path is to address the economic outcomes engendered by the historical policies of racial exclusion. Preferential access towards higher education institutions for previously disadvantaged individuals has been used as the weapon to combat poverty and inequality. However, having unemployed graduates in an economy severely lacking skills to grow is counter to the objective of reducing social inequality. The literature is at odds with regards to the relevance the field of study a graduate comes from in determining the prospects of success of a graduate in the labour market. So, with the use of the Quarterly Labour Force Survey (QLFS) dataset spanning from the first quarter of 2015 to the last quarter of 2019, this article employs a multinomial logistic regression model to investigate the correlates of employment amongst graduates in South Africa. The results indicate that graduate unemployment is fundamentally structural and therefore the field of study that a graduate comes from matters.

A word of appreciation.

This paper would not have been possible without Dr Adeola Oyenuki going beyond the call of duty to give encouragement, honesty and structure to a scatter-brained student such as myself. All errors or misjudgements made in the paper are solely my own as one could not ask for a better supervisor.

Introduction.

South African employers need individuals with skills however as the first quarter of 2021, 151 200 individuals who hold at the very least a degree cannot find work ([StatSA, 2021](#)). This [Pauw et al \(2008\)](#) coins as the labour market paradox. This is alarming because apart from the dignity employment gives to individuals, researchers have found that the South African labour market is the primary institution for determining several socio-economic welfare measures. Therefore, finding formal sector employment is greatly correlated with exiting out of poverty and losing formal sector employment is strongly correlated with entering poverty, ([Ranchhod and Daniels ,2020](#)). A related point is the relationship between unemployment and mental health. [Posel et al \(2021\)](#) found that individuals who lost employment because of COVID-19 related lockdown are more vulnerable to depression than those that retained their jobs. Unemployment has adverse effects on the people of South Africa which are not only limited to poverty and mental health. The causes and the impact of unemployment are well documented in the South African literature. Therefore, the point of this paper at this juncture is not to trot out the broad socio-economic issues pertaining to South African unemployment. However,

it is to focus on how graduate unemployment indicates a further waste of valuable resources, in three main ways.

Firstly, graduate unemployment indicates a failure to take advantage of the structural change that has transpired in the South African economy. Structural change in this context means that there has been a shift in demand for higher skilled workers relative to the lower skilled workers. The structural change in the South African economy therefore provides an opportunity for inclusive growth and an escape from poverty, ([Kraak,2010](#)). However, ironically the unemployment rate among graduates is reported as the fastest growing unemployment rate of all the education cohorts since 1995 ([Baldry,2016](#)). Secondly, taxpayer's money is lost when a graduate's university education has been state funded and the graduate is unable to find employment. According to the [National Student Financial Aid Scheme \(NSFAS\) funding report](#), as of June 2021 a total of R13,59 billion has been paid to the South African universities for sponsored students. During this time 9.95% of working age graduates were unemployed, thus if things remain the same then just under 10% of the NSFAS funds are being underutilized. The assumption is that the weighting of unemployed graduates having received funding through NSFAS is equal to those that were funded by other means. This assumption helps to paint the picture for the underutilised potential amongst the previously disadvantaged graduates. However, this assumption underestimates the extent of the problem as the literature indicates a disproportionate number of unemployed graduates coming from a disadvantaged background.

Lastly, brain drain in South Africa is exacerbated by the graduate unemployment problem. The reasons why there are unemployed graduates spark political debates as some believe that the cause is the influx of foreign skilled labour outcompeting the South African graduates. While on the other end of the spectrum it is argued that the influx of highly skilled foreign labour would help alleviate the graduate unemployment problem through a skills transfer structure. The latter is one of the two recommendations adopted in this paper. A survey conducted by the [Human Resource Science Council \(HSRC\)](#) found that just over one in three graduates (33.1%) from the humanities and arts faculty were planning to find work abroad. Graduates from this faculty of study were shown to have lower prospects for employment in the labour market, thus the search for work abroad. However, it must be mentioned that it is not only graduates that face a higher likelihood of unemployment that indicated a plan to work abroad, 31.7% and 31.6% of medical science and engineering graduates, respectively plan to work abroad. A major contributor could be that South Africa competes with countries such as Australia and the United Kingdom for experienced and qualified engineers, thus it is more than employment prospects that matter to this cohort of graduates, ([Xpatweb;2021](#)). The 2020-2021 critical skills survey by Xpatweb shows that 21% of companies indicated that the registration processes with professional bodies are particularly onerous when needing to apply for a Critical Skills Visa. Coupled with 77% of companies indicating that they struggle to recruit critical skills in South Africa shows that not enough foreign skilled labour is replacing the lost skills in the country.

Given the gravity of the possibility of wasted potential, this paper investigates correlates of employment amongst graduates in South Africa. This is important because identifying factors that increase the chances of being employed in an economy like South Africa (that has a labour market

paradox) can help policy makers address the unemployment problem. For instance, it has been found by [Bhorat \(2004\)](#) that field of study is relevant in predicting employment for graduates in South Africa.

Put differently, the research question of this paper is that, is the field of study that a graduate undertakes correlated with their prospects of finding employment. This is while controlling for key covariates that have been identified in the literature. My hypothesis is that the field of study for a given graduate significantly determines the prospects of employment in the South African labour market. Given the potential heterogeneous nature in finding employment amongst graduates from different fields of study, it is prudent that the South African government and households allocate its resources efficiently towards human capital enhancement. With public universities taking the lions' share of the post-school education and training budget, 67% or R92.3 billion of total revenue going to public institutions of higher learning in the 2019/2020 fiscal year ([Khuluvhe and Netshifhefhe, 2021](#)). It would be irrational for public resources not to be directed such that the return of such spending is maximized. Given that [Van Broekhuizen and Van Der Berg \(2012\)](#) assert that a major contributor to South Africa's slow economic growth is the lack of skills in the labour market. As such policies that alleviate the bottlenecks to importation and the training of domestic human resources in critical skills should be proliferated. The contribution of this research would be to elaborate on the incipient problem [Bhorat \(2004\)](#) postulated with regards to graduate unemployment, in that the fields of study that graduates come from determines their prospects for employment.

There are 2 strands of literature on graduate unemployment, the first strand places a greater weight on equity as a causal mechanism for the paradox and the second strand places more weight on efficiency or lack thereof. Researchers that focus on equity find that the significant covariates that predict a graduate's employment status are socio demographic factors, (Race, gender, age, socio economic background etc.), job searching costs, social networks and lack of support structures, ([Kraak, 2010](#); [Mncayi, 2014](#); [Baldry, 2016](#)). Researchers that focus on efficiency point to skills mismatch in the labour market; perceived heterogeneity in the quality of higher education institutions by employer and the unrealistic expectations of young graduates in the labour market, ([Moleke, 2005](#); [Pauw et al, 2008](#); [Van Der Berg & Van Broekhuizen, 2012](#); [Van Broekhuizen, 2016](#)). This paper stands at the intersection these 2 strands of literature, such that the argument is that the lack of policy coordination between higher education and skills development initiatives for growth have resulted in a surplus of skills that are not in demand in the labour market. The main argument is that there is often a trade-off between equity and efficiency, and it is important for policy makers to recognise this so that the trade-off can be exploited for public good.

The growth strategies ([Growth Employment and Redistribution \(GEAR\)](#); [Accelerated and Shared Growth Initiative for South Africa \(ASGISA\)](#); [New Growth Path \(NGP\)](#) and [New Development Plan \(NDP\)](#)) South Africa has implemented, have a fervent emphasis on skills development for growth and the expectation is that growth will trickle down to employment growth. Growth and skills initiatives such as the [Joint Initiative on Priority Skills Acquisition \(JIPSA\)](#) was mandated to minimize the skills deficit in the South African labour market to be in line with ASGISA targets, ([JIPSA, 2008](#)). However, the mandate only went as far as to boost the relevance and responsiveness of graduates

from an education and training standpoint, it did not inform higher education on which skills to prioritize such that the graduates that are produced by higher education are in line with the skills the employers demand. This serves only to counter the objective that initiatives such as JIPSA was assigned for. In such a manner that [Manpower Group's Annual Talent Shortage Survey](#) reported that the number of South African employers who had difficulty in filling vacant positions mainly because of shortcomings of jobseekers with appropriate skills increased from 8 per cent in 2014 to 31 per cent in 2015, ([Manpower Group, 2015](#))

Against this backdrop I argue that given the Neo-Liberal growth strategies that have been adopted, the next best thing to do is for policy to coordinate its efforts such that graduates that higher education churns out are in line with the critical skills that have been identified. This is a simple argument of tailoring the supply that the state pays for to meet the demand of what the economy needs. Failure to do so only means that efforts to bring equity through education provision are compromised and efforts to efficiently match skills with those employers are looking for and those that exist in the labour market will also be compromised. Put differently, equity should be balanced with efficiency and so given the outlay of the argument I elaborate briefly on the literature on graduate unemployment from the perspective of the two strands.

Literature Review.

Equity school of thought.

To reveal the factors that have been identified in the literature that contribute towards graduate unemployment, especially from an equity point of view then it is paramount to look at the historical context. The investment path in South Africa towards human capital accumulation has been purposefully kept below optimal in the apartheid regime in several ways two of which stand out in their relevance to this study. Firstly, the development of the production process in the economy was led by the apartheid government incentivising the use of capital as a factor of production relative to labour, ([Alleyne & Subramanian, 2001](#)). This makes labour as a factor of production relatively more obsolete in the production process. Which can go a long way to explaining the middle-income trap South Africa is in, such that South African labourers on average are less productive but are more expensive for their given level of productivity compared to developing nations such as Thailand, ([Jantarasombat, 1997](#)). Secondly, the philosophy and thus the policy during apartheid South Africa were to obtund the competitive ability of the non-White population by providing inadequate investment towards non-White human capital ([Letseka et al, 2010](#)).

The depressed investment path towards human capital for the non-White South African population is the focal point in contextualising the relevance of social demographic factors in this discussion. Such that [Baldry \(2016\)](#) finds that race is the strongest predictor for a graduate being unable to find formal sector employment. This is while controlling for educational factors such as the field of study, the level

of study and the marks obtained. Rather ubiquitously race in the literature is a significant predictor of employment, such that unemployment rates amongst black graduates is higher than those of white

graduates in South Africa, ([Van Rheebe 2012](#); [Cape Higher Education Consortium, 2013](#); [Rogan et al. 2015](#); [Baldry 2016](#); [Mncayi and Dunga, 2016](#)). Another point that is consistent in the literature is that female graduates are often more likely to be unemployed than their male counterparts, ([CHEC, 2013](#); [Mncayi and Dunga 2016](#)). Another sociodemographic factor that finds relevancy are the geographical background a graduate comes from. The Cape Higher Education Consortium ([CHEC, 2013](#)) published research that looked at the association between graduate unemployment and having attended a high school in a township, rural or a suburban area. The results show that for graduates from the four higher education institutions in the Western Cape there is a higher association of unemployment for those that come from high school in the townships as opposed to the suburbs (19% and 7%, respectively and 14% for those that come high schools in rural areas.)

The lack of social capital/networks in the labour market, the collapse of structured pathways from higher education to employment and the overall ineffective job searching strategies have been identified] as the factors that contribute towards certain graduates being unable to find work, ([Kraak, 2010](#); [Mncayi, 2016](#); [Baldry, 2016](#)). Career guidance services in South Africa have a fervent emphasis on the individual for career development, such that it is the individual that is seen as the agent for change with little attention paid to the individual's context, ([Watts & Fretwell, 2004](#)). However, patronage is quite relevant in the labour market, such that [Mncayi \(2016\)](#) identifies that the social networks a graduate has significantly determines their employment status. [Kraak \(2010\)](#) reasons that black graduate unemployment is higher than white graduate unemployment is in part due to the lack of social networks for the former. The transition towards prospective employment is characterised by job search costs therefore lack of financial resources and information asymmetry about opportunities available in the job market increase the barriers to entry for those with insufficient resources, ([Posel et al, 2014](#); [Mlathseni, 2014](#)). Incurring theses job search costs may be an ineffective strategy for some graduates if the social networks a person has are the main driver towards employment.

Two things should be mentioned about the collapse of the structured pathways to employment in South Africa. First is that this collapse is at best tenuously relevant for degree holding graduates. The relevance is more towards artisans and technicians such that placements for practical work experience is a prerequisite to fulfilling the requirements to graduate. In 2006 the Vice Chancellor of the Durban University of Technology submitted to government the issue of tertiary learners from these institutions failing to graduate due to not being able to find work placements for practical experience, albeit that they have fulfilled all other requirements for qualification. 40% of tertiary learners from 10 of these institutions were having this problem, ([Kraak, 2010:93](#)). Second thing to mention about the collapse of the structured pathways to employment happened post-apartheid when the South African labour market was going through the Neo-Liberal reforms.

The efficiency school of thought.

The strand of literature that puts a greater weight on efficiency have a reoccurring narrative to explain the phenomenon of graduate unemployment and that is that it is fundamentally structural, ([Moleke, 2005](#); [Development Policy Research Unit, 2006](#); [Pauw et al 2008](#); [Van Der Berg & Van Broekhuizen, 2012](#)). The structural nature of graduate unemployment can be broken down to two main components and that is firstly a skills mismatch problem in the labour market and secondly a difference in the quality of education in higher education.

The skills mismatch narrative is that from the demand side firms have a dearth for a specific set of skills whereas, on the supply side there is a surfeit of graduates that do not have the set of skills the market is looking for. Tracer studies done by the Human Science Research Council ([Moleke, 2005](#)) differentiated graduates from different fields of study, into fields of study that have a professional objective (Engineering, Healthcare, Education and Law) and general fields of study (Agriculture, Commerce, Science and Humanities & the Arts). Professional fields of study were shown to find work more immediately after graduation, they also were more likely to find work that was permeant and in line with their area of expertise as opposed to graduates from the general fields. [Van Der Berg & Van Der Westhuizen \(2012\)](#) show that there is a graduate market premium in the labour market such that graduates experience far lower levels of unemployment compared to other education cohorts. However, the experience of graduates in the labour market is not homogenous this therefore brings the relevance of the choice of field of study for students in higher education. [Moleke \(2005\)](#) finds that the distribution for the choice of field of study for female graduates is biased towards general fields such as the Humanities & the Arts, to which can partially explain why female graduates have the highest unemployment rates.

Within the institutions of higher education there is perceived heterogeneity in the quality of education received in historically advantaged institutions (HAI) from that in historically disadvantaged institutions (HDI). Thus, a report from [Developmental Policy Research Unit \(2006\)](#) argues that the heterogenous nature in the quality of higher education adversely affected employer confidence in the productivity-signalling effect of higher education, causing a shift in demand towards a more experienced worker rather than a more qualified one. This has led to an increase in the age of the employed cohort in the South African labour market over time, ([Pauw et al, 2008](#); [CHEC, 2013](#)). African graduates are still vastly represented in the HDIs and the choice of field of study for the African graduates is slanted towards the general fields, ([Moleke, 2005](#); [Van Broekhuizen, 2016](#)). Therefore, from this perspective the higher rates of unemployment of African graduates can be explained. Youth graduate unemployment is exacerbated by the high expectations with respect to remuneration which individuals who are recently qualified and making their transition into employment, ([Developmental Policy Research Unit, 2006](#)). Therefore, lack of work experience and high expectations of young graduates upward biases the age of employed individuals with higher skills in the labour market.

A point of departure, on what or who a graduate is, is crucial. Because unfortunately, in this regard researchers speak over each other as there is no consistent definition of what a graduate is. A plethora of researchers broadly define an individual with a post matric qualification as a graduate, ([Bhorat, 2004](#); [Kraak, 2010](#); [Baldry, 2016](#)). Whilst few researchers specifically define an individual that holds at the very least a degree as a graduate, ([Van Der Berg & Van Broekhuizen, 2012](#); [Van Broekhuizen, 2016](#)). In this paper I take the position of the latter for two reasons. Firstly, results are skewed when degree holders are lumped in together with certificate holders and diplomates. Secondly, nuance is important because the characteristics and trends in the labour market between degree holders, diplomates and those that hold a post matric certificate is not homogenous. Thus, policy intervention cannot paint with the same brush when it is time to canvas these issues.

Thus, with the predictors that have been identified in the literature, the empirical question becomes what are the significant set of covariates that correlate to a graduate's employment status? This empirical question is necessary to answer not only for policy makers but for households and individuals as well. As the human capital enhancement path for households and individuals requires a lot of time and resources. Therefore, possessing the information that can aid the success of a future graduate can minimize the potential waste of time and resources for households and individuals. Such information is derived in part from the data responsible to capture the movements in the South African labour market.

Data.

The dataset that I will use is the 20 waves from the Quarterly Labour Force Survey (QLFS) from the first quarter of 2015 to the last quarter of 2019. To which the data is pooled for the waves in consideration such that more rows of observations are added to my variables of interest. The QLFS is a household-based sample survey conducted by Statistics South Africa (Stats SA). Apart from the institutional population such as individuals living in worker's hostels, the QLFS samples only covers the non-institutional population in South Africa. The working population of graduates (15 to 65 years of age) have been isolated from the population covered in the QLFS sample. Graduates are defined in the same manner that [Van Der Berg & Van Broekhuizen \(2012\)](#) defines a graduate. To which are individuals that have the highest obtained qualification in either a bachelor's degree, a bachelor's degree with a diploma, an honour's degree and individuals that have obtained their highest education qualification in a masters or a PhD. This is so that the term graduate is not confused with those that have a post-matric qualification that is not a bachelor's degree or postgraduate qualification. 26 965 observations of working-class graduates are observed from different fields of study in the dataset from 2015 to 2019 and are weighted such that the results are populationally representative.

The master sampling frame for the QLFS has changed from 2015 onwards to where the 2011 Census information is used as a sample frame for developing the general-purpose household survey frame. This is so that the distribution of the population is represented at the provincial level as well as within the provincial level. Changes to the classification of variables such as the type of geography a household is from have been made after the fourth quarter of 2014. From urban formal, informal, rural formal and tribal areas to now urban, traditional and farms. Changes that have been made to the classification of education cohorts and field of study in the dataset have been accounted for such that the classification is consistent from 2015 to 2019. A quarter of the sampled dwelling units are rotated out of the survey in each quarter and thus a sampled dwelling unit can only remain for a maximum of four consecutive quarters. This presents a challenge in forming a panel data format over an extended period of time, but it does offer an opportunity to have the data in an appended form such that more observations are observed in the rows of the variables so that the limitations of small sample surveys are minimized.

Certain fields of study for graduates only have a very limited number of observations as such the fields of study have been grouped in such a manner to represent the different faculties of study they belong to. Table A1 represents the classification of fields of study in different faculties, this classification is similar to those adopted by South African universities, i.e University of Pretoria, the Witwatersrand and the University of Cape Town. With the latter two universities not having a faculty for Agriculture. With graduates in the Education, Commerce, Arts & Humanities, Law, Healthcare, Engineering and the Built Environment, Science and Technology, Agriculture and the other or unspecified fields of study representing 20.3%,25.2%,15%,5.8,8.8%,9.1%,7.2%,1.8% and 6.7% respectively, of the graduate cohort. Table A1 below in the appendix shows how the fields of study are grouped into the 9 faculties.

The 2020-2021 waves of the QLFS data are not included because of imputations having been done to the succeeding waves of data after the fourth quarter of 2019. Such imputations for example include whether a person was unemployed or economically not active in the fourth quarter of 2019 and so forth. Thus, the individual would be captured as still unemployed or not economically active in 2020 if they were not reached telephonically and those that were previously captured as employed were trickier to impute, ([StatSA, 2020](#)). The households that were out of scope in the datasets due to them not being reached telephonically, were represented in such a manner that the dataset of the first quarter of 2020 was used as a benchmark. The weights in the successive quarters of 2020 were "bias adjusted", in terms of labour market variables (status, sector, industry and occupation) and demographic (age, race and gender) characteristics, at three geographic levels. StatsSA suspended the conduction of face-to-face interviews and moved to what is known as Computer Assisted Telephonic Interviews (CATI). This was because of the hard lockdowns that were imposed by the government following the breakout of the Covid19 pandemic. Due to the new CATI survey approach, there was attrition in the dataset from respondents that did not have phone numbers.

This introduces the issue of it being difficult to ascertain whether the change in the observations of during the pandemic are due to the supply shock that happened in the economy or is it due to how the data is being collected. The imputations made would bias the results as the successive quarters of the data would be influenced by observations made in the fourth quarter of 2019.

Methodology.

My unordered dependent variables are employment, underemployed and not employed. I include underemployment as a separate category of the dependent variable because of the assertion made by [Baldry \(2016\)](#) that underemployment for graduates is insufficiently investigated in the literature for graduate unemployment. Underemployed individuals are employed persons who were willing and available to work additional hours, whose total number of hours worked during the reference period were below 35 hours per week, ([StatSA, 2021](#)). Graduates that are not employed are defined as those that are either unemployed in the narrow definition plus those that are discouraged as well as those that are not economically active. For ease of convenience in my estimation, that is carried out iteratively with use of the maximum likelihood estimation. I represent my outcome of interest with Y_n where $n \in [0, 2]$ such that Y_n is my unordered dependent categorical variable. The outcome of interest is whether a graduate is (0) not employed, (1) employed or (2) underemployed. Therefore, Y_0 represents the graduates that are not employed, Y_1 represents the graduates that are employed and Y_2 represents the underemployed graduates. The baseline category I use for my estimation is the “not employed” category so that my estimated coefficients give me the log odds of being employed or underemployed relative to not being employed at all. Thus, I have

$$Y_{nj} = \pi + \sum_{i=1}^{19} \beta_i X_{ij} + t_j + \varepsilon$$

Where t_j is a time dummy variable to represent the different quarters taken at different years the data was captured, such that $j \in [1, 20]$ (j is an element of the positive integers from 1 to 20) to represent the 20 waves of the dataset. and my regressors are represented by the X_{ij} denoting the different covariates from Race (African, Coloured, Indian/Asian and White), age, the 9 different faculties as well as the gender of each graduate. I also control for marital status, the location of the graduate, and their socioeconomic status by including a dummy variable to show whether they live in a household where they must fetch water from outside. The β_i represents the coefficients of the regressors, to which measure the logs of employment or underemployment relative to not being employed. The π represents the intercept of the regression model so that it gives the log odds of being employed or underemployed relative to being underemployed when all the covariates are set to zero. The ε represents the error term of the regression model. Age is differentiated into 5 categories, such that each category is represented by a dummy variable. All my regressors are represented in a dummy variable form so that the value of one represents the X_{ij} taking on that independent variable and zero otherwise. The gender dummy variable equal to zero represents males in the dataset and the value of 1 represents females. I shall run a multinomial logit regression model with time dummies that distinguish quarterly variations in the set of waves in the data.

In conjunction with the multinomial regression model, 2 Chi-Squared tests are run. The first Chi Squared test is to test for homogeneity between the 9 faculties graduates belong to. I run the test to ascertain whether there is homogeneity between the faculties graduates belong to with respect to the distribution of their employment status. Simply put, I am trying to find whether there are statistically significant differences between graduates from their respective faculties in the labour market. For each pair of faculties whereby there is homogeneity between the 2 groups of graduates in different fields of study a Fischer's exactness test is ran because an expected value of less than 5 in any of the cells of the 2x2 chi squared test increases the probability of a type 1 error. The second test ran is the Chi-Squared Wald test, to ascertain whether the beta coefficient estimates found in the model are statistically significant from one another. Specifically, the beta coefficient estimates for graduates from the 9 different faculties are tested. This is done to ensure that, if the correlates reveal that the faculty of study is relevant then the differences between the faculties should be robust enough such that graduates from different faculties have statistically significant different prospects of employment in the labour market.

Descriptive Statistics

Table 1

Variable	Mean	Standard Dev	Min	Max	Observations
Dependent Variables					
Employment	0.821	0.378	0	1	26 965
Underemployment	0.006	0.077	0	1	26 965
Not Employed	0.173	0.378	0	1	26 965
Independent Variables					
Faculties					
Commerce	0.252	0.434	0	1	26 965
Education	0.203	0.403	0	1	26 965
Engineering	0.091	0.288	0	1	26 965
Science	0.072	0.258	0	1	26 965
Health Science	0.088	0.283	0	1	26 965
Humanities	0.150	0.357	0	1	26 965
Law	0.058	0.234	0	1	26 965
Agriculture	0.018	0.133	0	1	26 965
Other and Unspecified Fields	0.067	0.249	0	1	26 965
Race					
African	0.515	0.500	0	1	26 965

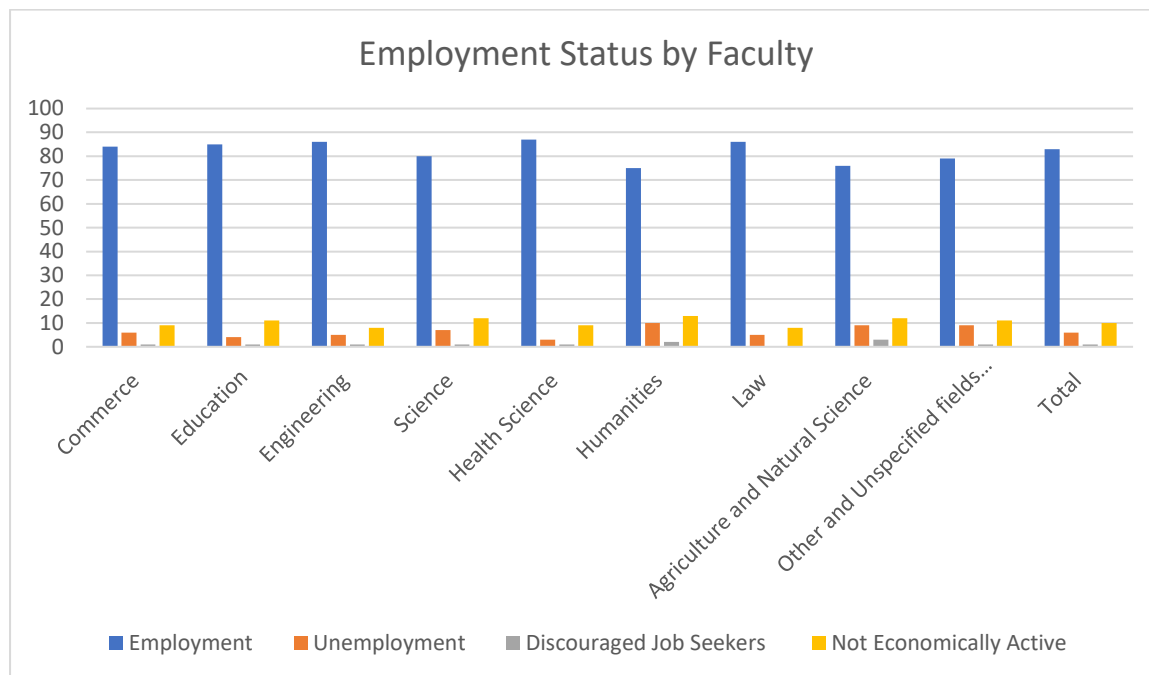
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Coloured	0.055	0.229	0	1	26 965
Indian/Asian	0.071	0.257	0	1	26 965
White	0.359	0.480	0	1	26 965
Marital Status				1	
Married	0.594	0.491	0	1	26 965
Never Married	0.294	0.456	0	1	26 965
Living Together	0.052	0.223	0	1	26 965
Widow(er)	0.021	0.145	0	1	26 965
Divorce/Separated	0.038	0.191	0	1	26 965
Metro/Non-Metro					
WCnonmetro	0.039	0.193	0	1	26 965
Cape Town	0.133	0.339	0	1	26 965
ECnonmetro	0.032	0.175	0	1	26 965
Buffalo City	0.017	0.131	0	1	26 965
Nelson Mandela Bay	0.019	0.137	0	1	26 965
NCnonmetro	0.010	0.100	0	1	26 965
FSnonmetro	0.018	0.133	0	1	26 965
Mangaung	0.156	0.124	0	1	26 965
KZNnonmetro	0.061	0.240	0	1	26 965
Thekwini	0.067	0.250	0	1	26 965
NWnonmetro	0.037	0.190	0	1	26 965
GPnonmetro	0.023	0.151	0	1	26 965
Erkhureleni	0.079	0.270	0	1	26 965
Johannesburg	0.186	0.389	0	1	26 965
Tswane	0.163	0.370	0	1	26 965
MPnonmetro	0.038	0.192	0	1	26 965
LPnonmetro	0.061	0.239	0	1	26 965
Time Dummy Variables					
2015Q1	0.023	0.151	0	1	26 965
2015Q2	0.023	0.151	0	1	26 965
2015Q3	0.024	0.152	0	1	26 965
2015Q4	0.024	0.153	0	1	26 965
2016Q1	0.024	0.152	0	1	26 965
2016Q2	0.023	0.150	0	1	26 965
2016Q3	0.048	0.214	0	1	26 965
2016Q4	0.054	0.226	0	1	26 965
2017Q1	0.059	0.236	0	1	26 965
2017Q2	0.061	0.240	0	1	26 965
2017Q3	0.063	0.242	0	1	26 965
2017Q4	0.060	0.237	0	1	26 965
2018Q1	0.062	0.241	0	1	26 965
2018Q2	0.060	0.238	0	1	26 965
2018Q3	0.064	0.245	0	1	26 965
2018Q4	0.062	0.242	0	1	26 965
2019Q1	0.065	0.247	0	1	26 965
2019Q2	0.066	0.248	0	1	26 965
2019Q3	0.065	0.246	0	1	26 965
2019Q4	0.069	0.253	0	1	26 965

**Other Socio
Demographic
Factors**

Fetchwater	0.029	0.166	0	1	26 965
Female	0.518	0.500	0	1	26 965
Age Categories					
15-25 Years	0.083	0.276	0	1	26 965
26-35 Years	0.282	0.450	0	1	26 965
36-45 Years	0.280	0.449	0	1	26 965
46-55 Years	0.223	0.416	0	1	26 965
56-65 Years	0.132	0.338	0	1	26 965

Figure 1



Own estimates are given using StatsSA 2015Q1- 2019Q4. Estimates are weighted and are calculated only for graduates in the population of working-age (15 - 65-year-olds).

Overall, the employment rate of working-class graduates is at 82.7%, of which only 0.72% are underemployed. This small proportion of underemployed graduates may arise from the definition StatSA uses for employment which is a minimum of one hour's work in the survey reference week, thus may disguise gross underemployment ([Bernstein, 2011](#)) and temporary underemployment ([Moleke, 2005](#)). Broadly defined unemployment rate is given by the not employed strata of graduates therefore graduates that are discouraged and those that are narrowly unemployed plus the not economically active are defined as not employed, this represents 17.3% of graduates.

Amongst the faculties, Commerce has the greatest number of graduates with Agriculture having the least amount 25.2% and 1.8%, respectively. African graduates are the most represented with them constituting most of the graduate population (51.5%). Female graduates also constitute a slight majority of graduates with 51.8% of the working-class graduate populations being female. With regards to age, the distribution of graduates shows that most are in the mid-range of the age categories (the 26–35-year-olds and the 36–45-year-olds). Most graduates reside in metropolitan areas (68%), to which a majority come from Johannesburg, Tswane and the City of Cape Town. Contra to the PALMs (Post-Apartheid Labour Market Series) the QLFS data is limited in socio economic variables that apply to both the unemployed and employed graduates. For instance, a grant recipient in the QLFS dataset is unemployed and a marker of wealth such as a contribution to a pension fund only applies to the employed cohort of graduates. Thus, a marker that can control for an individual's socio-economic status as well apply to both employed and unemployed graduates is the fetchwater variable. This binary variable indicates whether a graduate lives in a household whereby they must fetch water from outside the house or not. This applies to both graduates that are unemployed or are employed and therefore the variable is used as a control for socio-economic status. Most graduates are married and constitute 59.4% of the total working-class graduate population.

[Van Der Berg & Van Broekhuizen \(2012\)](#) found that South African trends in unemployment amongst graduates show little cause for concern, especially when compared internationally. The authors show that the inflated issue of graduate unemployment in the literature can be laid at the feet of the use of outdated and unrepresentative data and an incorrect trend analysis that uses only two data points (1995 and 2005). [Nunez & Livanos \(2010\)](#) find graduate unemployment in Europe to hover around 4.7%, with higher rates being in south European countries such as Spain (7%) and Greece (7.7%). Albeit that [Kraak \(2010\)](#) uses the broader definition of who a graduate is, the researcher finds that in a developing country such as Brazil, the graduate unemployment is at 16.4%. In many countries the massification of higher education has been found to be one of the drivers behind graduate unemployment, ([Mok and Neubauer, 2016](#)). However, [Graham et al \(2019: 362\)](#) finds that although there is increasing financial investment in South African higher education, the national participation rate remains low. Thus, the relatively low graduate unemployment rate can be in part be attributed to low participation rates in higher education.

Figure 1 is a chart that reveals the employment status of graduates in their respective faculties. Overall graduates only have a 6.13% unemployment rate thus this education cohort fares far better than the overall labour force which has an unemployment rate of 28.8% in 2018. The low graduate unemployment rate in South Africa masks the fact that graduates in South Africa are not the same ([Graham et al, 2019: 361](#)). For instance, graduates from the faculty of humanities have the highest unemployment rate (9.93%) and the lowest employment rate (75.46%) followed by graduates from the faculty of Agriculture with the greatest proportion of discouraged job seekers (2.73%). Differentiating between the job specific faculties and the general ones as [Moleke \(2005\)](#) would, it is evident that graduates from the job specific faculties fare better in the labour market than do those from the general faculties. The faculties of law, health science, engineering and education have the highest employment rates and the lowest unemployment rates. Amongst the general faculties, commerce fares better in the labour market with an employment rate of 84.09%, these results are analogous to those that were found by the HSRC study.

Results.

Table 2.

Base Category: The Not Employed Cohort of graduates.

Variables	Employment	Underemployment
Commerce	0.342*** (0.321-0.363)	19.365 (-1791.064- 1829.793)
Education	0.641*** (0.620-0.663)	19.184 (-1791.244-1829.612)
Engineering	0.351*** (0.330-0.373)	19.290 (-1791.138-1829.718)
Science	0.092*** (0.071-0.114)	19.877 (-1791.138- 1830.305)
Health Science	0.722*** (0.701-0.744)	19.633 (-1790.795-1830.062)
Humanities	-0.062*** (-0.083- -0.406)	19.371 (-1791.057- 1829.799)
Law	0.580*** (0.558-0.601)	19.267 (-1791.160- 1829.696)
Agriculture and Natural Science	-0.116*** (-0.138- -0.093)	18.129 (-1792.300-1828.577)
Other and Unspecified Fields of Study	0.093*** (0.071-0.114)	18.822 (-1791.606- 1829.25)
African	-0.221*** (-0.224- -0.219)	0.110*** (0.099-0.120)
Female	-0.495*** (-0.498- -0.493)	0.180*** (0.169-0.191)
Married	0.444*** (0.442-0.447)	0.354*** (0.343-0.366)
Non-Metropolitan area	-0.143*** (-0.146- -0.141)	-0.029*** (-0.404- -0.018)
Fetch water	-0.293 *** (-0.299- -0.288)	-0.590*** (-0.624- -0.556)
2015Q1	0.314*** (0.305-0.322)	0.468*** (0.437-0.500)
2015Q2	0.389*** (0.381-0.398)	0.067*** (0.029-0.104)
2015Q3	0.553*** (0.544-0.561)	0.720*** (0.689-0.751)
2015Q4	0.208*** (0.200-0.216)	-0.053** (0.089- -0.176)
2016Q1	0.287*** (0.279-0.295)	0.821*** (0.793-0.848)
2016Q2	0.286 *** (0.279-0.295)	-0.062** (-0.10- -0.025)

Graduate Unemployment: Does Field of Study matter?

2016Q3	0.122*** (0.116-0.128)	-0.187*** (-0.216- -0.159)
2016Q4	0.128*** (0.122-0.134)	0.348*** (0.324-0.372)
2017Q1	0.210*** (0.204-0.216)	-0.259*** (-0.287- -0.232)
2017Q2	0.088*** (0.083-0.094)	-0.125*** (-0.150- -0.909)
2017Q3	0.245*** (0.240-0.251)	-0.217*** (-0.244- -0.189)
2017Q4	0.079*** (0.073-0.085)	0.137*** (0.113-0.161)
2018Q1	0.104*** (0.099-0.110)	-0.540*** (-0.569 - -0.512)
2018Q2	0.179*** (0.173-0.185)	0.096*** (0.072- 0.121)
2018Q3	0.248*** (0.243-0.254)	-0.130*** (-0.156- -0.103)
2018Q4	0.163*** (0.157-0.169)	-0.190*** (-0.217—0.163)
2019Q1	0.072*** (0.066-0.078)	-0.886*** (-0.918- -0.854)
2019Q2	0.184*** (0.129-0.239)	-1.019*** (-1.052- -0.986)
2019Q3	0.109*** (0.103-0.115)	-0.796*** (-0.827- -0.765)
2019Q4	Omitted	
Age Category: 15-25 years	-0.057*** (-0.061- -0.053)	0.338*** (0.312-0.363)
Age Category: 26-35 years	1.194*** (1.191-1.198)	1.411*** (1.391-1.431)
Age Category: 36-45 years	1.446*** (1.443-1.45)	1.473*** (1.453-1.493)
Age Category: 46-55 years	1.587*** (1.583-1.591)	1.742*** (1.722-1.763)
Age Category: 56-65 years	Omitted	
Constant	0.322*** (0.300-0.344)	-24.029 (-1834.457- -1786.399)

Confidence Intervals in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Own estimates are given using StatsSA 2015Q1- 2019Q4. Estimates are weighted and are calculated only for graduates in the population of working-age (15 - 65-year-olds).

Table 2 gives the results of the multinomial logistic regression model. What is interesting is that the job specific faculties have the greatest odds of securing employment relative to other faculties. For instance, graduates from the faculty of health science and education have the highest odds of being employed as opposed to not being employed amongst other graduates from different faculties, with odds of 2.06 and 1.90 ($\exp(0.722) = 2.06$ and $\exp(0.641) = 1.90$), respectively. A COSATU study that laid a growth path towards full employment done by [Malikane et al \(2010\)](#) identified a dearth of skills in the healthcare and education sectors. The results above corroborate the identification made by the COSATU study such that notwithstanding a graduate's age, the greatest odds for a graduate to be employed is when they are from the faculties of health science or education. Being a graduate from

the faculty of commerce gives the greatest odds of being employed as opposed to not being employed compared to the other faculties ($\exp(0.342) = 1.41$ odds of being employed as opposed to not being employed compared to other faculties). Unfortunately graduates that come from the Humanities and Agricultural faculties have the least odds of being employed as opposed to not being employed relative to the other faculties, ($\exp(-0.062) = 0.940$ and ($\exp(-0.116) = 0.890$, respectively. Put differently, graduates from both faculties have greater odds of not being employed vs being employed, 1.064 ($1/\exp(-0.062)$) and 1.122 ($1/\exp(-0.116)$) for the Humanities and Agriculture faculties, respectively. Graduates from these 2 faculties are the only ones that have a greater probability of not been successful in the labour market from an employment perspective when compared with the other faculties. Underemployment has no discernible relationship from a statistical standpoint with the faculty a graduate belongs to, this can be attributed to the faculties being a relatively homogenous group when it comes to underemployment. Or this could be as a consequence of the small number of observations obtained in the sample due to how the definitions of employment are formulated in the questionnaire. With such a small number of observations for underemployed graduates (172 and 164 124, when weighted) the variability in the underemployed variables is observed through the size of its standard errors. Thus, even if some of the coefficients may be large the confidence intervals are quite wide making the coefficients insignificant. Meaning that statistical inference is limited for underemployed graduates.

The socio demographic factors indicate characteristics that have already been identified in the literature. Such that female graduates have significantly greater odds of not being employed as opposed to being employed compared to their male counterparts ($(1/\exp(-0.495) = 1.641$ odds of not being employed as opposed to being employed compared to male graduates). This is the strongest predictor from the set of covariates identified in this paper, that gives the highest likelihood of a graduate being in the not employed cohort in the labour market. The odds of not being employed vs being employed for African graduates are $(1/\exp(-0.221) = 1.248$ times those from other ethnic groups. African as well as female graduates both have greater odds of being underemployed as opposed to not being employed compared to their respective ethnic and male counterparts, ($\exp(0.110) = 1.116$ and ($\exp(0.180) = 1.197$ respectively. Graduates that reside in household dwellings whereby water is fetched from outside the house have greater odds of being not employed vs both being employed or underemployed ($(1/\exp(-0.590) = 1.341$ and ($1/\exp(-0.293) = 1.804$ when compared to households that have water and sanitation infrastructure within the house. Married graduates are ($\exp(0.444) = 1.559$ times more likely to be employed vs not being employed when compared with graduates that have a different marital status. They are also ($\exp(0.354) = 1.425$ times more likely to be underemployed vs not being employed when compared to graduates that are cohabiting, divorced, separated, widowed, or have never married.

Younger graduates in the 15–25-year age range have lower prospects of success in the labour market as they are $(1/\exp(-0.057) = 1.059$ times more likely to find themselves in the not employed cohort of graduates vs the employed, when compared with graduates that are older. The older graduates are more likely to find success in the labour market from an employment standpoint. Graduates in every age category (except for the omitted graduates in the 56-65 age range) are more likely to be underemployed vs not being employed when compared with graduates in a different age category. A graduate residing in a non-metropolitan area is significantly correlated to not being employed vs

employment or underemployment. Such that a graduate that resides in a nonmetropolitan area is $(1/\exp(-0.143)) = 1.154$ $((1/\exp(-0.029)) = 1.030)$ times more likely to not be employed vs being (under)employed when compared graduates that reside in metropolitan areas. The time dummy variables indicate that during the period 2015 and 2019 graduates were more likely to be successful in the labour market from an employment standpoint.

Variables such as a graduate having a medical aid or savings, that can serve as markers for wealth, such that I can control for more socio-economic factors present problems to the optimisation of the maximum likelihood function of the model. For example, only 4 727 observations are realised for graduates that have savings or not and only 18 970 are observed for graduates that have medical aid or not. The inclusion of such variables to the model inflates the standard errors, ensures that some estimates are completely determined, and that the maximum likelihood function is not concave. Such variables are therefore excluded from the model. Due to multicollinearity the last quarter of 2019 and the last age category (56-65 years) for graduates are omitted in the estimation. To further avoid multicollinearity graduates within the same category that share similar characteristics with regards to their prospects of success in the labour market are lumped together to form the base regressor. For example, with the race category, non-African graduates are all more likely to be employed. Thus, since their employment prospects are quite similar, they can be lumped together to form the base regressor for the African group of graduates, when we are looking at the race category. Similarly, this also applies to graduates that reside in metropolitan vs non-metropolitan areas and graduates that are Married vs those that have a different marital status.

Robustness Tests.

For the 9 different faculties above a chi squared test for homogeneity was run to see whether a cohort of graduates in one faculty is different from another with respect to the distribution of employment status. For instance, graduates from Commerce and Education faculties do not share any significant relationship regarding the distribution of their employment status. Specifically ($X^2 = 357.801$, 1 d.f, $p=0.000$) the chi squared estimate for one degree of freedom for graduates that are not employed in the commerce and education faculties is 357.801 with a p value of 0. Simply put, this infers that the 2 cohorts of graduates are significantly different regarding their distribution in their not employed status. Permutations on every pair of the 9 different faculties show that there are no 2 faculties that are homogenous regarding their distribution for employed and not employed status except for graduates that come from the faculties of Law and Agriculture. For instance, with respect to being not employed the graduates from the two faculties have for one degree of freedom an estimated $X^2=5.210$ and a p-value of 0.022. Thus, the 2 groups are only statistically different at the 5% level. The 2x2 chi squared tests however do show that the distribution for underemployed graduates in different faculties is the same for 27 pairs of faculties (i.e Commerce and Engineering, Commerce and Healthscience, Education and Science etc.). Specifically for the Commerce and HealthScience faculties the ($X^2=5.346$, 1 d.f, $p=0.021$) have for 1 degree of freedom a chi squared estimate of 5.346 and a p value of 0.021, which implies that at the 1% level of significance the 2 groups are homogenous. For each pair of faculties whereby there is homogeneity between the 2 groups of graduates in different fields of study a Fischer's exactness test was run because an expected value of less than 5 in any of

the cells of the 2x2 chi squared test increases the probability of a type 1 error. The Fischer's exactness test shows that all 27 pairs of faculties where graduates are underemployed there is homogeneity in each pair regarding their distribution. For instance, Commerce and Health Science have a Fischer's exactness test statistic that gives a p value of 0.025 and a p value of 0.012 for the 1-sided Fischer's exactness test. A table of results from the tests done above shall be included below in the appendix.

Finally, a Chi Squared Wald test on the coefficients for the faculty covariates indicates that none of them are statistically the same at the 1% level of significance except for 3 pairs of parameters. For instance, the parameters for graduates from the Science faculty as well as graduates that do not fall into any faculty (the other and unspecified fields) have parameters that are statistically the same with respect to employed graduates. With respect to underemployed graduates 2 pairs of parameters are statistically equal, the first pair being the Commerce and Humanities faculty and the second pair being the Engineering and Law faculties. The commerce and humanities faculty coefficients have for 1 degree of freedom a chi-squared Wald estimate of 0.79 and a p-value of 0.375 ($X^2=0.79$, 1 d.f, $p=0.375$) and for the engineering and law faculty coefficients have for 1 degree of freedom a chi-squared Wald estimate of 2.08 and a p-value 0.149 ($X^2=2.08$, 1 d.f, $p=0.149$). For the rest of the variables of interest the pair of parameters are not statistically the same. For instance, education and commerce faculty coefficients have for 1 degree of freedom a chi-squared estimate of 35 412.08 and p-value of 0 ($X^2=35\ 412.08$, 1 d.f, $p=0.000$) for them being equal. This is with respect to the employment variable and for the underemployed variable a chi squared estimate of 130.42 for 1 degree of freedom as well as a p-value of 0 ($X^2=130.42$, 1 d.f, $p=0.000$) is found for the hypothesis that coefficients of the commerce and education variable are statistically the same. A table is given below in the appendix to show the results of the Chi-Squared Wald test for each of the coefficients of the variables that indicate the faculty a graduate belongs to.

Discussion.

Graduate unemployment is a result of 1 of 3 things frictional, structural or a combination of the two. Graduate unemployment is structural in the sense that there is a skills mismatch in the labour market, from the demand side firms have a dearth of a specific set of skills whereas on the supply side there is a surplus of graduates that do not have the set of skills the market is looking for. Graduate unemployment is frictional in the sense that independent of the skills a graduate has, they are not being absorbed in the labour market. This can be a result of a contraction in aggregate demand in the economy from supply shocks such as the Covid-19 pandemic or this can be from mobility factors in the labour market, i.e a graduate that is in transition from being a student to being an employee. In keeping with the line of argument in this paper I maintain that graduate unemployment is structural in its nature. Such that firstly from an equity standpoint the collapse of structured pathways to employment is a contributor to structural graduate unemployment. Secondly, from an efficiency standpoint the structural nature of graduate unemployment is inherently a skill mismatch issue, put differently the field of study matters.

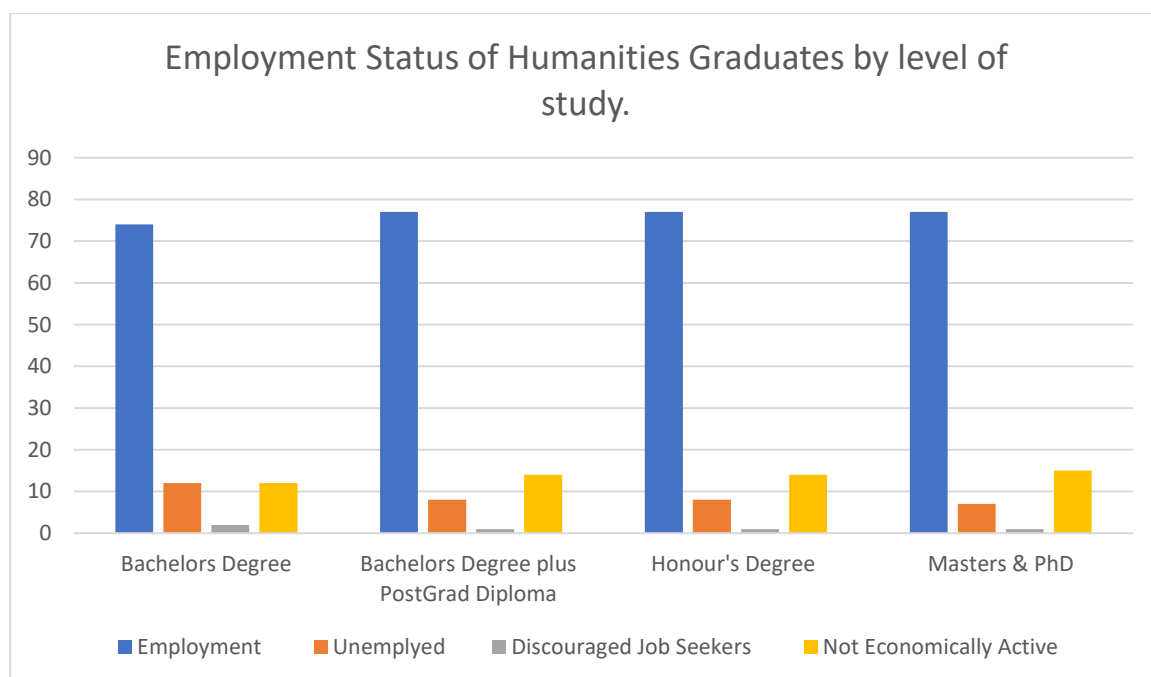
The correlates to employment amongst graduates in South Africa reveal that not only are socio demographic factors significantly relevant but so is the choice of field of study made by a graduate. The faculties of humanities and agriculture produce graduates that have the least chances of success in the labour market from an employment standpoint. [Koen \(2003:17\)](#) states that labour demand for graduates coming from the humanities and social science fields is less acute, whilst the enrolment rate in these fields still remain high. Thus, if the supply of graduates which are found to not have the critical skills needed in the labour market is not curtailed and coordinated to higher skills that are in demand then the labour market paradox will continue. Given the supply side dynamics of skilled labourers in the labour market have been identified a brief discussion below on the demand side is warranted.

A 2020-2021 critical skills survey by Xpatweb that serves as a benchmark for businesses and policymakers identified the top 10 most in demand skills by industries in the country. The South African skills crisis has not been getting better, as a 2008 annual report by the Jobs Initiative in Priority Skills Acquisition (JIPSA) has a 50% overlap in its top 10 list of skills that are in most demand with the Xpatweb critical skills survey. There is also a significant complementary overlap between the Occupations in Highest Demand list published by the Department of Higher Education and Training (DHET) with Xpatweb critical skills survey. 24 of the 32 occupations that were listed in the research were included in the OIHD preliminary technical report. The final critical skills list serves as a benchmark for the Department of Home Affairs to determine the list of skills deemed in short supply and thus regulates who may apply for a Critical Skills Visa under the Immigration Act. Engineering, ICT Specialists, Foreign Language speakers, Media & Marketing Specialists, Artisans, CSuite & Senior Financial executives, Healthcare Specialists, Science and Accounting Professionals were identified as the top 10 in demand skills in South Africa, in that order. The regression outputs given below in the appendix reveal that all but 2 in the list of critical skills that are relevant to graduates have positive and significant prospects of finding employment as opposed to being not employed. Graduates from the fields of Life & Physical Science as well as from the field of Language, Literature & Linguistics are significantly more likely not be employed.

This may seem as a kink in the armour for the structural graduate unemployment argument however further investigation reveals that not all the skills from these fields of study are in high demand in the marketplace. For instance, the labour market has a specific appetite for graduates in these 2 fields of study that are not all encompassing in the respective fields. Food and Beverage scientist, Geochemist, Botanical Scientist, Bio-economist, Chemical Scientist; Environmental Engineer, Environmental Manager, Engineering Geologist, Geophysicist, Biological Scientist, Environmental Scientist and Engineering Geologist are listed as the most in demand occupations from the field of life and physical science. With the proliferation of international business trade firms are now having an increased demand for individuals with foreign language abilities. This is relevant for graduates with an ability to interpret languages such as French, German, Mandarin etc. Thus, graduates with the relevant set of skills within these fields of study are more acute in the labour market compared to graduates within the same fields of study. This may show that there are intra field of study differences for graduates in their prospects for employment.

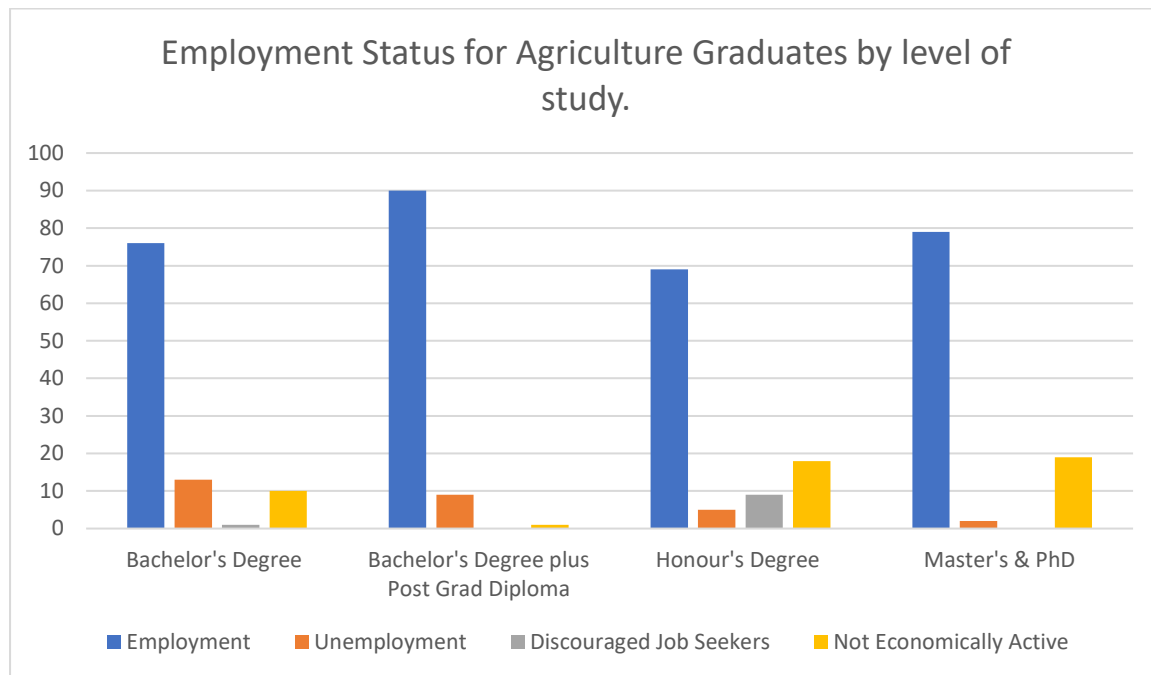
The collapse of the structural pathways to employment is manifest in the sense that Artisans are amongst top 10 skills that employers are looking for. Yet as [Kraak \(2010\)](#) identified students from universities of technology and FET colleges are unable to qualify due to unavailable work placements. Hence the supply of critical skills in South Africa is structurally limited which can only further widen the skills deficit the country is experiencing. Fortunately, as of the writing of this paper Public-Private Partnerships are in place to combat youth unemployment and to harness skills development. The [Presidential Youth Unemployment Stimulus \(PYEI\)](#) has been set up. With the guidance of the DHET (Department of Higher Education and Training), 26 South African public universities will be managing the placements of 3000 graduates. Such a structured pathway to employment develops the necessary skills and work experience young labourers need to be more attractive in the labour from an employment standpoint.

Figure 2.



Own estimates are given using StatsSA 2015Q1- 2019Q4. Estimates are weighted and are calculated only for graduates in the population of working-age (15 - 65-year-olds).

Figure 3.



Own estimates are given using StatsSA 2015Q1- 2019Q4. Estimates are weighted and are calculated only for graduates in the population of working-age (15 - 65-year-olds).

The charts above show the employment status by the level of study for the faculties of humanities as well agriculture. A graduate having a postgraduate degree from either faculty reduces the chances of being unemployed or a discouraged job seeker except in the case for graduates in agriculture that have an honour's degree. Graduates with an honour's degree from the faculty of agriculture have the highest proportion of discouraged job seekers at 8.73% and lowest employment rate, 68.46%. This could be attributed to an inadequate number of observations for graduates from the faculty of agriculture as they only make less than 2% of the total graduate population. However, the trend for both faculties is that obtaining higher levels of study reduces the chances of unemployment. The tracer study done by the HSRC reveals that graduates that opt to study further to a different faculty after obtaining their first degree mainly come from the Humanities & the Arts. Such that 41.9% of graduates from the Humanities & Arts faculty choose to further their studies in a different faculty and the reasons mostly are given are to improve career prospects, to specialise such that to have more relevance as a professional etc. Furthering one's studies presents an opportunity to individuals that may need to pivot so that to gain skills that relevant in the labour market, this however may indicate a lack of preparedness when entering higher education. As such this represents a misallocation of resources dedicated to individuals for at least 3 years to an educational qualification they may have little use for in the career life, (Moleke, 2005: 39). Therefore, if higher level educational attainment can serve as a signal to an individual's productivity, then incentive structures should be taken into consideration to only allow for the best students within faculties that have lower chances of

employment and the rest of the students be incentivised and coordinated towards faculties with better prospects of employment.

Lastly, it suffices to say that graduate unemployment is only in part frictional. The correlates reveal that in the time period between 2015-2019 a graduate had a positive and significant likelihood to find employment. However, this is not the case for all graduates thus the data points to graduate unemployment being more structural as opposed to being frictional.

Policy Suggestions.

HDIs have a disproportionate number of students graduating from fields with lower employment prospects, ([Moleke: 2005:5](#)). A greater proportion of students from poorer households are found at HDIs. From the above two statements an inference can, be made about the distribution of NSFAS students by the field of study, which may indicate that amongst recipients of financial aid, many choose fields that have lower employment prospects. Without coordination from the top or at the very least better-informed career guided choices made individually, then the cycle of poverty cannot be broken with higher education provision. Two main policy suggestions that have been given in the literature are reiterated below. First is that enrolment should also be governed to some extent as too many students are graduating in areas with low employment probabilities. This can be done implicitly through subsidisation and improved career guidance at schools. Improvements in school education, especially in the areas of maths and science, will also enable a large proportion of students to gain access to scientific and technical fields of study, ([DPRU, 2006:28](#)). Similarly, while keeping with the means test that has been the basis of rolling out of funds to students, the means test can be done in such a way to prioritize the fields of study identified as critical skills.

Secondly, South Africa competes globally for critical skills, countries such as Australia, The United Kingdom and the United States mirror the skills deficit faced by South Africa ([Xptaweb, 2021:16](#)). As such for the development of local skills, skilled immigration must be incentivised and streamlined at the managerial and C-suite executive level. With a skills transfer structure guiding the skills immigration process, two advantages may be realised. First domestic skills are developed as knowledge and technical know-how is imparted from foreign skilled labourers to domestic labourers. Second it is reasoned that firms recruit graduates below what they could otherwise if C-Suite executives and managers were adequately available to train the fresh recruits. Thus, streamlining the process of bringing in foreign skilled labourers may increase the appetite of firms to hire more newly formed graduates. This is a short-term strategy that can help develop critical skills the country needs as well as reduce graduate unemployment.

Conclusion.

Limitations of this paper primarily include the limited number of socio demographic factors to be controlled in the statistical analysis. These include variables such as income levels for households, food security, higher education institutions attended by graduates etc. Educational variables outside of the field of study such as marks obtained by graduates in university are further limitations of the dataset.

However, with the available resources (literature, data and the results) it is evident that graduate unemployment is fundamentally structural. In essence equity should be balanced with efficiency so that the labour market paradox can be further remedied. This brings opportunity for further research into detailing strategies on how policy can coordinate to prioritize critical skills in its provision of education to combat historical injustices.

The information given above is also relevant to households, as a great portion of households devote a significant amount of resources to higher educational attainment. For poorer households more especially, the objective is to escape poverty by upskilling themselves so that to have greater success in the labour market. Thus, factoring in the field of study improves the odds of success in the labour market and is vital information to the household's strategy.

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Appendix

Table A1: Classification of different fields of study into faculties

Faculty	Commerce	Education	Engineering and the Built Environment	Science	Healthcare	Arts & Humanities	Law	Natural Science and agriculture	Other and or Unspecified Fields of study
	Fields of Study								
	Busines, Commerce studies	Education and training	Engineering and technology	Computer Science	Healthcare or health sciences	Languages	Law	Agriculture	Other
	Industrial arts and trade	Education and development	Electrical infrastructure and construction	Mathematical Science	Physical education	Libraries or museum		Primary Agriculture	Other and Unspecified
	Finance, economics		Civil Engineering	Information Technology		Philosophy			
	Management		Mechatronics	Life science or physical science		Psychology			
	Marketing		Architecture			Public admin			
			Engineering			Social Science			

Graduate Unemployment: Does Field of Study matter?

	Hospitality
	Tourism
	Safety in society
	Military
	Science
	Office admin
	Home economics
	Arts, Visuals and performance
	Communicatio n

Table A2: Chi-Squared Test for Homogeneity between graduates that are not employed

The Not Employed Group of Graduates		
Variables	Chi-Squared estimate	P-Value
Commerce and Education	357.801	0.000
Commerce and Engineering	92.476	0.000
Commerce and Science	102.828	0.000
Commerce and Health Science	96.018	0.000
Commerce and Humanities & Art	360.067	0.000
Commerce and Law	61.3764	0.000
Commerce and Agriculture	31.611	0.000
Commerce and Other & Unspecified fields	115.320	0.000
Education and Engineering	88.849	0.000
Education and Science	98.796	0.000
Education and Health Science	92.252	0.000
Education and Humanities & Arts	345.946	0.000
Education and Law	58.969	0.000
Education and Agriculture	30.371	0.000
Education and Other and Unspecified fields	110.797	0.000
Engineering and Science	25.534	
Engineering and Health Science	23.843	0.000
Engineering and Humanities & Arts	89.412	0.000
Engineering and Law	15.241	
Engineering and Agriculture	7.850	0.005
Engineering and Other and Unspecified fields	28.636	0.000

Graduate Unemployment: Does Field of Study matter?

Science and Health Science	26.512	0.000
Science and Humanities & Arts	99.421	0.000
Science and Law	16.947	0.000
Science and Agriculture	8.728	0.003
Science and Other & Unspecified Fields	31.842	0.000
Health Science and Humanities & Arts	92.836	0.000
Health Science and Law	15.825	0.000
Health Science and Agriculture	8.150	0.004
Health Science and Other & Unspecified	29.733	0.000
Humanities & Arts and Law	59.343	0.000
Humanities & Arts and Agriculture	30.563	0.000
Humanities & Arts and Other & Unspecified	111.499	0.000
Law and Agriculture	5.210	0.000
Law and Other & Unspecified Fields	19.006	0.000
Agriculture and Other & Unspecified Fields	9.789	0.002

Null Hypothesis (H_0): The distribution of 2 sub-groups of graduates from 2 different faculties of study are homogenous with respect to the dependent variable. Alternative hypothesis (H_A) is that the distribution of 2 sub-groups of graduates from 2 different faculties of study are heterogenous. Own estimates are given using StatsSA 2015Q1- 2019Q4

Table A3: Chi-Squared Test for Homogeneity between graduates that are employed

The Employed Group of Graduates		
Variables	Chi-Squared estimate	P-Value
Commerce and Education	2200	0.000
Commerce and Engineering	668.844	0.000
Commerce and Science	464.971	0.000
Commerce and Health Science	706.017	0.000
Commerce and Humanities & Art	1100	0.000
Commerce and Law	421.614	0.000
Commerce and Agriculture	123.656	0.000
Commerce and Other & Unspecified fields	450.343	0.000
Education and Engineering	679.553	0.000
Education and Science	472.416	0.000
Education and Health Science	717.322	0.000
Education and Humanities & Arts	1100.000	0.000
Education and Law	428.365	0.000
Education and Agriculture	125.636	0.000
Education and Other and Unspecified fields	457.554	0.000
Engineering and Science	143.016	0.000

Graduate Unemployment: Does Field of Study matter?

Engineering and Health Science	217.157	0.000
Engineering and Humanities & Arts	341.991	0.000
Engineering and Law	129.680	0.000
Engineering and Agriculture	38.034	0.000
Engineering and Other and Unspecified fields	138.517	0.000
Science and Health Science	150.965	0.000
Science and Humanities & Arts	237.747	0.000
Science and Law	90.152	0.000
Science and Agriculture	26.441	0.000
Science and Other & Unspecified Fields	96.295	0.000
Health Science and Humanities & Arts	547.176	0.000
Health Science and Law	136.887	0.000
Health Science and Agriculture	40.148	0.000
Health Science and Other & Unspecified	146.215	0.000
Humanities & Arts and Law	215.578	0.000
Humanities & Arts and Agriculture	63.228	0.000
Humanities & Arts and Other & Unspecified	230.268	0.000
Law and Agriculture	23.975	0.000
Law and Other & Unspecified Fields	87.316	0.000
Agriculture and Other & Unspecified Fields	25.609	0.000

Null Hypothesis (H_0): The distribution of 2 sub-groups of graduates from 2 different faculties of study are homogenous with respect to the dependent variable. Alternative hypothesis (H_A) is that the distribution of 2 sub-groups of graduates from 2 different faculties of study are heterogenous. Own estimates are given using StatsSA 2015Q1- 2019Q4

Table A4: Chi-Squared Test for Homogeneity between graduates that are underemployed

The Underemployed Group of Graduates		
Variables	Chi-Squared estimate	P-Value
Commerce and Education	11.012	0.001
Commerce and Engineering	2.878	0.090
Commerce and Science	7.249	0.007
Commerce and Health Science	5.346	0.021
Commerce and Humanities & Art	15.284	0.000
Commerce and Law	3.217	0.073
Commerce and Agriculture	0.305	0.581
Commerce and Other & Unspecified fields	1.884	0.170
Education and Engineering	2.006	0.157

Graduate Unemployment: Does Field of Study matter?

Education and Science	5.054	0.025
Education and Health Science	3.727	0.054
Education and Humanities & Arts	10.656	0.001
Education and Law	2.243	0.134
Education and Agriculture	0.213	0.645
Education and Other and Unspecified fields	1.313	0.252
Engineering and Science	1.321	0.250
Engineering and Health Science	0.974	0.324
Engineering and Humanities & Arts	2.785	0.095
Engineering and Law	0.586	0.444
Engineering and Agriculture	0.056	0.814
Engineering and Other and Unspecified fields	0.343	0.558
Science and Health Science	2.453	0.117
Science and Humanities & Arts	7.014	0.008
Science and Law	1.477	0.224
Science and Agriculture	0.140	0.708
Science and Other & Unspecified Fields	0.865	0.342
Health Science and Humanities & Arts	5.173	0.023
Health Science and Law	1.089	0.297
Health Science and Agriculture	0.103	0.748
Health Science and Other & Unspecified	0.638	0.425
Humanities & Arts and Law	0.401	0.527
Humanities & Arts and Agriculture	3.113	0.078
Humanities & Arts and Other & Unspecified	0.295	0.587
Law and Agriculture	1.823	0.177
Law and Other & Unspecified Fields	0.062	0.803
Agriculture and Other & Unspecified Fields	0.384	0.536

Null Hypothesis (H_0): The distribution of 2 sub-groups of graduates from 2 different faculties of study are homogenous with respect to the dependent variable. Alternative hypothesis (H_A) is that the distribution of 2 sub-groups of graduates from 2 different faculties of study are heterogeneous. Own estimates are given using StatsSA 2015Q1- 2019Q4

Table A5: Fischer's Exactness Test for Homogeneity

Graduate Unemployment: Does Field of Study matter?

Variables	Fischer's Exactness Test	1 Sided Fischer's Exactness Test
Commerce and Education	0.000	0.000
Commerce and Health Science	0.025	0.012
Commerce and Engineering	0.119	0.086
Commerce and Agriculture	1.000	0.767
Commerce and Other and Unspecified Fields	0.338	0.199
Education and Engineering	0.362	0.170
Education and Science	0.027	0.013
Education and Health Science	0.078	0.040
Education and Humanities	0.000	0.000
Education and Law	0.213	0.139
Education and Agriculture	1.000	0.826
Education and Other & Unspecified Fields	0.592	0.311
Engineering and Science	0.603	0.301
Engineering and Health Science	1.000	0.406
Engineering and Humanities	0.212	0.093
Engineering and Law	1.000	0.596
Engineering and Agriculture	1.000	0.948
Engineering and Other & Unspecified Fields	1.000	0.721
Science and Health Science	0.224	0.112
Science and Humanities	0.004	0.003
Science and Law	0.613	0.262
Science and Agriculture	1.000	0.878
Science and Other & Unspecified Fields	1.000	0.452
Health Science and Humanities	0.024	0.013
Health Science and Other & Unspecified Fields	1.000	0.552
Humanities and Law	1.000	0.907
Humanities and Agriculture	0.339	0.208
Humanities and Other & Unspecified Fields	0.119	0.071
Law and Agriculture	1.000	0.942
Law and Other & Unspecified Fields	1.000	0.694
Agriculture and Other & Unspecified Fields	1.000	0.965

Null Hypothesis (H_0): The distribution of 2 sub-groups of graduates from 2 different faculties of study are homogenous with respect to the dependent variable. Alternative hypothesis (H_A) is that the distribution of 2 sub-groups of graduates from 2 different faculties of study are heterogenous. Own estimates are given using StatsSA 2015Q1- 2019Q4

Table A6: Chi-Squared Wald Test for Employed Graduates

Variables	Chi-Squared Estimate	P-Value
Commerce and Education	27609.56	0.000
Commerce and Engineering	17.00	0.000
Commerce and Science	13056.42	0.000
Commerce and Health Science	27225.98	0.000
Commerce and Humanities & Art	59098.95	0.000
Commerce and Law	7808.16	0.000
Commerce and Agriculture	14972.16	0.000
Commerce and Other & Unspecified Fields	12731.36	0.000
Education and Engineering	14412.65	0.000
Education and Science	52358.11	0.000
Education and Health Science	1156.11	0.000
Education and Humanities & Art	15 0000.00	0.000
Education and Law	480.41	0.000
Education and Agriculture	39520.70	0.000
Education and Other & Unspecified Fields	53367.55	0.000
Engineering and Science	9313.77	0.000
Engineering and Health Science	17411.97	0.000
Engineering and Humanities & Arts	32073.97	0.000
Engineering and Law	5385.44	0.000
Engineering and Agriculture	13352.19	0.000
Engineering and Other and Unspecified fields	9043.97	0.000
Science and Health Science	51083.33	0.000
Science and Humanities & Arts	4549.19	0.000
Science and Law	24699.88	0.000
Science and Agriculture	2634.09	0.000
Science and Other & Unspecified Fields	0.02	0.878
Health Science and Humanities & Arts	11 0000.00	0.000
Health Science and Law	2020.47	0.000
Health Science and Agriculture	41711.36	0.000
Health Science and Other & Unspecified	51228.31	0.000
Humanities & Arts and Law	54641.85	0.000
Humanities & Arts and Agriculture	202.87	0.000
Humanities & Arts and Other & Unspecified	4558.49	0.000

Graduate Unemployment: Does Field of Study matter?

Law and Agriculture	25829.40	0.000
Law and Other & Unspecified Fields	24427.22	0.000
Agriculture and Other & Unspecified Fields	0.00	0.982

Null Hypothesis (H_0): The parameters from each of the variables of interest are equal to each other (The two coefficients of interest are simultaneously equal to zero when subtracted from each other). Alternative hypothesis (H_A): The parameters from each of the variables of interest are not equal to each other. Own estimates are given using StatsSA 2015Q1- 2019Q4. Estimates are calculated only for graduates in the population of working-age (15 - 65-year-olds).

Table A7: Chi-Squared Wald test for the underemployed Graduates

Variables	Chi-Squared Estimate	P-Value
Commerce and Education	408.59	0.000
Commerce and Engineering	46.16	0.000
Commerce and Science	3532.06	0.000
Commerce and Health Science	711.01	0.000
Commerce and Humanities & Art	0.79	0.375
Commerce and Law	51.88	0.000
Commerce and Agriculture	1644.60	0.000
Commerce and Other & Unspecified Fields	1822.28	0.000
Education and Engineering	76.23	0.000
Education and Science	4668.92	0.000
Education and Health Science	1699.72	
Education and Humanities & Art	461.27	0.000
Education and Law	34.20	0.000
Education and Agriculture	1179.20	0.000
Education and Other & Unspecified Fields	704.63	0.000
Engineering and Science	2470.62	0.000
Engineering and Health Science	690.95	0.000
Engineering and Humanities & Arts	52.53	0.000
Engineering and Law	2.08	0.149
Engineering and Agriculture	1360.60	0.000
Engineering and Other and Unspecified fields	959.73	0.000
Science and Health Science	477.06	0.000
Science and Humanities & Arts	3258.55	0.000
Science and Law	1836.81	0.000
Science and Agriculture	3217.04	0.000
Science and Other & Unspecified Fields	6084.91	0.000

Graduate Unemployment: Does Field of Study matter?

Health Science and Humanities & Arts	677.93	0.000
Health Science and Law	586.03	0.000
Health Science and Agriculture	2325.10	0.000
Health Science and Other & Unspecified	3154.17	0.000
Humanities & Arts and Law	58.52	0.000
Humanities & Arts and Agriculture	1660.66	0.000
Humanities & Arts and Other & Unspecified	1837.74	0.000
Law and Agriculture	1231.29	0.000
Law and Other & Unspecified Fields	686.18	0.000
Agriculture and Other & Unspecified Fields	463.51	0.000

Null Hypothesis (H_0): The parameters from each of the variables of interest are equal to each other (The two coefficients of interest are simultaneously equal to zero when subtracted from each other). Alternative hypothesis (H_A): The parameters from each of the variables of interest are not equal to each other. Own estimates are given using StatsSA 2015Q1- 2019Q4. Estimates are calculated only for graduates in the population of working-age (15 - 65-year-olds).

Table A8: Multinomial Logistic Regression Table for Graduates in different Fields of Study.

Variables	Employment	Underemployment
Agriculture	-0.221 (-0.229- -0.213)	-0.658 (-0.721- -0.595)
Architecture	0.182 (0.173-0.192)	0.217 (0.161-0.273)
Arts/Visuals/Performance	0.127 (0.119-0.135)	1.071 (1.035-1.106)
Commerce	0.217 (0.212-0.221)	0.590 (0.565-0.616)
Communication	-0.132 (-0.140- -0.124)	0.393 (0.351-0.435)
Computer Science	0.468 (0.460-0.476)	1.225 (1.191-1.260)
Education	0.539 (0.534-0.543)	0.374 (0.374-0.401)
Engineering	0.412 (0.406-0.418)	0.912 (0.881-0.943)
Healthcare	0.631 (0.625-0.636)	0.835 (0.807-0.864)
Home Economics	0.145 (0.118-0.172)	-20.145 (-3855.262- 3814.971)
Industrial Arts	-0.171 (-0.188- -0.154)	-20.581 (-2832.921- 2791.759)
Language/Linguistics/Literature	-0.566 (-0.577- -0.555)	0.564 (0.516-0.613)

Graduate Unemployment: Does Field of Study matter?

Law	0.484 (0.478-0.490)	0.458 (0.424-0.491)
Libraries	0.341 (0.320-0.362)	1.276 (1.205-1.347)
Life and Physical Science	-0.478 (-0.485- -0.472)	0.774 (0.743-0.806)
Mathematical Science	-0.015 (-0.027- -0.002)	1.358 (1.315-1.402)
Military Science	1.203 (1.143-1.262)	-19.164 (-5343.109-5304.782)
Philosophy/Religion/Theology	-0.639 (-0.649- -0.629)	1.853 (1.820-1.885)
Physical Education	0.224 (0.198-0.250)	-20.120 (-3496.897-3456.656)
Psychology	-0.198 (-0.205- -0.191)	0.150 (0.113-0.187)
Public Administration	-0.126 (-0.133- -0.119)	-0.227 (-0.270- -0.183)
Social Science	-0.243 (-0.249- -0.236)	0.344 (0.311-0.376)
Management	0.163 (0.152-0.174)	0.711 (0.663-0.759)
Marketing	0.507 (0.495-0.520)	1.313 (1.269-1.358)
Information Technology	0.179 (0.170-0.189)	1.247 (1.210-1.285)
Finance/Economics/Accounting	0.448 (0.440-0.455)	-0.182 (-0.230- -0.135)
Office Administration	0.004 (-0.010-0.176)	0.125 (0.050-0.200)
Electric Infrastructure	-0.092 (-0.114- -0.071)	-20.161 (-3572.751-3532.430)
Civil Engineering	-0.383 (0.395- -0.371)	-20.552 (-1947.158-1906.053)
Engineering 2	0.026 (0.014-0.038)	-20.148 (-1638.104-1597.808)
Primary Agriculture	0.592 (0.513-0.671)	-19.691 (-10747.720-10708.340)
Hospitality	0.595 (0.567-0.623)	-19.950 (-4152.471-4112.572)
Tourism	0.096 (0.074-0.118)	-20.483 (-3515.590-3474.625)
Safety	0.393 (0.358-0.427)	-19.964 (-4302.978-4263.050)
Mechatronics	0.770 (0.726-0.815)	-19.798 (-6363.997-6324.401)
Education and Development	0.341 (0.318-0.365)	-20.274 (-3441.469-3400.921)
Other and Unspecified Fields of Study	Omitted	Omitted

Graduate Unemployment: Does Field of Study matter?

African	-0.235 (-0.237- -0.232)	0.161 (0.151-0.172)
Female	-0.485 (-0.487- -0.482)	0.266 (0.255-0.277)
Married	0.446 (0.444-0.449)	0.330 (0.319-0.341)
Non-Metropolitan Areas	-0.126 (-0.129- -0.124)	-0.660 (-0.077- -0.054)
Fetch Water	-0.297 (-0.304- -0.292)	-0.556 (-0.590- -0.522)
15–25-Year-Olds	-0.085 (-0.089- -0.083)	0.375 (0.350-0.400)
26–35-Year-Olds	1.172 (1.169-1.175)	1.438 (1.418-1.459)
36–45-Year-Olds	1.432 (1.429-1.436)	1.487 (1.467-1.508)
46–55-Year-Olds	1.582 (1.578-1.585)	1.757 (1.737-1.778)
56–65-Year-Olds	Omitted	Omitted
2015Q1	0.329 (0.320-0.337)	0.512 (0.480-0.543)
2015Q2	0.402 (0.393-0.410)	0.113 (0.076-0.150)
2015Q3	0.559 (0.550-568)	0.755 (0.724-0.786)
2015Q4	0.225 (0.217-0.234)	-0.048 (-0.083- -0.012)
2016Q1	0.301 (0.293-0.310)	0.833 (0.805-0.860)
2016Q2	0.295 (0.287-0.304)	-0.044 (-0.082- -0.006)
2016Q3	0.120 (0.114-0.126)	-0.158 (-0.187- -0.130)
2016Q4	0.123 (0.117-0.129)	0.357 (0.333-0.381)
2017Q1	0.211 (0.206-0.217)	-0.233 (-0.260- -0.205)
2017Q2	0.081 (0.072-0.083)	-0.109 (-0.134- -0.083)
2017Q3	0.245 (0.232-0.243)	-0.233 (-0.260- -0.206)
2017Q4	0.077 (0.072-0.187)	0.128 (0.104-0.152)
2018Q1	0.094 (0.088-0.099)	-0.548 (-0.577- -0.519)
2018Q2	0.181 (0.176-0.187)	0.095 (0.070-0.119)
2018Q3	0.238 (0.232-0.243)	-0.127 (-0.154- -0.101)
2018Q4	0.148	-0.211

Graduate Unemployment: Does Field of Study matter?

	(0.142-0.154)	(-0.238- -0.184)
2019Q1	0.058 (0.052-0.063)	-0.889 (-0.921- -0.857)
2019Q2	0.004 (-0.001-0.010)	-1.004 (-1.037- -0.971)
2019Q3	0.104 (0.099-0.110)	-0.786 (-0.818- -0.755)
2019Q4	Omitted	Omitted
Constant	0.431 (0.425-0.437)	-5.299 (-5.333- -5.265)

Own estimates are given using StatsSA 2015Q1- 2019Q4. Estimates are weighted and are calculated only for graduates in the population of working-age (15 - 65-year-olds).