

Graduate Unemployment in South Africa

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This paper serves as an assignment presented in partial fulfilment of the requirements for the degree of Master's of Commerce at the University of Stellenbosch.

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by

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Assignment presented in partial fulfilment of the requirements for the degree of Master's of
Commerce at the University of Stellenbosch.

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Abstract

To assess trends in graduate unemployment rates in South Africa and identify those most affected by this problem, various econometric techniques are employed using data from the Quarterly Labour Force Survey from 2008 to 2023. The findings show that graduate unemployment has doubled over the last sixteen years. However, regression analysis reveals that, while graduate employment is falling, it is not falling as steeply as in other education categories, mitigating concern about the returns to higher education. The surge in graduate unemployment seems to primarily form part of a broader stagnant trend in the labour market. In addition, propensity score techniques indicate that shifts in the composition of graduates have contributed to the decline in their employment rates in 2023. Concerningly, despite increased access to higher education, there remain inequalities in employment, whereby African, female and young graduates are most adversely affected among the graduate cohort. Due to the significant employment advantages of higher education, efforts to improve the quality of schooling and access to higher education should be continued, as well as policies to curb unemployment affecting young adults more broadly.

1. Introduction

South Africa's youth bear the greatest burden of staggeringly high unemployment rates. Although the economic prospects of those with higher education are generally positive, graduate unemployment appears to be following a rising trend. This trend may be due to various reasons. It may reflect diminishing returns to graduate education, signalling a potential shift in labour demand or a decline in the quality of these qualifications. Additionally, it may simply be a consequence of the rise in the unemployment rate for all labour market participants, indicating a stagnating labour market. Another perspective is that the increase in the unemployment rate may reflect racial and gender discrimination by employers, given the changing composition of graduates. Focusing the research on graduates, defined as individuals with a bachelor's degree or higher, is important given the considerable resources required to invest in higher education (Moleke, 2006). Identifying key trends in the labour market, especially among graduates and young individuals more broadly, can help assist employers, prospective graduates, and policymakers in their future planning.

Through primarily quantitative analysis, this study examines labour market trends in South Africa from 2008 to 2023 using Quarterly Labour Force Survey (QLFS) data. The analysis aims to investigate the extent of graduate unemployment in South Africa and whether its increase over time requires specific policy interventions. Additionally, the analysis delves deeper into which demographic groups are most adversely affected by graduate unemployment. It also examines which fields of study are most affected.

Trends in the unemployment rates for graduates indicate that unemployment has indeed been on an upward trend, doubling over the past sixteen years. In addition, the results highlight that female, African and young graduates are the most adversely affected by the rising unemployment trends. Most study fields have experienced a sharp increase in unemployment rates, with Health and Education fields being the least affected.

Upon further examination of the time trend, results from regression analysis indicate that, despite the fall in graduate employment over the last sixteen years, graduate employment rates have not fallen as extremely as other education categories. This finding alleviates the concern about the diminishing returns to higher education in employment prospects. It also highlights that the drop in graduate employment is predominantly linked to a sluggish labour market. Additionally, propensity score methods are employed to compare the change in the composition of graduates between 2008 and 2023, indicating that the change in composition in

graduates and the labour market in general has also contributed to the decline in employment rates.

The following section, Section 2, includes a literature review on South Africa's labour market, access to tertiary education, and employment prospects for graduates. An overview of the research questions, data and methodology are provided in Section 3. The results, involving descriptive statistics, non-parametric techniques, regression analysis and propensity score methods, are presented in Section 4. Section 5 discusses the results, before concluding in Section 6.

2. Literature Review

2.1. South Africa's labour market & youth unemployment

In South Africa, unemployment is considered to be predominantly structural due to the mismatch between the types of workers supplied and types of labour demanded. Unemployment has risen rapidly over the past decades, alongside the shift in labour demand towards high-skilled workers. As a result, poorly educated workers, who constitute the majority of the labour supply, struggle to find work (Pauw, Bhorat, Goga, Mncube, Oosthuizen et al., 2006). Additionally, given the labour market's highly segmented nature, several factors, including information and mobility barriers, obstruct job-searching activities and labour market entry (Fourie, 2011).

Given the shift towards skilled work, education and skills training are increasingly important in determining labour market outcomes. In South Africa, higher levels of education face higher rewards, as seen in the rates of return to education, both in terms of earnings and employment. Moreover, education only significantly impacts employment outcomes once working-age individuals have some form of tertiary education (Fourie, 2011). In terms of earnings, the returns are negligible for low levels of education and substantially higher at tertiary levels of education, with a large gap in the rate of returns between primary and higher education (Keswell & Poswell, 2004). Such patterns have implications for income, education and wealth inequality given the different incentives for education acquisition facing individuals of varying levels of affluence. Those able to attain high levels of education with relatively little cost will be able to reap high rewards, further exacerbating these inequalities.

Moreover, there are severe inequalities in South Africa's labour market outcomes across race, gender, age and generations. Regarding the gender profile of the labour force, more men were

employed than women in 2021 and 2022 (Khuluvhe, 2023). In terms of race, the absorption rate (i.e., the proportion of working-age individuals employed) is highest for White individuals and lowest for African individuals. These disparities contribute to the disproportionately high unemployment rates affecting black South Africans and women (Valodia & Ewinyu, 2023). Additionally, higher-skilled workers, favoured against the shrinking demand for semi- and low-skilled workers, are typically characterised as primarily male and White (Valodia & Ewinyu, 2023). These workers are also able to attain higher earnings.

South Africa's youth face the brunt of the country's unemployment problems. The unemployment rate in the first quarter of 2022 was almost 64 percent for those aged 15 to 24 years and 42 percent for those aged 25 to 34 years (Statistics South Africa, 2022). Absorption rates are highest among those aged between 45 and 54 years (Khuluvhe, 2023). Trends in the youth labour market again highlight the importance of higher educational attainment to improve employment prospects. Quality of education matters, as historically disadvantaged schooling is associated with significantly worse employment outcomes.

In addition to the shift in demand towards skilled labour, other factors have affected the youth labour market. The rate at which jobs have been created appears to be slower than the rate at which new entrants join the labour market (Kraak, 2010). Additionally, the employed population has become slightly older on average. These changes make finding work difficult for new entrants with little to no work experience. Moreover, location matters as rural youth who remain in rural areas have worse employment outcomes than those who migrate to urban areas (Mlatsheni & Ranchhod, 2017). Persistent racial and gender inequalities can also be seen in youth employment outcomes.

Moreover, the onset of the COVID-19 pandemic in South Africa in 2020 exacerbated pre-existing and rising unemployment levels (Altman, 2022). Nationwide lockdowns resulted in substantial job losses, which disproportionately affected more vulnerable groups, including women, black South Africans, the youth and less educated groups (Ranchhod & Daniels, 2021). Alongside abrupt job losses, the pandemic was associated with under-employment and hampering the economy's ability for job creation to absorb new labour market entrants (Yu, Botha, & Nackerdien, 2023).

Both labour force participation and employment experienced a steep decline in the second quarter of 2020, and although they gradually rose over the next few years, they did not return to pre-COVID levels in 2022 (Yu, Botha, & Nackerdien, 2023). Worryingly, South Africa's

poor labour market performance and lack of employment growth hamper attempts to address labour market inequalities.

2.2. Access to tertiary education in South Africa

In South Africa, the majority of employed individuals have completed or have at least some level of secondary education. Approximately 10 percent of the workforce holds a degree (Khuluvhe & Ganyaupfu, 2022). Despite substantial growth in tertiary education enrolment rates, South Africa's participation rates in this regard are relatively low compared to other middle-income nations, such as China and Malaysia (Khuluvhe & Ganyaupfu, 2023). Moreover, the proportion of the population aged twenty-five years and older who have obtained a bachelor's or equivalent degree or higher is substantially lower in South Africa than in many countries in Europe, Asia and America. This statistic is also lower than that of most other countries with similar GDP levels (Khuluvhe & Ganyaupfu, 2022).

Nevertheless, student enrolment in higher education institutions (HEIs) has increased by 27.3 percent from 2009 to 2021 (Department of Higher Education and Training (DHET), 2023). Approximately 64 percent of students are enrolled through the contact mode of learning, while 36 percent conduct their studies remotely, with 94 percent of the latter being enrolled at UNISA (DHET, 2023). In addition, UNISA enrolled the largest number of students in undergraduate degrees and postgraduate qualifications below Master's level compared to other HEIs in 2021 (DHET, 2023). Regarding demographics, in 2021, 61 percent of all students enrolled at public HEIs were female, and 80 percent were African.

Levels of educational attainment are improving across all of South Africa's population groups; however, levels of educational attainment are higher among White and Indian and Asian population groups compared to African and Coloured population groups. In 2021, approximately 29 percent of the White population reported holding a degree compared to less than 4 percent of the Coloured and African populations, respectively. Still, the number of African individuals with a degree has doubled over the decade 2010 to 2021 (Khuluvhe & Ganyaupfu, 2022).

Human capital theory suggests that individuals pursue further education due to the belief that their future labour market earnings will overall exceed the expenses associated with education and forgone earnings. While increased access to higher education can act to raise income and reduce inequality among previously disadvantaged groups, it requires substantial financial investment. The National Student Financial Aid Scheme (NSFAS), a government funding

scheme that provides direct financial assistance to students, has been and is one of the most significant interventions in improving access to tertiary education for the economically disadvantaged (Bhorat, Kimani, & Pillay, 2018). Over the period 2000 to 2012, the number of NSFAS recipients grew by 260 percent and covered 20 percent of all university students (Bhorat et al., 2018). It has been particularly successful at targeting women as well as African, Coloured and Indian students.

Through policies aimed at redressing historic inequalities and promoting access to education, there have been substantial improvements in narrowing South Africa's racial divide in education and the labour market. Despite this, White South Africans continue to be the most highly educated and hold the majority of high-skilled and management-level jobs (Valodia & Ewinyu, 2023).

2.3. Trends in tertiary and graduate unemployment

Understanding the employment returns to tertiary education is crucial as it influences the decision to invest in higher education. Consequently, the main question of interest is whether South Africa's graduate unemployment reflects diminishing returns to higher education and structural shifts in the labour market, compositional changes in graduates and skilled workers, or simply follows broad unemployment trends.

Although graduate unemployment is low compared to overall unemployment in the country, and there are undoubtedly substantial advantages to higher education, several studies indicated that unemployment among individuals with tertiary education appears to be rising (Bhorat, 2004; Pauw et al., 2008). In the period 1995 to 2002, unemployment rates among individuals with tertiary education more than doubled, rising by 139 percentage points, despite being absolutely lower than for other education categories (Bhorat, 2004). However, this increase was not as pronounced for other levels of education over the same period. For instance, individuals with completed matric experienced a 54-percentage point increase in unemployment over the same period (Bhorat, 2004). In contrast, Van Broekhuizen and Van Der Berg (2012) find no evidence of a high level or significant upward trend in unemployment for degreed individuals before 2012, mitigating concerns at the time for this issue¹.

¹ It is worth noting discrepancies in the definitions of "graduates". Pauw, Oosthuizen and Van Der Westhuizen (2008) refer to graduates as individuals having both university and non-university tertiary level education. Van der Berg and Van Broekhuizen (2012) define graduates as those who have obtained a bachelor's degree or higher, noting that broad definitions of the term graduates may lead to over-estimating graduate unemployment, given

If graduate unemployment is indeed on the rise, it is puzzling, considering the shift in demand towards skilled workers. In other words, such a trend would indicate that the economy is unable to generate sufficient jobs for those with higher education despite skills shortages (Oluwajodu, Greyling, Blaauw, & Kleynhans, 2015). In addition, it raises a possible concern that tertiary education has not adequately prepared the youth for entry into the labour force.

Across the literature, causes for graduate unemployment typically relate to the type of qualification obtained, field of study, quality of both secondary and tertiary education, and lack of work experience (Oluwajodu et al., 2015). Regarding field of education, study choices do not appear to be aligned with fields where skills are scarce or have high employment prospects (Pauw et al., 2008). For example, it has been found that graduates from the Humanities and Arts faculties have lower employment prospects, emphasising that the field of study plays a role in determining the likelihood of unemployment (Moleke, 2006). Similarly, Bhorat et al. (2017) found that fields such as Health and Education offer a relative employment advantage, while those in Humanities and Social Sciences face a relative disadvantage in the labour market.

Within tertiary education, there are various disparities in employment rates depending on the type of institution and qualification. Evidence confirms that holders of an undergraduate degree hold an advantage over those with certificates or diplomas, and those attaining a postgraduate degree enjoy greater rewards (Bhorat, Lilenstein, Lilenstein, & Oosthuizen, 2017; Van Broekhuizen & Van Der Berg, 2016). Moreover, the education institution attended impacts employment prospects and earnings, as university graduates tend to experience better employment probabilities and higher earnings than graduates from other tertiary institutions (Bhorat & Kimani, 2017). As a result, caution must be taken when defining graduates, as inconsistencies may lead to misleading results.

Aside from access to and quality of higher education, graduates, as well as the general youth in South Africa, face numerous other barriers to entry into the labour market, contributing to growing unemployment. These obstacles include low social capital, high costs of work seeking and lack of relevant work experience (Graham, Williams, & Chisoro, 2019).

Not all youth benefit from higher education in the same way, and racial and gender disparities persist despite tertiary education. Disaggregating the graduate unemployment rate by race

the disparities in labour market outcomes between those with university degrees compared to some other post-matric qualification.

indicates that African graduates bear most of the unemployment burden and face the longest search period for employment (Bhorat, 2004; Moleke, 2010). Van Broekhuizen (2016) partly attributes these differences across race to the heterogeneity in the quality and type of higher education institutions. Consequently, it is recommended that interventions are aimed at improving the functionality of historically disadvantaged higher education institutions as opposed to wide-scale reform across all higher education institutions. Nevertheless, even among individuals sharing the same institutional background, African individuals face difficulties in finding employment compared to their counterparts from other race groups, highlighting prevalent labour market discrimination in South Africa (Bhorat et al., 2017).

Furthermore, Baldry (2016) identifies race, socio-economic status and year of graduation as the largest determinants of graduate unemployment. As these characteristics are beyond an individual's control, the role of higher education systems and graduate employers may deserve extra scrutiny. Despite strategies to improve access to higher education for previously disadvantaged groups to address inequality, graduate employment practices may unintentionally act to counter these efforts. Tailoring graduate recruitment processes to target groups with high incidences of unemployment is one possible method to address this issue.

In sum, clarity is needed on the state of the graduate unemployment nexus and its evolution over time. Determining the extent of the issue and its potential causes are essential in assessing whether concern is warranted and, if so, in determining strategies to address it.

3. Data and Methodology

3.1. Data

Data from the Quarterly Labour Force Survey (QLFS) is employed in this analysis. The QLFS is a household-based survey conducted by Statistics South Africa. It collects data on labour market activities of individuals aged fifteen years or older on a quarterly basis. The descriptive and non-parametric analysis to follow compares trends in quarter 1 of 2008, 2012, 2015, 2019 and 2023. The regression analysis incorporates quarter 1 data in each year from 2008 to 2023. In all, this constitutes sixteen years of data. Alongside its large sample sizes and abundant information on labour market activity, this dataset provides a rich foundation to examine South Africa's graduate unemployment.

Regarding survey design, weights are available in the QLFS data to correct for non-response and to adjust to known national population estimates. In addition, the datasets include

adjustments for strata to allow for the representation of population subgroups in the sample. Given that surveyed households are assigned to primary sampling units, comprising certain enumerated areas in the country, the analysis can control for clustering in the standard errors.

3.2. Aim and Research Questions

The aim of this paper is to assess the rise of graduate unemployment in South Africa and whether it is a cause for concern. The research topic can be summarised into four research questions, listed below.

1. Is graduate unemployment rising in South Africa?
2. Who is most adversely affected?
3. Which fields of study are most affected?
4. What policy choices are available to combat graduate unemployment?

3.3. Methodology

To address these research questions, this paper primarily employs quantitative methods. Descriptive and regression analysis is used to determine the extent of graduate unemployment, how it has risen over time, and who is most adversely affected. Throughout the paper, graduates are defined as individuals whose highest level of education achieved is a bachelor's degree or higher. Thus, a clear distinction is made between graduate education and non-graduate tertiary education, the latter encompassing individuals whose highest level of education attained is a tertiary certificate or diploma.

Descriptive statistics assess the composition of graduates over time and changes in graduate unemployment rates across varying demographic characteristics. These relationships are further examined non-parametrically by estimating logistic polynomial graphs to ascertain the composition of graduate employment over time. These graphs make use of an Epanechnikov kernel density function. The advantage of such non-parametric models is their flexibility in data modelling and, consequently, in capturing potential nonlinearities.

Subsequently, the relationship between employment and graduate-level education is examined via regression analysis. This relationship and its determinants are estimated using linear probability models. Linear probability models allow for ease of interpretation, particularly for interaction effects, and provide good predictions of response probabilities. As a robustness check, probit models for the main specifications are also provided in the appendix. Probit models are designed to handle binary outcome variables. As the marginal effects of interaction

terms in probit regressions cannot be directly estimated, the raw coefficients are presented to indicate whether the direction and significance of the estimates are robust.

The estimated regression model can generally be described by equation (1):

$$\Pr (Emp_{it} = 1) = \alpha + X_{it}\beta + E_{it}\lambda + G_{it}\phi \dots (1)$$

In the above equation, i is an indicator for individual i and t is an indicator of time (year). Emp_{it} represents employment, and $\Pr (Emp_{it} = 1)$ represents the probability of employment being equal to 1 for individual i at time t . The intercept term is represented by α . X_{it} is a vector of individual-level demographic characteristics, namely age, gender, and population group. E_{it} represents educational attainment, ranging from categories of no schooling, less than primary, completed primary, less than secondary, completed secondary, non-graduate tertiary education and graduate education. G_{it} is a vector of geographic controls, comprising whether a surveyed individual resides in an urban or rural area. β , λ and ϕ are the respective coefficient vectors associated with X_{it} , E_{it} and G_{it} .

The regression analysis is followed by propensity score weighting methods to determine the compositional labour market effects of graduate unemployment over the period 2008 to 2023. The propensity scores are computed using regression analysis to estimate the demographic composition of graduates in the first year of the sample (2008) as described in equation (2).

$$\Pr(Y_{2008}_{it} = 1) = \alpha + X_{it}\beta + G_{it}\phi \dots (2)$$

$\Pr(Y_{2008}_{it} = 1)$ represents the probability of being observed in 2008. The intercept term is denoted by α . As in equation (1), X_{it} encompasses individual-level demographic characteristics, namely age, gender, and population group and G_{it} is a vector of geographic controls, comprising whether a surveyed individual resides in an urban or rural area. Again, β and ϕ are the respective coefficients associated with X_{it} and G_{it} .

The weights are then calculated using the propensity scores to balance the distribution of demographic characteristics between 2008 and 2023, expressed in equation (3). This technique assists in reducing potential biases that arise from demographic disparities.

$$w_i = \frac{2023 \cdot Y_{2008}}{1 - Y_{2008}} \dots (3)$$

This weight is then applied to the employment rate of 2023 graduates according to equation (4). Comparing this to the actual observed employment rate in 2023 allows the determination of the compositional component of the change in the employment rate.

$$\text{Weighted employment rate}_{2023} = \frac{\sum_{i=1}^N \text{employed}_i * w_i}{\sum_{i=1}^N w_i} \dots (4)$$

4. Data Analysis

4.1. Descriptive Statistics

The results of weighted tests for significant differences in several covariates when testing across working-age graduates and non-graduates (i.e., all individuals without graduate education) are presented in Table 1. In this analysis, graduates are defined as individuals holding a bachelor’s degree or higher.

Table 1: Weighted Descriptive Statistics by Graduate Education

Variable	Mean			p-value	Std error
	Full Sample	Graduate	Non-Graduate		
Female	0.51	0.50	0.51	0.12	0.01
African	0.78	0.49	0.80	***	0.01
Coloured	0.09	0.06	0.10	***	0.00
Indian/Asian	0.03	0.07	0.03	***	0.01
White	0.10	0.38	0.08	***	0.01
Age (years)	40.60	41.98	40.51	***	0.17
Urban	0.70	0.90	0.69	***	0.01
Employed	0.54	0.84	0.52	***	0.00
N individual	169907	8063	161844		

Notes to Table 1: Differences in individual covariates between graduates and non-graduates are shown. Data sourced from QLFS 2008Q, 2012Q1, 2015Q1, 2019Q1 and 2023Q1. Estimates are rounded to two decimal places. Descriptive statistics are calculated using QLFS survey weights and standard errors are corrected for clustering. The sample is restricted to individuals between the ages of twenty-five and sixty-five.

Table 1 provides a breakdown of the racial composition of graduates, averaged from 2008 to 2023. Among graduates, 49 percent are African, which is lower than the total sample average (78 percent). Additionally, 38 percent of graduates are White despite White individuals comprising only 10 percent of the sample population. This already reflects some of South Africa’s racial inequities in education.

To supplement Table 1, Table 2 below provides the trends and demographic changes of graduates over the past 15 years (2008, 2012, 2015, 2019 and 2023). Most strikingly, the proportions of graduates across race have changed since 2008. An increase in African graduates over time has resulted in changes in the proportions of graduates by race, transitioning from White graduates, constituting over half of the graduate population in 2008, to African graduates, comprising over half by 2023. Such a trend indicates at least some progress towards reducing inequity among graduates in post-Apartheid South Africa, despite there still being large and persistent inequalities in the labour market for African graduates. This trend corroborates the literature on the increased access to tertiary education over the last few decades. The proportion of Indian, Asian and Coloured graduates has not experienced as sharp an increase over the sample period.

Table 1 indicates that the gender composition has been roughly equal when averaged over the sixteen-year period. Interestingly, there has been an increase in the proportion of female graduates over the last sixteen years, as seen in Table 2. In 2008, 46 percent of graduates were women. In 2023, women constituted almost 54 percent of graduates.

Regarding geographic locations, 90 percent of graduates reside in urban areas, which encompass both urban formal and informal areas, as opposed to rural areas, which include farms as well as traditional and tribal areas. This is a substantially higher proportion compared to the full sample, whereby 55 percent of individuals live in urban areas. In Table 2, it can be seen that this statistic has remained relatively unchanged over the sixteen-year sample.

As expected, Table 1 displays that employment rates are much higher among individuals with a graduate degree, whereby 84 percent of graduates report being employed. Employment levels among individuals without graduate-level education are low and relatively similar to that of the full sample, being 52 percent and 54 percent, respectively.

Table 2: Demographics of Graduates 2008-2023

	2008q1	2012q1	2015q1	2019q1	2023q1
<i>Gender</i>					
Female	45.9%	48.8%	50.5%	50.7%	53.7%
<i>Race</i>					
White	51.6%	45.7%	41.8%	36.6%	35.4%
African	37.5%	41.4%	43.6%	51.2%	52.4%
Coloured	4.5%	6.4%	6.6%	6.1%	5.6%
Indian/Asian	6.2%	6.6%	8.0%	5.7%	6.6%
<i>Area</i>					
Urban	91.7%	91.4%	90.2%	89.1%	88.2%
<i>Age groups</i>					
20-29	17.5%	15.8%	20.6%	19.0%	20.5%
30-39	28.8%	27.7%	25.8%	23.8%	25.3%
40-49	27.7%	25.9%	25.8%	24.7%	23.5%
50-59	15.0%	19.1%	17.0%	18.4%	18.3%
60-69	11.0%	11.4%	6.8%	9.1%	8.5%
70 +			4.1%	5.1%	4.1%
Graduate sample	1 696	1 939	1 646	1 886	2 133
Full sample	61 979	56 604	48 205	45 462	42 641
Graduates (weighted)	1 140 448	1 392 863	1 603 585	1 933 449	2 435 285

Notes to Table 1: Data sourced from QLFS 2008Q1, 2012Q1, 2015Q1, 2019Q1 and 2023Q1. The proportion of graduates who fall under each category is presented. Estimates are adjusted for survey weights and rounded to one decimal place.

Using survey weights to calibrate to known population levels, the number of graduates between 2008 and 2023 has more than doubled in population size, reflecting an increase in the level of high-skilled individuals in South Africa. This influx of graduates can also be seen in the changes in the age composition of graduates, whereby the proportion of graduates in their twenties is steadily rising. As mentioned above, this trend corresponds with the increased access to higher education in South Africa.

The change in broad unemployment rates, which comprise both actively unemployed and discouraged workers, across different education levels from 2008 to 2023 is presented in Table 3. Individuals with tertiary education have substantially lower unemployment rates, highlighting the advantage of tertiary education in South Africa's labour market. Moreover,

the unemployment rate among graduates with tertiary education is substantially lower than among those non-graduate tertiary qualifications (i.e., a diploma or certificate with matric). The latter group’s unemployment rate has more than doubled, rising from 11.6 percent in 2008 to over 26 percent in 2023. Nevertheless, graduate unemployment has sharply risen from 5.8 percent in 2008 to almost 12 percent in 2023, providing cause for concern surrounding the employment returns to higher education.

The highest unemployment rates are experienced among those with less than secondary education, reaching 48.8 percent in 2023. The similarly high unemployment rates in 2023 for all education groups, up to and including completed secondary education, imply low employment prospects for individuals without tertiary education. In absolute terms, there has been a 15-percentage point rise in the unemployment rates for those with primary education, matric education and non-graduate tertiary education. Although the graduate unemployment rate rose by 6 percentage points, in relative terms, it rose by a staggering 103 percent. For comparison, the relative increase in unemployment for those with less than tertiary education ranges between 40 percent and 55 percent. The rise is relatively the largest for those with non-graduate tertiary education, who experienced a 128 percent increase in unemployment.

Table 3: Broad Unemployment Rates across Different Levels of Education

	No schooling	Less than primary	Primary	Less than Secondary	Secondary	Other Tertiary	Graduate Tertiary
2008q1	22.5%	29.8%	28.5%	34.9%	27.1%	11.6%	5.8%
2012q1	31.0%	35.0%	36.3%	41.5%	33.2%	14.9%	5.9%
2015q1	28.9%	35.9%	38.0%	41.6%	32.8%	19.9%	7.6%
2019q1	32.8%	38.8%	37.3%	44.5%	35.7%	20.4%	9.2%
2023q1	34.0%	39.1%	44.0%	48.9%	42.5%	26.5%	11.8%

Notes to Table 3: Data sourced from QLFS 2008Q1, 2012Q1, 2015Q1, 2019Q1 and 2023Q1. Estimates are adjusted for survey weights and rounded to one decimal place. “Graduate Tertiary” includes individuals with a bachelor’s degree or equivalent and higher. “Other Tertiary” refers to individuals with post-matric qualifications who do not hold a bachelor’s degree or equivalent or higher.

In addition, strict unemployment rates (not presented), calculated as actively unemployed individuals as a proportion of the narrow labour force (employed and actively unemployed individuals) follow a similar trend. Although graduate unemployment rates are much lower

than that of other levels of educational attainment, they have risen rapidly from 5.4 percent in 2008 to 10.5 percent in 2023.

Table 4: Broad Unemployment Rates among Graduates

	2008q1	2012q1	2015q1	2019q1	2023q1
Female	4.9%	7.7%	7.1%	10.0%	14.0%
Male	6.6%	4.4%	8.1%	8.4%	9.5%
African	11.3%	9.0%	11.8%	13.8%	17.9%
White	2.0%	2.1%	2.4%	2.3%	3.7%
Coloured	2.2%	5.3%	4.6%	8.4%	4.5%
Indian/Asian	0.8%	9.1%	11.4%	6.3%	6.5%
Urban	5.3%	5.8%	6.7%	7.7%	10.1%
Rural	11.4%	7.5%	15.5%	21.3%	25.5%
20-29	17.9%	16.8%	18.0%	21.2%	30.3%
30-39	6.2%	5.7%	6.2%	9.2%	10.2%
40-49	13.8%	2.2%	2.9%	6.3%	7.9%
50-59	2.1%	3.4%	6.3%	3.8%	3.0%
1940's	1.2%	-	-	-	-
1950's	1.8%	3.4%	3.5%	0.8%	0.2%
1960's	1.3%	3.2%	5.2%	3.4%	3.0%
1970's	6.5%	5.1%	3.4%	6.3%	7.9%
1980's	20.3%	11.0%	9.6%	9.2%	10.2%
1990's	-	39.4%	29.2%	21.2%	30.3%

Notes to Table 4: Data sourced from QLFS 2008Q1, 2012Q1, 2015Q1, 2019Q1 and 2023Q1. Broad unemployment rates are presented among graduate demographic groups. Estimates are adjusted for survey weights and rounded to one decimal place.

It is likely that these unemployment rates are not uniform among graduates. In Table 4, the broad unemployment rates of different demographic groupings of graduates are presented. Despite the general graduate unemployment rate of 11.8 percent in quarter 1 of 2023 displayed in Table 3, there are stark disparities among graduates highlighted in Table 4. Individuals in their twenties consistently have the highest graduate unemployment rates, reaching over 30 percent in 2023. Individuals aged above forty with graduate-level education have the lowest unemployment rates, despite being subject to fluctuations over the years. Looking at birth decades, which potentially reflect generational factors not necessarily associated with age, graduates born in the 1980s and 1990s tend to face higher unemployment rates on average.

In terms of race, graduate unemployment is highest among African individuals, reaching almost 18 percent in 2023. The unemployment rate for Coloured graduates has risen from 2.2 percent to 4.5 percent, while for and Indian and Asian graduates, it has increased from 0.8 percent to 6.5 percent, respectively. For White South Africans, graduate unemployment rates have remained consistently low (around 2 percent), but rose to 3.7 percent in 2023. In sum, although unemployment rates have risen for all graduates, there are stark racial inequalities in the graduate labour market.

Regarding gender disparities, the graduate unemployment rate is 4.5 percentage points higher for women than for men, reaching 14 percent in 2023. Additionally, the rural-urban divide is particularly strong, with graduate unemployment rates reaching over 25 percent in rural areas compared to 10 percent in urban areas in 2023.

From 2013, the QLFS included survey questions on field of study, providing valuable information on the field in which the highest post-school qualification was obtained. To maintain consistency in the years presented in this section of the analysis, broad unemployment rates for graduates by field of study² are presented in Table 5 for 2015, 2019 and 2023. Unemployment rates have risen across most study fields over the period 2015 to 2023. Education and Health graduates have had generally low unemployment rates over this period (i.e., remaining under 10 percent). Those facing the highest unemployment rates in 2023 are Administration (24.7 percent), Arts and Social Sciences (17.6 percent), Agriculture (17.5 percent) and Science (15.3 percent) graduates.

Table A2 in the Appendix presents the broad unemployment rates by field of study, not limited to graduates³. In other words, it presents the unemployment rates for individuals with a post-matric qualification and is not limited to those with a bachelor's degree or higher. Hospitality and Tourism face the largest broad unemployment rate in 2023 (39 percent). Health, Education, and Law fields have the lowest levels of unemployment in comparison to other study fields, similar to those in Table 5.

² The QLFS includes categories on field of study for highest post-school qualification. These categories are grouped into broader categories presented in Table 5. The composition of each broad category can be found in Table A1.

³ Similar to those displayed in Table 5, the full composition of each category presented in Table A2 can be found in Table A1.

Table 5: Broad Unemployment Rates per Study Field among Graduates

Field of Study	2015q1	2019q1	2023q1
Commerce	10.3% (0.019)	10.4% (0.016)	12.7% (0.018)
Engineering	2.1% (0.011)	5.7% (0.021)	11.8% (0.026)
Science	6.8% (0.030)	6.9% (0.031)	15.3% (0.034)
Arts and Social Sciences	11.1% (0.030)	9.4% (0.024)	17.6% (0.035)
Health	2.4% (0.014)	6.2% (0.021)	7.0% (0.019)
Education	6.0% (0.015)	7.5% (0.015)	8.7% (0.015)
Technology	15.9% (0.108)	- -	14.1% (0.081)
Administration	16.9% (0.052)	22.8% (0.067)	24.7% (0.107)
Agriculture	4.8% (0.049)	16.7% (0.070)	17.5% (0.070)
Law	5.9% (0.025)	5.1% (0.025)	10.1% (0.030)
Other	3.7% (0.038)	18.8% (0.043)	6.1% (0.034)

Notes to Table 5: Data sourced from QLFS 2015Q1, 2019Q1 and 2023Q1. Broad unemployment rates are presented by field of study. Given the fluctuations in sample sizes for each field of study over the sampled periods, standard errors are presented in parentheses and rounded to three decimal places. Strata are not included in this analysis given that certain strata had only a single sampling unit, preventing the calculation of standard errors. Survey weights are included, and standard errors are corrected for clustering.

Comparing unemployment rates among individuals who studied at a university to those who studied at a Technical Vocational Education and Training college (TVET), unemployment rates are much higher among TVETs (see Table A3). Unemployment rates have risen over the three examined years, reaching over 28 percent in quarter 1 of 2023. Among those who

attended a university, unemployment rates have increased from 14 percent to 20.5 percent from 2015 to 2023.

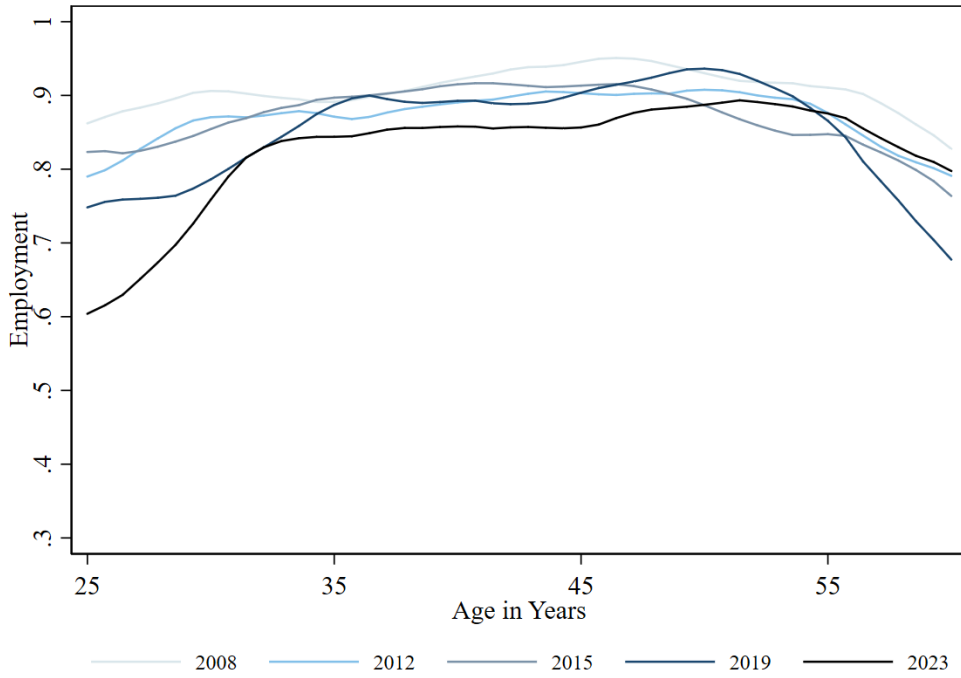
4.2. Graphical Analysis

To visualise these changes in employment rates, graduate employment rates across five different QLFS samples, ranging from 2008 to 2023, are displayed in Figures 1-7. From Figure 1, it is evident that the employment rate in 2023 for graduates between the ages of twenty-five and fifty years is almost everywhere lower than all other years. Most notably, the fall in the employment rate is most pronounced among young graduates below the age of thirty years, indicating that employment issues are more concentrated among the younger working population.

For comparison, the employment rates among non-graduates, i.e., South African individuals who do not hold a bachelor's degree or higher, are presented in Figure 2. A clear non-linear pattern between age and employment is displayed across each year. Employment is at its lowest for the youngest and oldest individuals in the sample and peaks at around the age of forty years. Additionally, all non-graduates have experienced a stark drop in employment between 2008 and 2023. In general, and as expected, the employment rate for graduates is everywhere greater each year than for non-graduates despite the fall in employment for both groups, highlighting the advantage of tertiary education in the labour market.

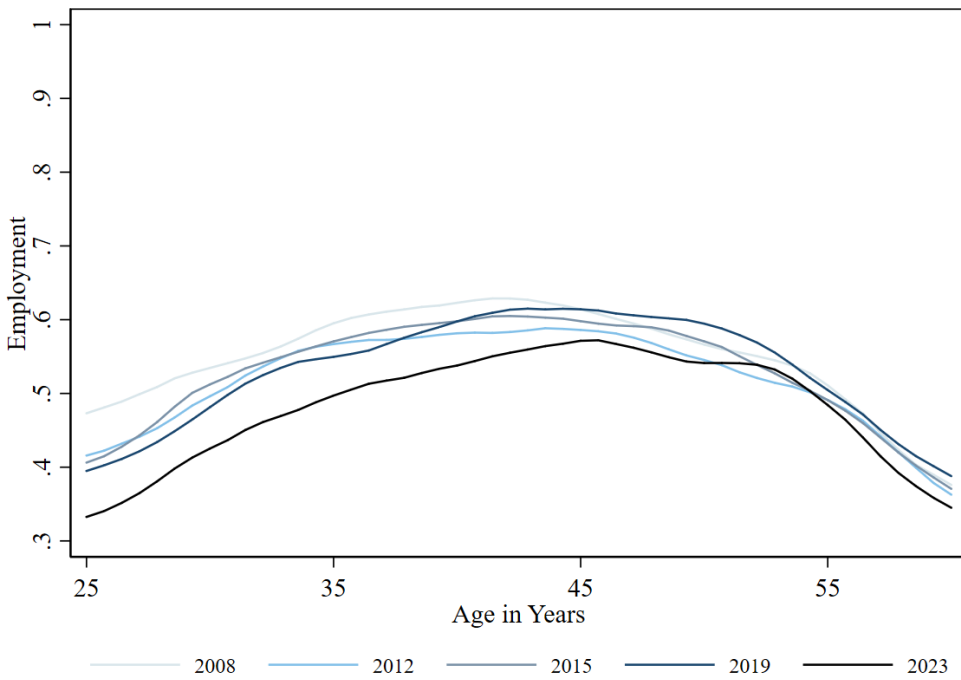
Figures 3 and 4 display the graduate employment rates among females and males over time. Again, it is clear that younger adults have suffered lower employment rates in recent years. For both male and female graduates in their mid-twenties, over 85 percent were employed in 2008 compared to only approximately 60 percent in 2023. For male graduates, employment rates remained relatively similar across all age groups over 2008, 2012 and 2015. However, in 2019 and 2023, there was a steep fall in employment for young male graduates. In general, there are no substantial differences over the years in male employment for those over the age of thirty-five years. Conversely, almost all female graduates below the age of fifty-five years were affected by a lower employment rate in 2023 compared to 2019 and earlier. Again, it is the young female graduates that experienced the most severe drop in employment in 2023.

Figure 1: Graduate Employment by Year



Notes to Figure 2: Local polynomial estimates are presented, using the Epanichnikov kernel. A bin width of 2 is selected. Employment rates are graphed by year for graduates.

Figure 2: Non-Graduate Employment by Year



Notes to Figure 1: Local polynomial estimates are presented, using the Epanichnikov kernel. A bin width of 2 is selected. Employment rates are graphed by year for non-graduates.

Figure 3: Male Graduate Employment



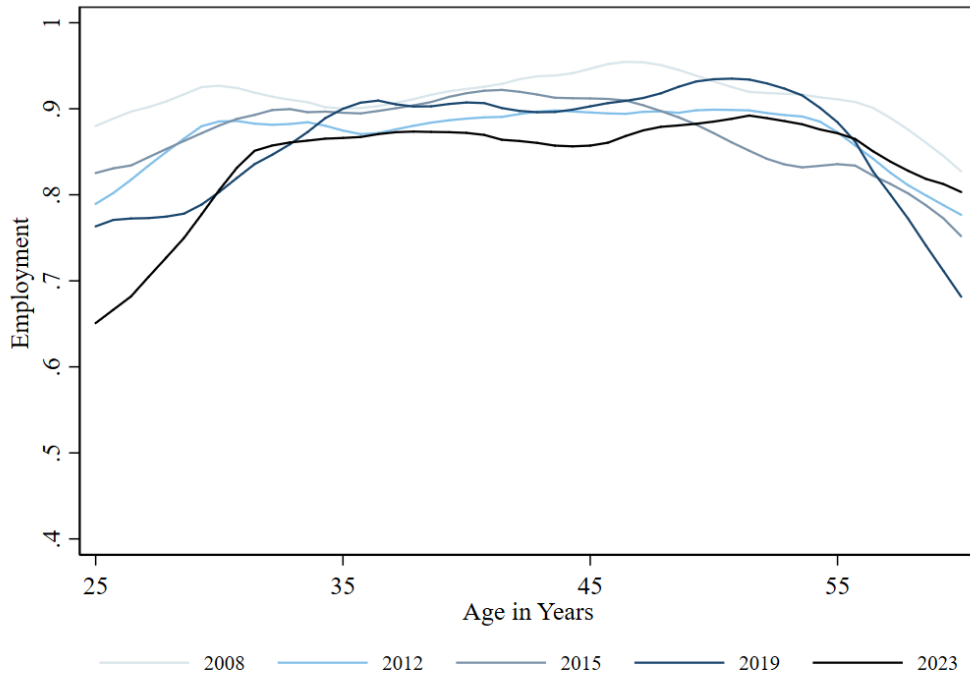
Notes to Figure 3: Local polynomial estimates are presented, using the Epanichnikov kernel. A bin width of 2 is selected. Employment rates are graphed by year for male graduates.

Figure 4: Female Graduate Employment



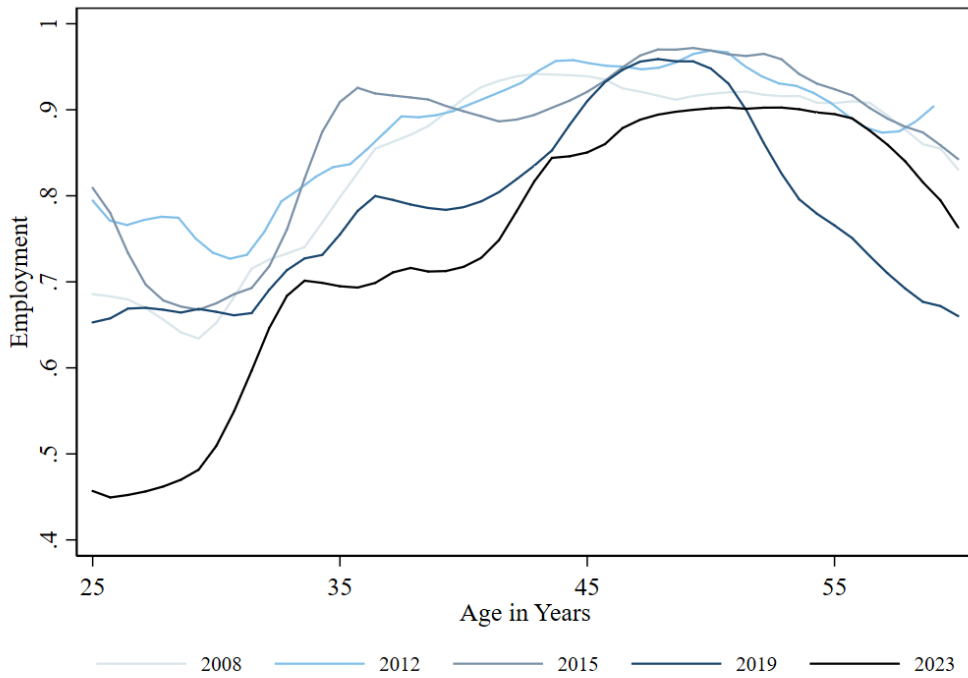
Notes to Figure 4: Local polynomial estimates are presented, using the Epanichnikov kernel. A bin width of 2 is selected. Employment rates are graphed by year for female graduates.

Figure 5: Urban Graduate Employment



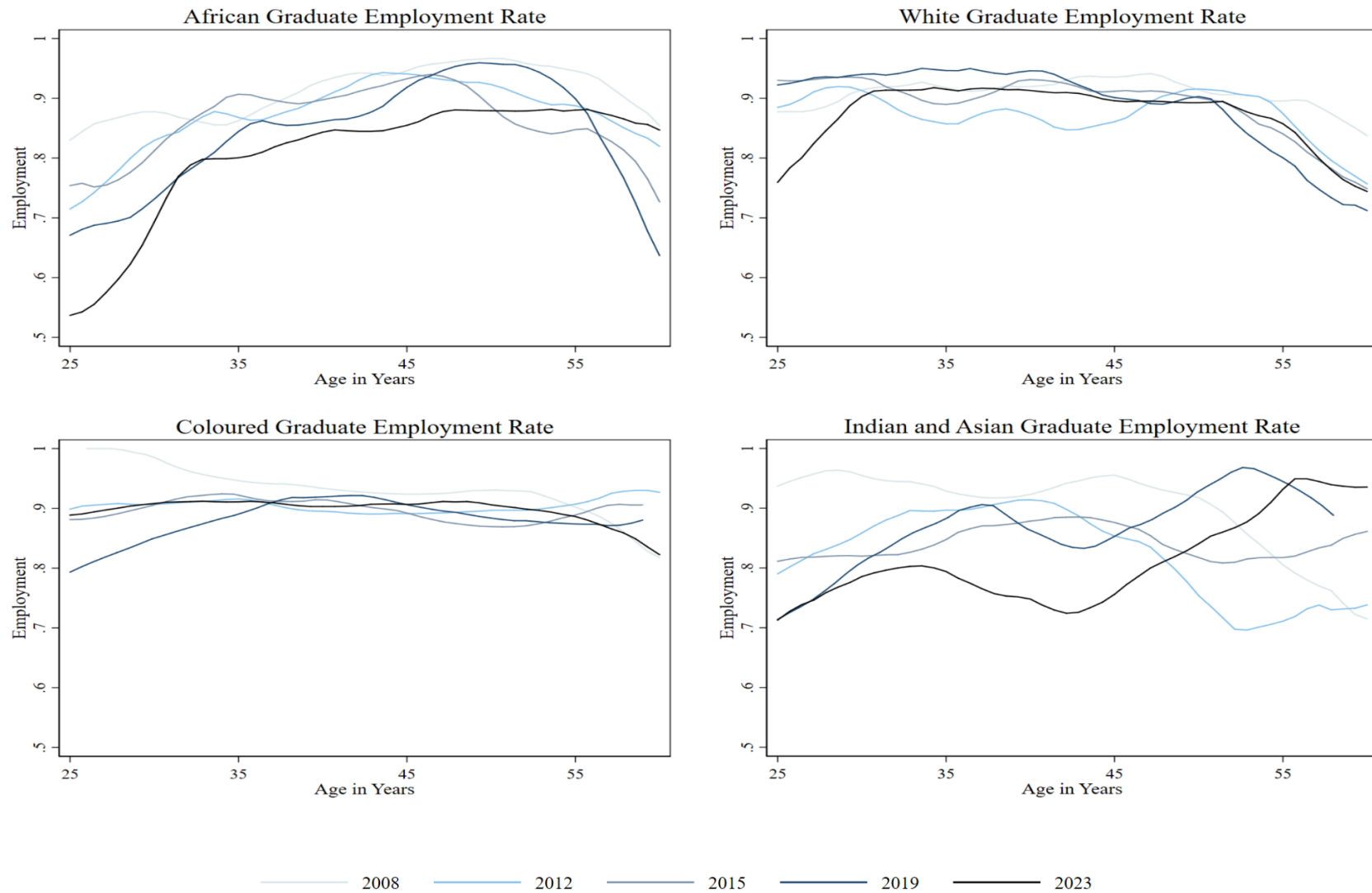
Notes to Figure 5: Local polynomial estimates are presented, using the Epanichnikov kernel. A bin width of 2 is selected. Employment rates are graphed by year for graduates in urban areas.

Figure 6: Rural Graduate Employment



Notes to Figure 6: Local polynomial estimates are presented, using the Epanichnikov kernel. A bin width of 2 is selected. Employment rates are graphed by year for graduates in rural areas.

Figure 7: Graduate Employment by Population Group



Notes to Figure 7: Local polynomial estimates are presented, using the Epanichnikov kernel. A bin width of 2 is selected for African and White Graduates. Bin widths of 5. And 3.5 are selected for Coloured and Indian/Asian graduates, respectively. Employment rates are graphed by year for graduates in each population group.

From Figure 5 and Figure 6, graduate employment rates in urban areas are generally higher than in rural areas. While employment rates were strictly higher in 2008 compared to 2023 for all ages in both rural and urban areas, young graduates in rural areas have experienced the steepest drop in employment. The drop in employment for this group is especially stark in 2023, indicating that employment prospects for those residing in rural areas have worsened substantially in recent years, widening the rural-urban divide in the labour market. It is worth noting, however, that geographic location is not fixed over time. Consequently, the falling graduate employment rate in rural areas partly reflects graduates moving to urban areas to seek employment.

The graduate employment trends across different population groups are presented in Figure 7. Compared to other population groups, the graduate employment rate tends to be the lowest for African individuals aged twenty-five years across each sample. The fall in employment for Indian and Asian graduates is pronounced between the period 2008 and 2023, but the employment rates remain higher than those experienced by African graduates. Among White and Coloured graduates, unemployment rates have not changed as dramatically over the sample period. Additionally, employment levels for these graduates are substantially higher than other population groups, only dropping below 80 percent for those above the age of fifty-five years. However, it should be noted that some missing observations and sparseness of the data for certain age groups skew the graphs for Coloured⁴ and Indian and Asian graduates⁵.

Some prominent trends occur across all figures. Firstly, graduate employment rates are generally much lower in 2023 than in previous years. This finding corresponds to the estimates presented in the descriptive tables. Secondly, employment is much lower for young individuals, especially in 2023. In general, it appears that age and employment are nonlinear, with employment levels being at their lowest for young graduates in their twenties and early thirties as well as for individuals in their fifties. Thirdly, there are stark inequalities in graduate employment levels among various demographic groupings, with African graduates being the worst affected by the fall in graduate employment levels.

⁴ For example, among Coloured graduates in 2008, the sample consisted of only 113 individuals, of which 100 were employed. Between the ages of twenty-five and thirty years, there are only 11 in the sample and all are employed, skewing the graph upward.

⁵ To accommodate sparseness in the data, the bin width of the logistic polynomials is adjusted to 3.5 for Indian and Asian graduates and 5 for Coloured graduates. For comparison, a default bin width of 2 is selected for other groupings depicted in Figures 1-7.

4.3. Regression Analysis

While the graphical analysis above provided some patterns in the composition of graduate employment over time, regression analysis complements it by adding a more rigorous and quantitative approach to understanding the relationship between employment, graduate education and other covariates. To assess the determinants and socioeconomic factors associated with employment for those between the ages of twenty-five and sixty-five years, results from linear probability models are presented in Table 6 below.

In Column 1, *employed*, a binary variable representing whether an individual is employed or not, is regressed on education level and year. On average, graduate education is significantly associated with a 23-percentage point increase in the probability of employment compared to completed secondary education, the reference group. As expected, individuals without completed secondary education (i.e., *matric*) are substantially less likely to be employed than those who do, holding all else constant. This result again highlights the advantages of tertiary education in finding employment.

In addition, similar to what was reflected in the graphical analysis, overall employment fell between 2008 and 2023. Each year is associated with a 0.8 percentage point decline in employment, on average, for non-graduates. The interaction term between graduate education and year is positive and significant, indicating that graduate education acts to slightly offset the negative employment trend (by 0.2 percentage points). This effect is important, highlighting that there are high employment returns to graduate-level education. Graduate employment levels have declined over the sample period, but to a lesser extent than other education categories, decreasing by approximately 0.6 percentage points.

Column 2 controls for age categories. In this analysis, individuals between the ages of twenty-five and twenty-nine years are the base category. In general, thirty-, forty- and fifty-year-olds all have an advantage in the labour market over those aged between twenty-five and twenty-nine years. On the other hand, individuals between the ages of sixty and sixty-five years are associated with a 13-percentage point reduction in the likelihood of being employed compared to those aged twenty-five to twenty-nine years, most likely due to these individuals exiting the labour market for retirement.

To distinguish between time effects, which capture fluctuations in labour market conditions, and compositional effects, which capture shifts in demographics and education levels, Column

3 includes several interaction terms between age, calendar year and graduate education. Interpreting the interaction between age group and year implies that, although the probability of employment fell for everyone over time, the fall is largest for individuals (specifically, non-graduates) in their twenties compared to any other age category. Compared to those in their twenties, individuals in their fifties are the least disadvantaged by this negative time trend.

In addition, interacting graduate education with age highlights that graduate education is the most advantageous to individuals in their twenties compared to other age groups. These results imply that individuals in their twenties are disadvantaged in terms of employment prospects, and this disadvantage has increased with time. At the same time, these individuals derive greater benefits from graduate-level education than older individuals. There are several possible explanations for this finding. One explanation is that access to schooling may have improved, resulting in more South Africans completing primary and secondary education, making matric education more commonly attained and, consequently, slightly less valuable. Firms may experience difficulty in identifying high-quality candidates and use tertiary education as a screening device or signal to distinguish between potential hires. As a result, young adults with graduate education are more likely to find employment than those without.

The interaction between graduate education, age group and year, presented in Column 4, captures how the relationship between being a graduate, age group and employment status varies across years. In other words, it shows the combined effect of being a graduate and age group on employment status changes across years. However, after adding these controls, there is no significant relationship between graduate education and time. It is possible that the relationship between graduate, time and age is more complex and, thus, cannot be adequately captured by the model's interaction terms.

In Column 5, various demographic controls are added. As time effects have been accounted for, these added coefficients represent compositional effects in employment. Moreover, these coefficients provide more precise estimates of the inequalities in gender, race and area of residence discussed in Sections 4.1 and 4.2. Females, on average, are associated with a 14.9 percentage point decrease in employment compared to males. In terms of race, White individuals, on average, are 7.8 percentage points more likely to be employed than African individuals, the base group. In addition, Coloured individuals are associated with a 4-percentage point increase in the likelihood of being employed compared to African individuals. In contrast, Indian and Asian individuals are associated with a significant decrease in the

likelihood of employment compared to African individuals, on average. Corresponding to the descriptive analysis, residing in urban areas, compared to rural areas, is associated with an increase in the likelihood of being employed by 9 percentage points, on average, holding all else constant.

After all the relevant controls have been included in Column 5, graduates are still shown to have a significant advantage over those with a matric, being 23-percentage points more likely to be employed, on average. Those with non-graduate tertiary education (i.e., post-matric qualifications such as certificates of diplomas) are associated with a 15-percentage point increase in the likelihood of employment compared to those with a matric. These results again reflect the disparity in employment returns between those with undergraduate and postgraduate degrees compared to those holding other tertiary certifications. On the other end of the spectrum, individuals with no schooling are associated with a 20-percentage point reduction in the likelihood of employment compared to individuals with matric, on average.

Table 6: Linear Probability Models of the Determinants of Employment

Variables	(1) Employed	(2) Employed	(3) Employed	(4) Employed	(5) Employed
No schooling	-0.297*** (0.004)	-0.271*** (0.005)	-0.269*** (0.005)	-0.269*** (0.005)	-0.203*** (0.005)
Less Primary	-0.210*** (0.004)	-0.208*** (0.004)	-0.207*** (0.004)	-0.207*** (0.004)	-0.166*** (0.004)
Primary	-0.155*** (0.004)	-0.158*** (0.004)	-0.159*** (0.004)	-0.159*** (0.004)	-0.128*** (0.004)
Less Secondary	-0.125*** (0.002)	-0.127*** (0.002)	-0.128*** (0.002)	-0.128*** (0.002)	-0.109*** (0.002)
Non-Graduate Tertiary	0.160*** (0.003)	0.151*** (0.003)	0.151*** (0.003)	0.151*** (0.003)	0.150*** (0.003)
Graduate	0.233*** (0.006)	0.219*** (0.006)	0.257*** (0.011)	0.266*** (0.021)	0.232*** (0.021)
Year	-0.008*** (0.000)	-0.008*** (0.000)	-0.012*** (0.001)	-0.012*** (0.001)	-0.011*** (0.001)
Graduate*year	0.002*** (0.001)	0.003*** (0.001)	0.002*** (0.001)	0.001 (0.002)	0.003 (0.002)
(30-39)		0.138*** (0.003)	0.117*** (0.004)	0.118*** (0.005)	0.113*** (0.004)
(40-49)		0.205*** (0.003)	0.174*** (0.005)	0.175*** (0.005)	0.163*** (0.005)
(50-59)		0.150*** (0.003)	0.094*** (0.005)	0.095*** (0.005)	0.077*** (0.005)
(60-65)		-0.134*** (0.004)	-0.178*** (0.007)	-0.181*** (0.007)	-0.197*** (0.007)

Table 6 Continued

(30-39)*year			0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)
(40-49)*year			0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
(50-59)*year			0.007*** (0.001)	0.007*** (0.001)	0.008*** (0.001)
(60-65)*year			0.006*** (0.001)	0.001*** (0.001)	0.007*** (0.001)
Graduate*(30-39)			-0.020* (0.011)	-0.039* (0.023)	-0.027 (0.023)
Graduate*(40-49)			-0.057*** (0.011)	-0.069*** (0.022)	-0.066*** (0.022)
Graduate*(50-59)			-0.032*** (0.012)	-0.050** (0.024)	-0.063*** (0.024)
Graduate*(60-65)			-0.080*** (0.018)	-0.034 (0.037)	-0.066* (0.036)
Graduate*(30-39)*year				0.002 (0.003)	0.001 (0.003)
Graduate*(40-49)*year				0.001 (0.003)	0.001 (0.003)
Graduate*(50-59)*year				0.002 (0.003)	0.002 (0.003)
Graduate*(60-65)*year				-0.005 (0.004)	-0.005 (0.004)
Coloured					0.042*** (0.004)
Indian/Asian					-0.012** (0.005)
White					0.078*** (0.004)
Female					-0.149*** (0.002)
Urban					0.087*** (0.003)
Constant	0.658*** (0.003)	0.548*** (0.003)	0.574*** (0.004)	0.574*** (0.004)	0.567*** (0.005)
Observations	524,587	524,587	524, 587	524,587	524,587
R-squared	0.072	0.109	0.109	0.109	0.143

Notes to Table 6: Data sourced from the QLFS 2008-2023. Age is restricted between twenty-five and sixty-five years. Estimates are rounded to three decimal places. Coefficients are adjusted for QLFS survey weights, and standard errors are corrected for clustering and stratification.

The results alleviate some of the concerns surrounding graduate unemployment. Graduate employment rates seem to be falling alongside general employment and serve to slightly offset the negative employment trend plaguing South Africa's labour market. Despite the rising unemployment rates among graduates due to current labour market trends, it is crucial to note that the value of higher education has not diminished. The regression analysis highlights that,

especially in contrast to the disappointing employment trend for individuals without tertiary education, the returns to higher education are likely more valuable than ever.

To further examine the racial inequalities presented in Table 6, graduate education is interacted with population group and time in Table A4 in the Appendix. As seen from Table 6, White individuals generally face a higher employment likelihood than African individuals. Moreover, when interacting population group and year, it appears that, on average, White individuals are less affected by the declining employment trend, experiencing a 0.5 percentage point fall in employment as opposed to a 0.8 percentage point fall.

Columns 2, 3 and 4 of Table A4 include interactions between graduate education and population group. The significant negative coefficient (-0.113) implies that while graduate education generally increases the probability of employment for all individuals, the increase in employment probability for those with graduate education is lower for White individuals than for African individuals. This result implies that graduate education assists to some extent in reducing racial inequalities in terms of employment. Column 5 includes interactions among population group, graduate education and year. This term indicates that the positive effect of graduate education for White individuals, compared to African individuals, is gradually growing.

In sum, these interactions suggest a nuanced relationship between graduate employment, time and population group. Graduate education has a large and positive effect on employment probability compared to other education categories. Although employment has been falling over time for all individuals, graduate education slightly offsets this negative employment trend. Compared to African graduates, the fall in employment over time is even less for White graduates. At the same time, graduate education appears to be slightly less advantageous to White individuals who already face labour market advantages. To a certain extent, at the graduate level, racial inequalities are somewhat mitigated.

In an attempt to further examine any other potential compositional effects associated with the fall in graduate employment levels, graduate education is interacted with birth cohorts and time in Table A5 in the Appendix. Birth decades of individuals in the sample are used as a proxy for compositional changes in the sample that might contribute to an explanation of the changes in employment rates over the last sixteen years. In particular, birth decades allow for the examination of specific social or economic factors related to certain generations that may impact employment patterns. One should be cautious of including calendar year, birth cohorts

and age simultaneously, but the restrictions on the specific effects captured by birth decade dummies and the linear time trend should be sufficient to avoid multicollinearity issues. The interaction of these covariates assists in accounting for unique variations associated with each aspect of time.

Column 2 of Table A5 includes these birth cohorts, with individuals born in the 1990s as the base category. Individuals born in the 1990s face a lower employment probability than those born in other decades, except for individuals born in the 1940s. This exception may arise due to these individuals likely beginning to retire or exit the labour market in earlier years of the sample. After including the complete set of controls in Column 5, sampled individuals born in the 1960s are approximately 4 percentage points more likely to be employed than individuals born in the 1990s.

Columns 3 to 5 include interactions between birth decade and calendar year. The fall in employment over the sixteen years has not been as pronounced for individuals born before the 1990s, except for individuals born in the 1940s, compared to those born in the 1990s. In addition, Columns 3 to 5 include interactions between birth decade and graduate education. In Column 5, once all the relevant controls have been added, graduate education becomes more advantageous to those born in the 1990s than those born in the 1960s. Individuals born in the 1960s face an 11-percentage point reduction in the employment returns to graduate education on average, compared to those born in the 1990s. There appears to be no significant relationship in the interaction between graduate education, calendar year and birth decade.

Similar to the findings in Table 6, there are also no year effects for graduates after the inclusion of the full set of controls. In addition, individuals born more recently, as well as younger individuals in general, face employment disadvantages in the labour market. Graduate employment returns have not varied over time across birth cohorts. However, graduates born recently have higher returns to higher education, particularly considering their initial labour market disadvantage compared to other birth cohorts.

Given the binary nature of the outcome variable, employment, probit models of the main specifications are estimated and their coefficients are reported in Table A6. As marginal effects of interaction terms are not directly estimable, the raw coefficients are presented to assess whether the direction and significance of the coefficients are robust. Column 1 simply regresses employment on education level, year, and the interaction between year and graduate education. Again, graduate education substantially increases the likelihood of employment compared to

other education groups. The overall employment trend is negative, as found in the linear probability models. However, the interaction between graduate education and year is insignificant. In other words, it is no longer robustly positive and significant. Variation in the coefficient of the interaction between graduate education and year indicates that there is some degree of uncertainty regarding the graduate employment trend in relation to the overall employment trend. The significance and direction of the other covariates presented in Columns 2 to 5 of Table A6 generally support those found in Columns 2 to 5 of Table 6. As a result, those results can be taken as robust.

It is important to note that there are a few limitations and possible endogeneity issues in the analysis. Notably, data on the quality of education at primary, secondary or tertiary levels are unavailable. Given the variation in schooling quality in South Africa, these factors most likely impact employment prospects. Similarly, the size of social networks, difficult to measure quantitatively, will also influence the likelihood of finding employment. Moreover, since the QLFS does not track the same respondents throughout the 2008 to 2023 period, individual-specific controls cannot be incorporated. Additionally, there may be heterogeneity among graduate qualifications. For instance, the employment prospects may differ between individuals with master's and doctoral degrees compared to those with only a bachelor's degree. Nevertheless, the controls presented in the analysis are likely indicative of South Africa's labour market conditions on average.

4.4. Propensity Score Methods

As highlighted in the previous sections, graduate employment levels are falling, but to a lesser extent than other education groups. To provide an alternative perspective on the graduate employment nexus, propensity score reweighting methods are used to examine the compositional aspects of graduate employment. Although the declining employment trend is not unique to graduates, the composition of graduates has changed in the last sixteen years, which may account for some of the changes in the employment rate.

In Table 7, the 2008 graduate employment rate is compared to the 2023 graduate employment rate, along with the 2023 graduate employment rate that has been reweighted to mirror the demographic characteristics of the 2008 graduate labour force. This reweighting process involves estimating the demographic composition, such as race, gender, age and geographic location, of the 2008 sample. Subsequently, propensity scores are predicted based on these factors to derive the weighting term. In other words, the propensity scores are estimated by

predicting the probability of being observed in 2008, as opposed to 2023, based on certain observable characteristics. The advantage to propensity scores is that they are useful in reducing biases often present in non-randomised observational data.

The weighting adjustment serves to create comparable groups between 2008 and 2023 to examine the differences in graduate employment rates over this period. The reweighted 2023 graduate employment rate reflects the employment rate for individuals with a similar demographic composition as those in 2008. Regarding race, the composition of the 2008 graduate sample is 42 percent African, 44.5 percent White, 7 percent Coloured and 6.5 percent Indian or Asian⁶. In 2023, 56 percent of graduates are African, 31 percent White, 7 percent Coloured, and 6 percent Indian or Asian. Additionally, 50 percent of graduates were female in 2008 compared to 55 percent in 2023. Reweighting ensures that the 2023 sample is representative of the 2008 sample.

Table 7: Propensity Score Reweighting of Graduate Employment Rates

2008 Graduate Employment Rate	2023 Graduate Employment Rate	2023 Graduate Employment Rate Reweighted
85.5	75.9	82.3

Notes to Table 7: Data sourced from QLFS 2008Q1 and 2023Q1. Estimates are rounded to one decimal place.

The results from Table 7 decompose the fall in the graduate employment rate from 2008 to 2023. Overall, the employment rate fell from 85.5 percent to 75.9 percent, marking a substantial 10-percentage point decrease. Notably, the compositional effect, defined as the difference between the 2023 graduate employment rate and its reweighted rate, comprises 6.4 percentage points. This implies that the change in the composition of graduates can explain a substantial portion of the decrease in the graduate employment rate. The remaining 3.2 percentage points capture a pure time effect, reflecting changes to labour market conditions that resulted in a fall in the employment rate.

This large compositional effect reinforces the previously observed disparities within the labour market in the descriptive analysis. It is essential to note that the fall in the graduate employment

⁶ Note that the discrepancies in the composition of graduates in Section 4.1 and 4.4 are due to the samples in Section 4.4 being trimmed based on predicted propensity scores. Trimming is common practice in propensity score methods to reduce outliers, and produces a more balanced sample when comparing graduates in 2008 and 2023. In this analysis, individuals with a propensity score greater than 0.99 or less than 0.01 are removed from the sample.

rate does not imply a decline in the value of graduate education. Instead, it appears that the change in the composition of graduates plays a role in explaining the drop in employment. As discussed in Section 4.1, there has been a notable increase in the number of graduates in recent years, as well as an increase in the proportions of female and African graduates. The fall in the employment rate attributed to compositional effects corroborates the trends seen in Section 4.1. These findings shed light on the higher unemployment rates for specific demographic groups, such as female and African graduates, despite the increase in graduate education within these groups. Despite the advantages of higher education, displayed in Section 4.3, inequalities in terms of race, gender and age remain distinct.

The same method is replicated and extended to analyse the change in the general employment rate, not limited to graduates, as detailed in Table 8. Standing at 48.6 percent in 2008, the employment rate decreased by 6.5 percentage points to 42.1 percent in 2023. Upon examination of the reweighted employment rate, it is evident that the compositional effect constitutes an approximate 6-percentage point shift, nearly accounting for the full observed decrease in the employment rate. Once again, these findings indicate substantial compositional changes to the general labour force and highlight inequalities in South Africa’s labour market.

Table 8: Propensity Score Reweighting of Employment Rates

2008 Employment Rate	2023 Employment Rate	2023 Employment Rate Reweighted
48.6	42.1	48.1

Notes to Table 8: Data sourced QLFS 2008Q1 and 2023Q1. Estimates are rounded to one decimal place.

It is worth noting that this method does face certain limitations. By comparing point estimates from 2008 and 2023, the analysis overlooks the intricate nuances within individual years. Nevertheless, this method provides valuable insights into the changing composition of graduates, the general labour force, and its impact on employment.

5. Discussion

Assessing the extent of South Africa's graduate unemployment is essential as it indicates the value of higher education and the health of the labour market more generally. Moreover, rising unemployment rates among graduates would raise concerns about their employment prospects, especially given the substantial costs associated with tertiary-level education (Pauw et al., 2008). Various notable trends arise from the data analysis regarding the graduate

unemployment nexus. Indeed, graduate unemployment has risen over the period 2008 to 2023. More specifically, descriptive results indicated that graduate broad unemployment more than doubled, rising from 5.8 percent in 2008 to 11.8 percent in 2023.

Regression results from the linear probability model provide a degree of relief to the unsettling increase in graduate unemployment. Graduate employment levels have fallen but to a lesser degree than general employment levels, implying that graduate education serves to offset the declining trend in employment. As a result, the issue surrounding graduate unemployment is partly a problem relating to the sluggish nature of the labour market as a whole, whereby the graduate unemployment rate has suffered similar adverse shocks to that of the general unemployment rate. The fact that graduate employment is falling slower than employment for all other education categories highlights the significant value of graduate education in terms of employment prospects. However, it is worth noting that the results from the probit model were inconclusive regarding whether graduate employment was falling slower than general employment levels.

Moreover, the analysis examined which graduates are most adversely affected by rising unemployment. From the descriptive statistics, on average, African graduates are most affected by the rise in unemployment, experiencing a broad unemployment rate of almost 18 percent in 2023, compared to White graduates who face an unemployment rate under 4 percent. Section 4.2, which displays these inequalities visually, corroborates the findings in Section 4.1 and highlights that younger African graduates between the ages of twenty-five and thirty years are the most adversely affected compared to other age and population groups. Regression analysis reiterated that African graduates are more disadvantaged in employment outcomes compared to White graduates, although graduate education assists in mitigating these inequalities to a certain extent. Nevertheless, there are stark racial inequalities in the labour market in general, whereby African individuals face a significantly lower probability of employment than White individuals.

In addition, as documented in the literature, there are also gender inequalities. Despite there being slightly more female graduates than male graduates, the female graduate unemployment rate is higher than that of their male counterparts in recent years. The results from the regression analysis show that these gender inequalities persist throughout the labour market and are not unique to graduates.

Area of residence is also correlated to employment. Similar to the findings of Mlatsheni and Ranchhod (2017), labour market prospects for graduates based in rural areas are declining, and are markedly lower when compared to those in urban areas. Additionally, rural employment among graduates displayed a particularly steep drop in 2023. Part of this trend likely reflects the migration of highly educated individuals towards urban areas for work.

A trend from the graphical and regression analysis is that the relationship between age and employment is nonlinear, and young graduates are the most adversely affected by falling employment levels. Of great concern is that the results point to the severity of youth unemployment more broadly in South Africa. Individuals in their twenties and those born in the 1990s face substantially lower employment rates than other age groups and birth cohorts, aside from those approaching retirement age, regardless of education level. At the same time, the regression analysis highlighted that education remains a powerful tool, given that higher education is significantly more advantageous to the younger demographic than to their older counterparts.

Looking at the composition of graduates, the descriptive analysis supports the claims that interventions, such as NSFAS, have been successful in improving access to higher education for female and African students. The number and proportion of graduates have increased in the population. Consequently, this has resulted in a demographic shift in the composition of graduates. Despite the increase in African and female graduates, these graduates still suffer disadvantages in finding employment, as highlighted above. In other words, the increase in African and female graduates has not sufficiently translated into a proportional increase in employment for these graduates. Moreover, the results from propensity score reweighting techniques imply that a substantial portion of the change in the graduate employment rate can be attributed to compositional changes among graduates over the sampled period. This finding corroborates the inequalities by race, gender and age present in the labour market, which contribute to the falling employment rate of graduates.

The inclusion of questions in the QLFS pertaining to field of study for those who obtained tertiary-level qualifications assisted the analysis in identifying areas of study with the highest broad unemployment rates. Unemployment rates for most study fields have risen over the sample period. Among graduates, Administration, Science, and Arts and Social Sciences are fields that have experienced a substantial rise in unemployment in 2023. More broadly, among those with any tertiary qualification, the education fields with the highest unemployment rates

are Hospitality and Tourism, Technology and Administration. Meanwhile, for both graduates and those with other tertiary qualifications, unemployment rates for Health and Education fields remain the lowest and least affected by rising unemployment trends. However, as noted in the analysis, the sample sizes of respondents in particular fields of study are small in certain instances. Nevertheless, these findings correspond to a certain extent to other findings, such as Bhorat et al. (2017), who find that Education and Health fields of study have advantages regarding employment returns.

In addition, the type of institution attended matters, as university unemployment rates are substantially lower than other tertiary institutions, such as TVETs. Moreover, although the paper primarily focused on graduates (i.e., those with a bachelor's degree or higher), it is clear that those with other forms of tertiary education experience substantially higher unemployment rates than graduates. Non-graduate tertiary unemployment rates are everywhere larger and appear to have increased more rapidly, rising from 11 percent in 2008 to 26 percent in 2023. The sharp increase in the unemployment rate growth for this group is concerning. In addition, the disparity in unemployment rates among those with tertiary education further highlights the importance of distinguishing between graduate education and post-secondary certificates and diplomas. Nevertheless, the employment returns for those with any form of tertiary qualification are still higher than those holding only matric education.

While this is not a policy-driven paper, the findings spark thought regarding appropriate measures required to address the aforementioned labour market issues. Notably, the trends observed in graduate unemployment closely follow those in general unemployment rates. Consequently, labour market policies aimed at reducing overall unemployment will likely also assist graduates. Specifically, given that young adults bear the brunt of these issues, there is a pressing need for policies to address youth unemployment more broadly. Until the labour market absorbs more unskilled workers or the education system produces individuals equipped with the skills sought by employers, youth unemployment will remain a problem (Graham & Mlatsheni, 2015).

While there are significant advantages to graduate education, certain targeted policies may assist in slowing down the rising unemployment rate. In all, a multi-faceted approach is needed. Central to this approach is improving the quality of education, requiring reforms that are implemented early in primary and secondary education. Commonly suggested policies to address quality include infrastructure improvement, teacher development and training, and data

monitoring and evaluation to track progress, particularly in historically disadvantaged schools and education institutions (Altman & Potgieter-Gqubule, 2009). Although the analysis did not speak to institutional quality, it is worth noting that the educational quality of higher education institutions will also likely play an essential role in addressing inequalities in graduate unemployment.

In addition, providing comprehensive career guidance would be pivotal in channelling students into fields experiencing shortages or increased demand. This would assist in mitigating the skills mismatch and ensure that education decisions are aligned with economic needs. Furthermore, learnerships may assist in closing skills gaps by providing young individuals with soft skills or bridging courses (Development Policy Research Unit, 2006). Moreover, policies such as youth employment tax incentives, internships and apprenticeships to promote specific skills training, and job creation initiatives would assist in targeting young adults attempting to enter the labour market.

Aside from the quality of education, it remains imperative to continue to improve access to higher education. This need is highlighted by the fact that the proportion of South Africans with tertiary education is lower than in countries of similar economic standings (Khuluvhe & Ganyaupfu, 2022). Considering the evident advantages of higher education, it is imperative to reduce the number of youths with poor quality and low levels of education (Yu, 2013). Although initiatives such as NSFAS have successfully widened access to higher education, more effort is needed to increase equitable access. At the same time, to reduce disparities in employment rates that persist among graduates by race and gender, policies should aim to bridge the gap between higher education and employment.

Due to data availability constraints, this study is unable to examine the quality of education and higher education institutions. Additionally, the analysis does not speak to the quality or type of employment found by graduates, length of employment search, whether the area of employment relates to field of study, or the earnings return to graduate education. Given the extensive scope of the graduate unemployment problem, there are many avenues for further research.

6. Conclusion

The employment prospects of graduates have become a topic of increasing concern amid South Africa's soaring unemployment rates. Using data from the QLFS, this study employed a range

of econometric methods to analyse the nature and extent of graduate unemployment in South Africa from 2008 to 2023. Its objective sought to explore whether graduate unemployment was on an upward trend, identify demographic groups most adversely affected and assess whether this trend was cause for concern.

Over the past sixteen years, the analysis revealed a stark increase in graduate unemployment, doubling over this period. However, results from the regression analysis highlighted that, although graduate employment is indeed declining, it is doing so at a slower rate than other education categories. Moreover, those with graduate-level education experience significant labour market advantages. These findings suggest that while the rise in graduate unemployment is concerning, excessive panic may not be warranted. The substantial investment required to pursue graduate education yields significant returns, albeit amidst worsening employment prospects for all South Africans. Consequently, it appears that graduate unemployment is primarily a component of a broader issue within a stagnant labour market that impacts all participants within it.

However, the findings raise concerns about significant employment disparities among different demographic groups. Specifically, African, female and young graduates experience notable disadvantages in finding employment. Encouragingly, the analysis indicates evident compositional shifts among graduates over the last sixteen years, reflecting improved access to higher education. However, propensity score methods reveal that these compositional changes likely played a role in shifting employment rates, reflecting inequalities in employment. In sum, despite the increase in graduate education levels and its value in finding employment, labour market inequalities persist, and graduate education has not been sufficient in eliminating these disparities.

In addition, the analysis delved into different fields of study, identifying those affected by rising unemployment rates. While almost all fields of study have experienced a pronounced increase in unemployment, Health and Education fields have been the least affected by the rising unemployment rates among those with tertiary education. Moreover, there is a clear distinction between graduate education and other tertiary qualifications, with the latter facing substantially larger unemployment rates.

There are certain policy options to consider in addressing graduate unemployment. Regarding policy action, targeting young adults more broadly would also alleviate graduate unemployment, considering the vulnerability of this group. Strategies including the provision

of career guidance, promotion of learnerships and internships for skills development, and sustained efforts to improve access to higher education are imperative. Although the analysis could not cover education quality due to data limitations, its critical role in addressing employment prospects should remain a key focus in policy considerations, particularly in enhancing the quality of historically disadvantaged institutions.

Word count: 10 480

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Appendix

Table A1: Field of Study Categories

Field of Study	QLFS Categories
Commerce	Business, Commerce or Management Sciences; Marketing (TVET); Finance, Economics and Accounting (TVET); Management (TVET)
Engineering	Engineering or Engineering Technology; Architecture or Environment Design; Civil Engineering and Building Construction (TVET); Engineering (TVET); Mechatronics (TVET)
Science	Mathematical Sciences; Life Sciences or Physical Sciences; Computer Sciences; Information Technology and Computer Science (TVET)
Arts and Social Sciences	Psychology; Philosophy, Religion or Theology; Visual and Performing Arts; Languages, Linguistics or Literature; Social Sciences or Social Studies; Libraries or Museums; Communication; Home Economics
Education	Education, Training or Development; Physical Education or Leisure; Education and Development (TVET)
Administration	Public Administration or Social Services; Office Administration (TVET)
Hospitality and Tourism	Hospitality (TVET); Tourism (TVET)
Technology	Industrial Arts, Traders or Technology; Electrical Infrastructure Construction (TVET)
Military, Safety and Police	Military Sciences; Safety in Society (TVET)
Agriculture	Agriculture or Renewable Natural Resources; Primary Agriculture (TVET)
Health	Health Care or Health Sciences
Law	Law

Table A2: Broad Unemployment Rate by Field of Study

Field of Study	2015q1	2019q1	2023q1
Commerce	17.5% (0.013)	19.5% (0.014)	24.0% (0.014)
Engineering	14.6% (0.015)	17.3% (0.017)	24.6% (0.018)
Science	22.8% (0.026)	20.5% (0.026)	22.3% (0.025)
Arts and Social Sciences	15.7% (0.025)	14.6% (0.028)	23.6% (0.027)
Health	12.2% (0.018)	9.6% (0.016)	13.2% (0.017)
Hospitality and Tourism	23.3% (0.052)	27.3% (0.054)	39.4% (0.084)
Education	7.5% (0.011)	8.6% (0.011)	12.9% (0.014)
Technology	23.2% (0.039)	27.6% (0.045)	32.8% (0.049)
Administration	22.0% (0.026)	28.9% (0.031)	31.4% (0.045)
Military and Safety and Security	25.2% (0.064)	16.8% (0.041)	22.4% (0.076)
Agriculture	11.2% (0.041)	32.5% (0.063)	23.4% (0.052)
Law	10.0% (0.027)	8.7% (0.026)	14.4% (0.031)
Other	24.1% (0.024)	21.8% (0.020)	24.7% (0.038)

Notes to Table A2: Broad unemployment rates for individuals who reported obtaining their highest level of education from particular fields of study. Data sourced from QLFS 2015Q1, 2019Q1 and 2023Q1. Standard errors are in parentheses, rounded to three decimal places and corrected for clustering. Estimates include adjustments for survey weights and are rounded to one decimal place.

Table A3: Broad Unemployment Rates for University and TVET

	2015q1	2019q1	2023q1
University	14.0%	13.4%	20.5%
	(0.007)	(0.008)	(0.008)
TVET	21.8%	26.2%	28.6%
	(0.013)	(0.014)	(0.024)

Notes to Table A3: Broad unemployment rates for individuals who reported obtaining their highest level of education from either a university or TVET. Data sourced from QLFS 2015Q1, 2019Q1 and 2023Q1. Standard errors are in parentheses, rounded to three decimal places and are corrected for clustering. Estimates include adjustments for survey weights and are rounded to one decimal place.

Table A4: Determinants of Employment with Interactions between Graduates, Race and Year

Variables	(1) Employed	(2) Employed	(3) Employed	(4) Employed
No Schooling	-0.205*** (0.005)	-0.203*** (0.005)	-0.204*** (0.005)	-0.204*** (0.005)
Less Primary	-0.166*** (0.004)	-0.164*** (0.004)	-0.165*** (0.004)	-0.165*** (0.004)
Primary	-0.127*** (0.004)	-0.126*** (0.004)	-0.126*** (0.004)	-0.126*** (0.004)
Less Secondary	-0.108*** (0.002)	-0.107*** (0.002)	-0.107*** (0.002)	-0.107*** (0.002)
Non-graduate Tertiary	0.151*** (0.003)	0.150*** (0.003)	0.150*** (0.003)	0.150*** (0.003)
Graduate	0.184*** (0.006)	0.217*** (0.007)	0.229*** (0.007)	0.245*** (0.008)
Year	-0.008*** (0.000)	-0.007*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)
Graduate*Year	0.004*** (0.001)	0.003*** (0.001)	0.002** (0.001)	0.000 (0.001)
(30-39)	0.133*** (0.002)	0.132*** (0.002)	0.132*** (0.002)	0.132*** (0.002)
(40-49)	0.195*** (0.003)	0.194*** (0.003)	0.195*** (0.003)	0.195*** (0.003)
(50-59)	0.135*** (0.003)	0.134*** (0.003)	0.135*** (0.003)	0.135*** (0.003)
(60-65)	-0.150*** (0.004)	-0.151*** (0.004)	-0.151*** (0.004)	-0.151*** (0.004)
Coloured	0.042*** (0.004)	0.043*** (0.005)	0.031*** (0.007)	0.031*** (0.007)
Indian/Asian	-0.012** (0.005)	-0.010* (0.006)	-0.027*** (0.009)	-0.032*** (0.010)
White	0.076*** (0.004)	0.087*** (0.005)	0.057*** (0.006)	0.064*** (0.007)

Table A4 Continued

Graduate*Coloured		-0.021*	-0.023**	-0.028
		(0.012)	(0.012)	(0.018)
Graduate*Indian/Asian		-0.030**	-0.032**	-0.005
		(0.015)	(0.015)	(0.027)
Graduate*White		-0.066***	-0.070***	-0.113***
		(0.008)	(0.008)	(0.012)
Coloured*Year			0.001	0.001
			(0.001)	(0.001)
Indian/Asian*Year			0.002*	0.003**
			(0.001)	(0.001)
White*Year			0.004***	0.003***
			(0.001)	(0.001)
Graduate*Coloured*Year				0.001
				(0.002)
Graduate*Indian/Asian*Year				-0.003
				(0.003)
Graduate*White*Year				0.005***
				(0.002)
Female	-0.148***	-0.148***	-0.148***	-0.148***
	(0.002)	(0.002)	(0.002)	(0.002)
Urban	0.087***	0.087***	0.087***	0.087***
	(0.003)	(0.003)	(0.003)	(0.003)
Constant	0.540***	0.538***	0.542***	0.542***
	(0.004)	(0.004)	(0.004)	(0.004)
Observations	524,587	524,587	524,587	524,587
R-squared	0.142	0.143	0.143	0.143

Notes to Table A4: Data sourced from the QLFS 2008-2023. Age is restricted between twenty-five and sixty-five years. Estimates are rounded to three decimal places. Standard errors in parentheses. Coefficients are adjusted for QLFS survey weights and standard errors are corrected for clustering and stratification. *** p<0.01, ** p<0.05, * p<0.1

Table A5: Determinants of Employment with Birth Cohorts

Variables	(1) Employed	(2) Employed	(3) Employed	(4) Employed	(5) Employed
No Schooling	-0.297*** (0.004)	-0.267*** (0.005)	-0.271*** (0.005)	-0.271*** (0.005)	-0.202*** (0.005)
Less Primary	-0.210*** (0.003)	-0.205*** (0.004)	-0.206*** (0.004)	-0.206*** (0.004)	-0.166*** (0.004)
Primary	-0.155*** (0.004)	-0.157*** (0.004)	-0.157*** (0.004)	-0.157*** (0.004)	-0.128*** (0.004)
Less Secondary	-0.125*** (0.002)	-0.127*** (0.002)	-0.127*** (0.002)	-0.127*** (0.002)	-0.109*** (0.002)
Non-Graduate Tertiary	0.160*** (0.003)	0.153*** (0.003)	0.152*** (0.003)	0.152*** (0.003)	0.150*** (0.003)
Graduate	0.233*** (0.006)	0.234*** (0.006)	0.272*** (0.016)	0.315*** (0.062)	0.272*** (0.060)
Year	-0.008*** (0.000)	-0.007*** (0.000)	-0.010*** (0.001)	-0.010*** (0.001)	-0.012*** (0.001)
Graduate*Year	0.002*** (0.001)	0.001* (0.001)	0.001 (0.001)	-0.003 (0.005)	-0.000 (0.005)
(1940-1949)		-0.114*** (0.007)	-0.102*** (0.016)	-0.101*** (0.016)	-0.032* (0.018)
(1950-1959)		0.017*** (0.005)	0.123*** (0.014)	0.123*** (0.014)	-0.007 (0.016)
(1960-1969)		0.196*** (0.004)	0.193*** (0.013)	0.197*** (0.014)	0.041*** (0.015)
(1970-1979)		0.203*** (0.004)	0.131*** (0.013)	0.132*** (0.013)	0.023* (0.014)
(1980-1989)		0.121*** (0.004)	0.008 (0.013)	0.010 (0.013)	-0.018 (0.013)
(1940-1949)*Year			-0.028*** (0.004)	-0.028*** (0.004)	-0.016*** (0.004)
(1950-1959)*Year			-0.019*** (0.001)	-0.019*** (0.001)	0.003** (0.001)
(1960-1969)*Year			-0.001 (0.001)	-0.002 (0.001)	0.004*** (0.001)
(1970-1979)*Year			0.008*** (0.001)	0.008*** (0.001)	0.007*** (0.001)
(1980-1989)*Year			0.012*** (0.001)	0.012*** (0.001)	0.007*** (0.001)
(1940-1949)*Graduate			-0.067** (0.032)	-0.097 (0.074)	-0.109 (0.072)
(1950-1959)*Graduate			-0.057*** (0.018)	-0.069 (0.063)	-0.082 (0.062)
(1960-1969)*Graduate			-0.044*** (0.015)	-0.121** (0.062)	-0.112* (0.060)
(1970-1979)*Graduate			-0.051*** (0.015)	-0.084 (0.062)	-0.069 (0.061)
(1980-1989)*Graduate			-0.013 (0.015)	-0.053 (0.064)	-0.043 (0.063)

Table A5 Continued

(1940-1949)*Graduate*Year				-0.004 (0.021)	-0.008 (0.020)
(1950-1959)*Graduate*Year				-0.001 (0.006)	-0.003 (0.006)
(1960-1969)*Graduate*Year				0.008 (0.005)	0.006 (0.005)
(1970-1979)*Graduate*Year				0.002 (0.005)	0.001 (0.005)
(1980-1989)*Graduate*Year				0.003 (0.006)	0.002 (0.006)
(30-39)					0.091*** (0.004)
(40-49)					0.126*** (0.006)
(50-59)					0.084*** (0.007)
(60-65)					-0.147*** (0.009)
Urban					0.087*** (0.003)
Coloured					0.042*** (0.004)
Indian/Asian					-0.013** (0.005)
White					0.078*** (0.004)
Female					-0.149*** (0.002)
Constant	0.658*** (0.003)	0.516*** (0.005)	0.0556*** (0.013)	0.554*** (0.013)	0.566*** (0.013)
Observations	524,587	524,587	524, 587	524,587	524,587
R-squared	0.072	0.098	0.105	0.105	0.144

Notes to Table A5: Data sourced from the QLFS 2008-2023. Age is restricted between twenty-five and sixty-five years. Estimates are rounded to three decimal places. Standard errors in parentheses. Coefficients are adjusted for QLFS survey weights and standard errors are corrected for clustering and stratification. *** p<0.01, ** p<0.05, * p<0.1

Table A6: Probit Model of the Determinants of Employment

Variables	(1) Employed	(2) Employed	(3) Employed	(4) Employed	(5) Employed
No Schooling	-0.771*** (0.012)	-0.736*** (0.013)	-0.729*** (0.013)	-0.729*** (0.013)	-0.566*** (0.013)
Less Primary	-0.536*** (0.009)	-0.550*** (0.010)	-0.548*** (0.010)	-0.548*** (0.010)	-0.445*** (0.010)
Primary	-0.394*** (0.011)	-0.416*** (0.012)	-0.416*** (0.012)	-0.416*** (0.012)	-0.338*** (0.012)
Less Secondary	-0.318*** (0.006)	-0.333*** (0.006)	-0.333*** (0.006)	-0.333*** (0.006)	-0.287*** (0.006)
Non-Graduate Tertiary	0.450*** (0.010)	0.445*** (0.010)	0.445*** (0.010)	0.445*** (0.010)	0.454*** (0.010)
Graduate	0.805*** (0.027)	0.807*** (0.027)	0.782*** (0.041)	0.776*** (0.071)	0.684*** (0.075)
Year	-0.021*** (0.001)	-0.022*** (0.001)	-0.031*** (0.001)	-0.031*** (0.001)	-0.030*** (0.001)
Graduate*Year	-0.004 (0.003)	-0.003 (0.003)	-0.003 (0.003)	-0.003 (0.007)	0.003 (0.008)
(30-39)		0.365*** (0.007)	0.310*** (0.012)	0.310*** (0.012)	0.309*** (0.012)
(40-49)		0.553*** (0.008)	0.471*** (0.013)	0.469*** (0.013)	0.454*** (0.013)
(50-59)		0.405*** (0.009)	0.253*** (0.014)	0.256*** (0.014)	0.211*** (0.015)
(60-65)		-0.427*** (0.012)	-0.518*** (0.020)	-0.520*** (0.020)	-0.602*** (0.021)
(30-39)*Year			0.007*** (0.002)	0.007*** (0.002)	0.007*** (0.002)
(40-49)*Year			0.010*** (0.002)	0.010*** (0.002)	0.011*** (0.002)
(50-59)*Year			0.019*** (0.002)	0.018*** (0.002)	0.020*** (0.002)
(60-65)*Year			0.013*** (0.002)	0.013*** (0.002)	0.015*** (0.003)
Graduate*(30-39)			0.086** (0.041)	0.093 (0.087)	0.137 (0.091)
Graduate*(40-49)			0.074* (0.042)	0.134 (0.089)	0.148 (0.093)
Graduate*(50-59)			0.048 (0.043)	-0.025 (0.092)	-0.064 (0.096)
Graduate*(60-65)			-0.170*** (0.050)	-0.133 (0.107)	-0.218** (0.111)
Graduate*(30-39)*Year				-0.001 (0.009)	-0.005 (0.010)
Graduate*(40-49)*Year				-0.007 (0.010)	-0.009 (0.010)
Graduate*(50-59)*Year				0.008 (0.010)	0.007 (0.010)
Graduate*(60-65)*Year				-0.004 (0.011)	-0.003 (0.011)

Table A6 Continued

Coloured					0.117*** (0.012)
Indian/Asian					-0.036** (0.016)
White					0.260*** (0.013)
Female					-0.421*** (0.006)
Urban					0.242*** (0.008)
Constant	0.407*** (0.008)	0.125*** (0.009)	0.193*** (0.012)	0.193*** (0.012)	0.178*** (0.013)
Observations	524,587	524,587	524,587	524,587	524,587

Notes to Table A6: Data sourced from the QLFS 2008-2023. Age is restricted between twenty-five and sixty-five years. Estimates are rounded to three decimal places. Standard errors in parentheses. Coefficients are adjusted for QLFS survey weights and standard errors are corrected for clustering and stratification. *** p<0.01, ** p<0.05, * p<0.1