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The relationship between tertiary education and employment in South Africa

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The relationship between tertiary education and employment in South Africa

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Abstract

Studies worldwide have proven that there is a positive correlation between education and employment. Education equips people with the knowledge and skills that best prepare them for the workplace, and such knowledge enables individuals to execute their job responsibilities effectively. This has necessitated individuals acquiring higher levels of education, particularly tertiary education, due to it yielding the highest returns to education, as research has conveyed. Therefore, this becomes the motivation for individuals to acquire tertiary education as a means of signalling their potential productivity and competence. The primary objective of this dissertation is to investigate the relationship between tertiary education and employment in South Africa using the General Household Survey. Whilst South African and international literature has explored this relationship, limited studies have disaggregated the levels of tertiary educational attainment. Disaggregating tertiary education is particularly important because it provides a nuanced understanding of how each level influences employment outcomes. This dissertation uses a logit model to estimate employment outcomes and disaggregates tertiary educational attainment levels into their respective National Qualification Framework (NQF) Levels. This investigation is undertaken with a particular focus on how tertiary educational attainment influences labour market outcomes across different age cohorts, genders, and amongst the African populace in South Africa by using descriptive statistics and regressions. The results indicate that there are positive and significant differences in the returns to tertiary educational attainment when observing employment outcomes. There is a greater proportion of employed individuals possessing a masters or doctoral degree, followed by those with honours and bachelors degrees. Those with a masters or doctoral degree are associated with the highest probability of being employed compared to individuals with primary or no schooling. When observing this relationship across gender, women have higher returns to tertiary educational attainment than men. In the age cohort analysis, the findings suggest that possessing tertiary education positively and significantly influences employment outcomes and that this relationship varies by age cohort. Individuals in the mid-career (30-39 and 40-49) age cohort reap the most returns to tertiary education due to their experience, whereas the youngest cohort yields relatively lower results. Older cohorts experience diminishing returns to tertiary education due to approaching retirement and health issues. This is consistent with the model for African individuals. All South African race groups have a significantly greater probability of being employed compared to Africans.

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Chapter 1: Introduction

1.1 Background and motivation

Education equips people with the knowledge and skills that best prepare them for the workplace, enabling individuals to execute their job responsibilities effectively. A substantial body of international research consistently demonstrates that higher levels of education are substantially correlated with favourable labour market outcomes. This is consistent across various contexts, whether in cross-country comparative studies (for example, Núñez and Livanos (2010) for Europe), country-specific research (such as Yahong and Khan's (2015) study on China), or wider analysis of developing regions, as demonstrated by Patrinos et al (2019). Studies have consistently shown that higher levels of education are associated with higher earnings and thus make education attractive to individuals (Oswald-Egg and Renold, 2021; Fredericks and Yu, 2018).

Collectively, these studies highlight the crucial role of higher education in enhancing employment outcomes. In addition, these studies, along with others, stress that the advantages of tertiary education in relation to employment outcomes are not uniformly distributed across demographics; instead, they demonstrate considerable variations by age and gender (Marelli & Vakulenko, 2016; Oswald-Egg and Renold, 2021; Roberts and Schöer, 2021; Roberts, 2022).

Given the enduring legacy of apartheid, which continues to manifest in deep-rooted poverty and South Africa's position as the most unequal society in the world, tertiary education emerges not merely as a vehicle for personal development but as an essential instrument for social change and economic empowerment (Francis and Webster, 2019). Therefore, this dissertation explores the relationship between tertiary education and employment outcomes in South Africa.

This focus on higher education aligns with the objectives of the United Nation's Sustainable Development Goals (SDG). The targets for SDG 4 include ensuring equitable access to affordable and high-quality technical, vocational, and tertiary education and significantly expand the number of youth and adults with the necessary skills, including technical skills for employment and decent jobs by 2030 (Mthembu and Nhamo, 2021). The SDG 8 goal is also highly relevant in this dissertation in that it promotes inclusive growth, productive

employment, and the reduction of labour market inequalities by 2030 (Mthembu and Nhamo, 2021).

The Higher Education Act of 1997 and the National Student Financial Aid Scheme (NSFAS), which became a statutory body in 1999, were some of the policy interventions implemented to redress the imbalances caused by the apartheid system (Hay and Monnapula-Mapesela, 2009; Jackson, 2002). The Act emphasises oversight and transparency, funding, and making sure that the citizens of the country have equal access to tertiary education, particularly groups that were previously disadvantaged (Republic of South Africa, 1997).

The Department of Higher Education and Training (DHET) (2025) reported that Higher Education Institutions more than doubled the enrolment they had in 1994 of 495 356 by reaching 1 077 768 and 1 071 715 in 2022 and 2023, respectively. According to the Twenty-Year Review of South Africa: Education (1994-2014), substantial progress was made in increasing access to higher education. Between 1991 and 2011, the government facilitated access by providing financial assistance to 991 759 students through NSFAS, amounting to approximately R25 billion in loans and bursaries (South African Government, 2013). According to the DHET (2024), public spending on Post School Education and Training rose from R69 billion in 2018 to R116.4 billion in 2021/22.

To provide financial support to students from impoverished and working-class families due to the increased access to tertiary education, the NSFAS budget in 2022/2023 was R49 billion, of which the Department of Higher Education and Training contributed R45.9 billion (SA Government, 2022). During the same financial year, the National Skills Fund provided additional budget support of R866 million for scholarships and bursaries, which is composed of R221 million to the National Research Fund, R527 million to NSFAS, R80 million to the Department of Agriculture, Land Reform and Rural Development, and approximately R37.9 million to the DHET Internal Scholarship (SA Government, 2022). The allocation of extensive public resources towards increasing access to tertiary education has contributed to a significant increase in the number of individuals with tertiary education, thereby justifying further investigation of how this expanded tertiary education access relates to employment outcomes in South Africa.

International and South African literature has provided substantial evidence of the role that tertiary educational attainment plays in influencing employment outcomes (Núñez and Livanos, 2010; Branson and Leibbrandt, 2013; Kraak, 2015; Marelli and Vakulenko, 2016;

Fredericks and Yu, 2018; Psacharopoulos and Patrinos, 2018; Posel and Casale, 2019; Yahong and Khan, 2021). However, whilst substantial strides have been achieved in this area of research, there are still notable gaps within the literature.

When investigating the relationship between educational attainment and labour market outcomes, most studies group all tertiary education qualifications into one category (Núñez and Livanos, 2010; Branson and Leibbrandt, 2013; Marelli and Vakulenko, 2016; Fredericks and Yu, 2018; Psacharopoulos and Patrinos, 2018; Yahong and Khan, 2021). In contrast, limited studies disaggregate tertiary education into its respective levels (Van der Berg and Van Broekhuizen, 2012; Kraak, 2015). This dissertation adopts this disaggregated approach, using the National Qualification Framework (NQF) to separate the levels, with the overall aim of providing a nuanced understanding of how the different levels of tertiary education relate to employment outcomes using recent data. This dissertation achieves its overall aims by addressing the following four objectives:

i. To provide an overview of tertiary education and employment status for South African men and women.
ii. To assess the value of using a disaggregated tertiary education indicator to estimate the relationship between education and employment status.
iii. To determine whether the relationship between tertiary education and employment status differs by age-cohort or gender
iv. To investigate the relationship between tertiary education and employment status for the African subsample in South Africa.

The empirical research is conducted using data from the General Household Survey (GHS), a nationally representative cross-sectional survey that has been undertaken by Statistics South Africa (Stats SA) annually since 2002 (Stats SA, 2023). The GHS collects data on a wide range of socioeconomic factors, such as education, health, gender, race, geographical location, and household composition, that influence an individual's employment outcomes. Furthermore, this dataset is particularly important due to how it defines every level of tertiary educational attainment following the NQF levels.

The remainder of this dissertation is structured into the following chapters, each of which explores a specific dimension of the topic under investigation. Chapter 2 explores pertinent literature and economic theories on tertiary education and employment outcomes and suggests reasons employment outcomes may differ across age, gender, and race. This is followed by a

discussion of empirical findings from international and South African studies that are pertinent to the topic of tertiary education and employability.

Chapter 3 begins with an overview of the South African nationally representative household surveys that contain relevant education, household, and employment information that could be used to investigate this topic. It discusses the chosen dataset and variables of interest used in this study. Descriptive statistics are presented that highlight how the employment status of an individual at each level of education varies considerably across age cohorts and gender in South Africa. This analysis is repeated for African individuals only, given that they were the most historically disadvantaged group under apartheid.

Chapter 4 provides a discussion of the methods used in the multivariate analysis. This is followed by the presentation of results and interpretations of the logit estimations of employment, and an in-depth analysis of the findings. Lastly, the limitations of the chosen methods are outlined and acknowledged.

The last chapter, Chapter 5, concludes this dissertation by presenting a summary of the overall findings from each chapter and the contribution of the study. A brief discussion on policy recommendations will follow.

Chapter 2: Literature review

This dissertation investigates the relationship between tertiary education and employment in South Africa. The United Nations' SDG 8 provides valuable context for understanding how education can contribute to achieving productive employment and dignified work (Venkatesan and Luongo, 2019). This study seeks to explore how the different levels of educational attainment influence employment outcomes, which can be contended as contributing to improving an individual's living standards. This is consistent with the United Nations' SDG 8's commitment to providing full and productive employment for everyone (Venkatesan and Luongo, 2019).

The relevance of the SDG 8 goal in this dissertation is that it promotes inclusive growth and the reduction of labour market inequalities. Part of the objectives of this dissertation are to investigate how tertiary education influences access to employment opportunities across different race groups and age cohorts, which are unalterable characteristics as noted by Spence's (1978) definition of indices. It can be argued that by uncovering the disparities in labour market outcomes, this dissertation can assist in highlighting the importance of SDG 8 in reducing inequalities in access to decent employment through the development of human capital using education.

After highlighting the importance and relevance of the United Nations SDG Goal 8, it is critical to consider how national policies, such as the Higher Education Act of 1997, advance these ideas and objectives. The Higher Education Act of 1997 serves an essential role in developing human capital by improving access to tertiary education, which is necessary for equipping individuals with the skills and tools that are required to engage in productive employment. Its primary purpose is to provide an accessible, equitable and exceptional higher education system that assists with achieving the country's social and economic development. It was intended to address the serious inequities that were created by apartheid, mainly the exclusion of Black South Africans from high-quality tertiary education (Republic of South Africa, 1997).

The Higher Education Act of 1997 was formulated as a countermeasure to address the shortcomings of the Extension of University Education Act, Act 45 of 1959. It is essential to gain a comprehensive context of the background of educational access and how it affected South African labour market outcomes. This law was created to restrict and regulate higher education for African people in South Africa, which limited their access to tertiary education

and influenced the structure of the country's educational system (Republic of South Africa, 1997).

Following the implementation of the Higher Education Act of 1997, which sought to reform the higher education system in South Africa by encouraging fairness and accessibility. The National Student Financial Aid (NSFAS) was essential in carrying out this purpose. NSFAS was created to provide financial assistance to students who come from previously disadvantaged backgrounds and make tertiary education accessible to more people (Pillay, Bhorat and Asmal, 2021). The NSFAS funding strategy evolved following the Higher Education Act, and ensures that individuals from low-income families can enrol in tertiary educational institutions, therefore rectifying the inequities perpetuated by apartheid (Pillay, Bhorat and Asmal, 2021). NSFAS substantially enhances the accessibility of education by lowering financial obstacles, which contributes to the act's overall objectives of inclusiveness and equity.

Expanding on the role of NSFAS in improving access to tertiary education, studies have shown that there is a positive correlation between education and employment, as education equips people with knowledge and skills that best prepare them for the workplace. Such knowledge enables individuals to execute their job responsibilities effectively and efficiently (Schultz, 1961). This is then justified by the notion that economies around the world have significantly progressed, thus increasing the need to acquire more skilled labour (Schultz, 1961). It then becomes necessary to gain a more comprehensive understanding of how educational attainment may influence labour market outcomes as individuals equip themselves with more skills and education to get a favourable position. According to a report conducted by The Department of Higher Education and Training (2022), enrolments in public higher education institutions from 2009 to 2020 increased by more than 30.7 percent. The expansion in the accessibility of education, particularly tertiary education, may increase the number of people with tertiary education qualifications. This has a probability of providing them with better labour market outcomes, enabling them to potentially enhance their socio-economic circumstances.

The remainder of this chapter is structured as follows. The following section provides the theoretical framework, which consists of the theory of labour participation and allocation of time, the human capital theory and Spence’s signalling theory, which underpins the relationship between tertiary education and employment status. This is followed by the analysis of the

empirical literature regarding tertiary education and employment status within the developed and South African contexts.

2.1 Theoretical framework

The three main economic theories that will assist in explaining the relationship between education and employment are namely, the theory of labour participation and allocation of time, the human capital theory and the signalling theory.

2.1.1 Theory of labour participation and allocation of time

Gary Becker's Theory of Allocation of Time and Treatise on the Family, perceives time as being a limited resource that people divide among a variety of activities to optimise their utility (Becker, 1965). Through the theory, Becker (1965) asserts that individuals and households determine how to spend their time by evaluating the marginal returns of various activities, such as household production, leisure and labour market. The allocation of resources is influenced by how an individual intends to optimise their utility, depending on factors such as labour market outcomes, wages, family responsibilities, cost of goods and services and what the individual prefers (Becker, 1965; Lundberg and Pollak, 1996; Chiappori and Lewbel, 2015). In the context of household decision-making, Becker (1965) explores the concept of comparative advantage. He suggests that households allocate time by considering the levels of efficiency in executing specific duties. An illustration of this would be if a household member possesses a higher earning potential in the labour market, or favourable employment outcomes, that individual has a higher likelihood of specialising in the labour market and less time in household production as they receive more utility when working (Becker, 1965).

Consistent with this rationale, John Mincer (1962) lays the foundation for Becker’s work by discussing the significance of specialisation inside the household in his work on labour supply and human capital. He advances the idea that in a two-member household, one partner, usually the man, focuses or specialises in the labour market, whilst the other partner, normally the woman, focuses on domestic production (Mincer, 1962; Pollak, 2003). Mincer (1962) holds that such can be perceived as an efficient strategy to optimise overall productivity and well-being. In his analysis, Mincer (1962) proposes that women's time allocation is affected by a potentially lower return on the investment they make in the labour market in comparison to

their male counterparts. He adds that this can be attributed to circumstances that can cause interruptions in their careers, such as time spent on childbearing and rearing, household responsibilities, and household composition. Consequently, women may intuitively devote more time to household production as it is economically rational, provided their lower returns to human capital compared to men. This economic decision is largely influenced by diminished potential earnings due to career interruptions, which implies that the opportunity costs of forgone wages are lesser for women than men (Mincer, 1962).

Becker (1965) proposes the idea of the theory of labour force participation to expand his philosophy of the allocation of time. It serves as a proponent that explains that individuals will opt to participate in the labour market should the benefits gained from the market, outweigh the potential costs. Highly favourable labour market outcomes and higher wages encourage higher labour force participation, whereas lower wages may cause individuals to devote more of their time to domestic production or leisure. He articulates the idea that the theory considers how an individual's participation in the labour market varies over their lifetime (Becker, 1965). Individuals earlier in their lives may prioritise investing more in their education and may delay labour force involvement, whereas later in life, they may minimise their participation as they near retirement. This is consistent with the ideas that he proposes on the theory of time allocation, as he argues that an individual's time allocation fluctuates throughout their life. An example of this, young adults may invest more time in enhancing their human capital through education, middle-aged adults might invest more of their time in their labour market, and older individuals may allocate a large portion of their time to leisure or retirement (Becker, 1965)

For women (particularly those who are married), the decision to participate in the labour market is multidimensional and thus cannot be merely analysed in terms of time allocation between leisure and market activities (Grossbard, 2015). A third component that married women spend their time on is housework. Furthermore, it is imperative to acknowledge a critique of the work-leisure choice dichotomy, which states that the theory fails to consider that women typically have to choose between work, leisure and household production. Married couples provide evidence of this because the household has to decide who will specialise in homemaking tasks that are a required service instead of engaging in labour market opportunities for an income. In many instances, women usually tend to take the responsibility of tending to household production and specialisation in homemaking tasks, thus forgoing potential leisure or any labour market outcomes (Goldin, 1989).

Mincer (1962) makes a compelling argument by stating that in large households, there exists the need to allocate financial resources effectively and efficiently to maximise utility. For instance, a large household may place greater emphasis on purchasing goods that are the best substitute for time, like spending on ready-made meals, washing machines or hiring a domestic assistant, thereby reducing the time strain on the household members. Mincer (1962) states that the income effect may be significantly greater in larger households, especially if there is a reliance on one or a limited number of income earners within the household. The necessity to earn enough income to provide support for additional family members can exert compulsion on individuals to obtain employment or work additional hours (Mincer, 1962)

The theoretical foundation proposed by Mincer's analysis of human capital and career interruptions and Becker's idea of time allocation in the household, lays an appropriate block to explore the role of women in participating in the labour force, considering how they are uniquely affected by the complex relationship between household responsibilities, leisure and employment. Thus, it is essential to investigate how other studies have applied these theories.

The significance of the theory of time allocation to this dissertation is that it highlights how household composition, marriage or family responsibilities, gender roles, and health influence time allocation, affecting an individual's participation in the labour market. The theory provides a fundamental insight into how to analyse how distinct time investments shape employability in the long run, especially when individuals face obstacles such as family, financial and societal standards, which affect labour market outcomes.

The theory of labour participation and allocation of time has demonstrated how the decision to supply labour to the market is influenced by potential earnings. The human capital theory will explain how education influences an individual's performance in the labour market. The idea that possessing higher education, training, and more work experience contributes to better labour market outcomes provides a thought-provoking insight into understanding employability, which is a focus of this dissertation. The idea of time allocation provided by authors referenced above creates a foundation to explore how education and work experience impact the employability of different demographic groups.

2.1.2 Human capital theory

An alternative yet complementary theory is the human capital theory. The theory is initially introduced by Adam Smith in 1776 in his book, The Wealth of Nations (Teixeira, 2014). It can be pointed out that even though Smith does not utilise the term human capital, he proposes the idea of the theory by recognising that the obtained and productive skills of people are a crucial component of a nation's wealth and economic development (Becker, 2009). The theory is further extended by Mincer (1962) and Schultz (1961) to a microeconomic perspective, who assert that everyone possesses a set of talents or aptitudes that can be accumulated or developed through education and a training process (Schultz, 1961). If an individual continuously invests in their human capital, this will be accompanied by an expansion in their value in the marketplace as they provide more skills and productivity at their jobs.

Gary Becker and Jacob Mincer can be acknowledged as being amongst the first economists to apply the human capital theory (Teixeira, 2014). Becker (1964), in his initial approach, formulates a framework of individual investment in human capital. Through this perspective, human capital is comparable to the physical productive resources. Becker (1964) further argues that investment placed in human capital indicates every action that can influence future real income by investing resources in individuals. According to Weisbrod (1966), human capital investments comprise costs associated with education, training, health, and labour mobility. Sweetland (1996) advances on the idea that improvement in human capital improves an individual's labour market outcomes and also helps reduce social costs such as crime as they are faced with favourable economic conditions.

Schultz (1961) presents his notion of human capital that is consistent with Becker (1964) and Mincer (1962) by claiming that both knowledge and skill can be considered as being a type of capital, and that such capital is a consequence of direct investment made by an individual. Schultz (1961) draws a direct correlation between higher levels of investments in human capital and higher wage levels for everyone. According to Schultz (1961), investments in human capital should concentrate on helping individuals further their education because it is knowledge and skills that determine an individual's capacity to perform productive labour. Schultz (1961) asserts that health is a critical aspect of human capital. He contends that to enhance levels of productivity and economic growth, investing in health and education is vital. Schultz (1961) highlights the notion that healthier individuals are more productive, and the more likely it is that they have the capacity to comprehend and absorb education, which can

further suggest that they are also capable of working more hours than individuals who are not. Ishiwa and Ryan (2002) argue that the amount that an individual earns is largely influenced by their level of human capital.

Having discussed the various definitions of different scholars regarding the human capital theory, it is critical to expand the idea of the theory by focusing on the crucial factors that influence human capital. This exploration provides an in-depth understanding of how elements such as education and skills development, health, household composition, environment, gender and marriage contribute to enhancing human capital, ultimately determining an individual's employment outcomes.

It is crucial to detail the influence of gender on the accumulation of human capital due to factors such as household production that hinder one's ability to further their education through studies or training and gain work-related experience. Mincer's (1962) work expresses the idea that women's capacity to enhance their human capital skills is usually disrupted by marriage, childbirth and caregiving responsibilities. Women usually assume such roles due to traditional societal norms and specialisation. Men tend to focus more on the labour market due to having more of an advantage there, so dividing the responsibilities becomes important (Mincer, 1962). This idea is initially explored in the theory of labour force participation and time allocation.

Provided that gender differences in the accumulation of human capital have been explored, it is important to analyse household composition, which is a proxy for individuals in a household, including adults, children, and dependents substantially influence human capital accumulation. Mincer (1962) argues that households with limited financial resources may prioritise the investment in educational attainment for some members of the household. This suggests that in larger households that consist of more dependents, parents may possess limited resources to invest in their children's education and training or other household members. This can be considered as being a factor that reduces the overall human capital formation in the household.

According to Bloch and Smith (1977), the return to education is something that can be considered as being dependent on two interconnected channels. These are, namely, the higher worker incomes along with higher levels of productivity for the firm that is associated with expanded employment probabilities.

Sweetland (1996) offers a compelling perspective by highlighting the significance of the environment in shaping human capital. He contends that an individual's ability to accumulate and utilise their human capital is substantially influenced by their environment, which includes

aspects such as family background, the schooling system, and socioeconomic conditions. The idea presented by Sweetland suggests that human capital is not only influenced by inherent capabilities and investments but is also significantly impacted by external factors. This fosters a deeper understanding that these external aspects can either promote or impede the development of skills, knowledge and abilities. An illustration would be, a constructive educational environment and having favourable family finances can help build human capital, whereas negative socioeconomic conditions can impede it.

The relevance of the human capital theory to this dissertation lies in its ability to capture how individuals can enhance their employment prospects by developing their capabilities and potential through acquiring skills, education, and training. This provides a solid foundation and understanding when investigating how educational attainment influences employability. This theory will be notably critical in assisting to address one of the specific objectives of this study, which seeks to investigate if there is a difference in graduates' employability across the different levels of tertiary qualifications.

When investigating employability using human capital theory, multiple important variables are critical in influencing employment outcomes. These variables comprise educational attainment, age, work experience, marital status, household composition, labour force participation and gender. The interaction of these variables contributes to an individual's decision-making toward human capital development and labour market involvement. The level of education is critical in determining employability since higher education levels are often correlated with high human capital levels, which leads to favourable employment outcomes and higher income. This idea will be essential when investigating employability across the different levels of tertiary education qualifications.

A criticism of the theory is that it is complicated to measure. To estimate the impact that education may have on productivity requires a calculation of the education and training along with the productivity that a particular person has (Zizzamia and Ranchhod, 2019). A further shortcoming is in terms of its failure to account for how to measure a worker's productivity level and future labour market outcomes that are associated with a specific career (van Broekhuizen, 2009).

2.1.3. Signalling theory

To acquire a comprehensive understanding of the labour market, one can draw upon the seminal paper of Michael Spencer, on the "Job Market Signalling", where he investigates how signals like education influence employment decisions in the labour market. The study proposes the idea that the employer is unable to examine an applicant's productivity directly; thus, there exists a reliance on observable attributes, some of which are adjustable or alterable, signals, whereas others are not, indices. Spencer (1978) advances the argument that education is a great example of a signal in which applicants might invest to enhance their perceived productivity.

In his seminal paper, Spence (1978) further emphasises that the value of a signal, such as an educational qualification, is derived from its capacity to distinguish one candidate from another when observed by employers. The effectiveness of such a signal lies in its relative scarcity and thus providing substantial information about the candidate's potential productivity (Spence, 1978). Therefore, this implies that as more individuals obtain the same qualification, be it a degree or a certificate, the signalling value of such credentials diminishes, and it becomes less effective in differentiating candidates. When a signal becomes too prevalent, it loses the ability to convey distinctive information about a candidate's productivity, resulting in market saturation (Spence, 1978; Weiss, 1995).

The relevance of this argument to this dissertation lies in its ability to elucidate how the acquisition of education or certifications serves as a signal of an individual's productivity and competence within the labour market. This can serve as a motivating factor for individuals to pursue higher levels of education, as these qualifications are generally less common and, therefore, may serve as stronger signals of competence, potentially enhancing employability.

In his exploration of Job Market Signalling, Spence (1978) elaborates on the concept of indices, which refers to unchangeable characteristics such as race, gender, or age, which significantly influence an individual’s employability by shaping how employers perceive signals such as education or work experience. He adds that employers can interpret these signals differently in correspondence to an individual’s indices, leading to biases or disparities in perceived competency or productivity, which results in varying levels of employability (Spence, 1978). Spence (1978) expands his argument that indices can additionally affect the range of opportunities available to individuals, with certain demographic groups experiencing persistent inequalities in the labour market despite possessing comparable qualifications.

Spence (1978) expands his notion by proposing that individuals with particular indices may potentially experience higher signalling costs since they may need to invest more in education or skills as a means of counteracting biases; however, they still obtain lesser returns on these investments. Therefore, indices assume an essential role in influencing labour market outcomes, frequently resulting in unequal opportunities and rewards that do not necessarily correspond with an individual's actual productivity.

The relevance of Spence's idea of indices to this dissertation is that it allows for a more nuanced evaluation of how education interacts with the different demographic characteristics to influence labour market outcomes. This method allows for not only just the investigation of the direct influences of education on employability, but also the intricate ways that unalterable characteristics impact the efficacy of educational signals in the labour market. This is relatively significant to this dissertation because it assists with establishing the fundamental understanding of the importance of why it seeks to improve employability amongst graduates across different age cohorts and race groups.

The conclusive thought on this section is that a strong foundation for comprehending the intricate connection between tertiary education and employment is established by the theory of labour force participation and time allocation, the human capital theory and the signalling theory. The theory of labour force participation and time allocation illustrates how people choose to enter the labour market based on factors which include educational attainment, household responsibilities and potential earnings. These decisions are influenced by demographic indicators such as access to education, traditional gender roles and household composition, which influence how much time to allocate in the labour market versus household production.

This is further strengthened by the human capital theory, which perceives education as a kind of investment that increases productivity and consequently, labour market returns. The theory is essential to this dissertation because it suggests that there are distinct employment outcomes across different education levels and age cohorts.

Furthermore, the signalling theory enhances the understanding of the relationship between tertiary education and labour market outcomes by providing information on how employers evaluate educational qualifications or certificates when making decisions to employ a candidate. The theory provides a rationale as to why individuals have a desire to pursue higher

levels of education and how it affects their employability in the labour market, where there are different degrees of competition.

It is important to state that these interrelated theories provide a meticulous lens to explore the ways that tertiary education impacts employment in South Africa. By combining these theoretical frameworks, a more comprehensive analysis arises as they allow for the investigation of how socioeconomic and demographic indicators such as age, race, gender and the makeup of the household influence employability in addition to the influence of educational attainment.

2.2 Empirical research

This section reviews empirical literature on the relationship between tertiary education and employment, concentrating on key variables that shape labour market outcomes. It examines how different levels of education and socioeconomic factors influence employment prospects, drawing on evidence from developed countries and the South African context. For each theme identified, the discussion will first consider international evidence before narrowing it down to the South African literature.

2.2.1 Patterns of higher education and employment

International studies, such as the work done by Núñez and Livanos (2010) and Psacharopoulos and Patrinos (2018), consistently demonstrate a positive correlation between higher education and employment outcomes. The studies use the human capital theory as the foundation to examine this impact. This is particularly relevant as it is one of the theoretical frameworks of this dissertation and provides an interesting perspective as to how developed countries apply it in their analysis of the impact of tertiary education and employment. Núñez and Livanos's work (2010) empirically investigates the effect of possessing an academic degree and field of study on unemployment across distinct European countries using a multinomial logit. In their analysis, they find that tertiary education consistently results in favourable labour market outcomes.

Moreover, Núñez and Livanos (2010) find that individuals who possess academic degrees have a higher likelihood (relative to individuals possessing a medium level of education) of being employed rather than unemployed in the short term. The findings further reveal that those with

a university qualification have a lower probability of being long-term unemployed than individuals who do not have a university qualification. This serves as an indication that higher education does improve the potential employment outcomes of graduates in the European context, as it lessens the probability and period of unemployment. Comparable views are expressed by Psacharopoulos and Patrinos (2018) in their study, which offers a comprehensive analysis of the returns on education from a worldwide perspective, using a database of 1 120 estimates in 139 countries. The study implements a full discounting method and the Mincerian earnings function and reveals that tertiary education continuously results in improved employment wages, particularly in developing regions. Additionally, this demonstrates the importance of tertiary education as it equips individuals with skills and educational qualifications that substantially improve employability and employment outcomes.

The empirical work of Yahong and Khan (2015) explores the relationship between educational attainment and health status and a person's likelihood of being employed in China. The study utilises the 2015 Chinese General Social Survey. The study uses a binary logistic regression estimation and finds that individuals who possess tertiary education in China have a better likelihood of being employed when compared to those who have less or zero education (Yahong and Khan, 2021). It is discovered that those with university degrees and higher qualifications (honours, masters) have a more than 80 percent likelihood of being employed when compared to those who have college diplomas and higher certificates (Yahong and Khan, 2021).

While international studies have provided insight into the patterns of higher education and employment, it is essential to examine how these trends materialise within the South African context. South Africa provides a distinctive contextual landscape for investigating the impact of tertiary education on employment, due to the historical inequities in access to schooling by the majority of the populace and the rapid expansion post-apartheid. The DHET (2025) reveals that Higher Education Institutions experienced more than a twofold increase in the enrolment they had in 1994 of 495 356 by reaching 1 077 768 and 1 071 715 in 2022 and 2023, respectively. The expansion in access to tertiary education has assisted many people in gaining labour market opportunities. However, much higher general rates of unemployment with persistent racial inequalities are still witnessed as South Africa is characterised by extreme socioeconomic disparities, as it is considered the most unequal society in the world (DHET, 2022).

According to a study by Branson and Leibbrandt (2013), tertiary education is correlated with favourable labour market outcomes, better standards of employment and well-paying jobs in South Africa. The study uses seventeen nationally representative cross-sectional household surveys from 1994 to 2010, consisting of the October Household Surveys, Labour Force Surveys, the GHS and the Post-Apartheid Labour Market series. The study implements a variety of econometric models: a semi-log linear regression, a linear probability model of employment, and a Heckman selection model using maximum likelihood estimation.

Bhorat et al (2017) use the CHEC Graduate Destination Survey dataset to implement a descriptive and probit analysis and find that employment outcomes of those with and without tertiary education vary significantly. The study finds that individuals who possess tertiary degrees demonstrate significantly stronger employment returns than individuals who have a diploma or a higher certificate. The study reveals that possessing a tertiary education qualification is not a definitive predictor of favourable labour market outcomes, and there are variations in graduates' employment outcomes. This is consistent with the study by Branson and Leibbrandt (2013), which stresses that greater access to education does not always result in improved employment outcomes, particularly for historically marginalised groups like Black South Africans. The study proposes that while the number of individuals with tertiary education has increased due to educational expansion, many people are unable to fully take advantage of this due to structural challenges in the labour market, such as high unemployment levels and mismatches between skill sets and job availability.

Van der Berg and Van Broekhuizen (2012) find similar results to studies by Branson and Leibbrandt (2013) and Bhorat et al (2017) when analysing levels and patterns of graduate unemployment. The study uses data from the October Household Survey 1995 to 1999, the Labour Force Survey 2000-2007, and the QLFS 2008Q3 to 2011Q3. Van der Berg and Van Broekhuizen (2012) propose that an approach to inspect the scarcity value of graduates in the labour market involves determining how the employment probability of an individual who possesses some level of tertiary education compares to one who has matric, after controlling for important demographic and socioeconomic factors. Using a set of probit models, the study finds that individuals who possess some level of tertiary education are 20 to 25 percent more likely to get employment than a matriculant, with the ratio gradually increasing significantly over the years.

The study by Bhorat and Kimani (2015), which focuses on education and employment, corroborates the findings of Branson and Leibbrandt (2013). The study uses the NIDS dataset and different econometric estimation models: a partial generalised ordered probit, an augmented Mincerian regression, Kaplan-Meier estimator and the Cox proportion hazard model. The study finds that higher educational attainment is strongly positively correlated with improved employment prospects. It particularly finds that individuals with tertiary education attainment or qualifications possess a greater likelihood of being employed than individuals whose highest educational attainment is primary or secondary schooling.

The study conducted by Zizzamia and Ranchhod (2019) uses the entire longitudinal coverage of the NIDS dataset to construct a series of employment transitions. The study found that in the sample, approximately a fifth of individuals who possess a level of schooling less than a matric were employed in the labour market. However, those who possess post-secondary qualifications have a significantly higher likelihood of being employed, consisting of approximately 60 percent of the sample employed individuals (Zizzamia, and Ranchhod, 2019). The findings suggest that individuals who have finished their secondary schooling demonstrate a competitive edge in the labour market relative to individuals who are without secondary schooling and the general population. However, their employment possibilities are still limited when compared to individuals with tertiary education (Zizzamia, and Ranchhod, 2019).

The consistent theme between international and South African studies is that higher levels of education improve an individual's employment outcomes. The studies typically draw on the human capital theory or signalling theory and employ similar demographic and socioeconomic indicators when investigating labour market outcomes. While the general relationship between tertiary education and employment is positive, the strength of this association differs across national contexts, influenced by broader economic and social factors. This stresses the idea that returns to human capital vary with region. Furthermore, the inclusion of variables such as level of education, age, gender, marital status, and household composition emerges as a recurring element in the analytical frameworks utilised across the studies.

While existing South African literature has provided an in-depth investigation on this, most studies have treated tertiary education as a single variable (Branson and Leibbrandt, 2013; Baldry, 2016; Zizzamia and Ranchhod, 2019). There are limited studies that have disaggregated tertiary education across different National Qualification Framework levels

(Van der Berg and Van Broekhuizen, 2012; Kraak, 2015) and herein lies the valuable contribution of this study. This provides for a more comprehensive analysis that can assist in uncovering the employment outcomes for each level of disaggregated tertiary education and how each level is able to serve as a signal to the labour market after individuals have acquired the human capital.

2.2.2 Age and experience

While educational attainment has a significant impact on labour market outcomes, age and work experience are also crucial components in determining employment prospects. Age and experience underscore the necessity of analysing how human capital accumulates and translates into employment advantages and disadvantages across different stages of life.

A study by Marelli and Vakulenko (2016) focuses on youth unemployment in the Italian and Russian context, using the European Union Statistics on Income and Living Conditions for Italy and for Russia; it uses the Russian Longitudinal Monitorial Survey of the Higher School of Economics. The study uses a Heckman probit model on young individuals aged 15-24 years and adults aged 25-60 in the Russian context, and in the Italian context, 25-64 years, due to differing retirement ages in each country. Additionally, the study finds that in both Italy and Russia, adults who possess a secondary or tertiary education qualification as their highest education attainment have a much lower probability of being unemployed than those who do not. Whereas for young individuals in Italy, having secondary education as the highest education attained is correlated with an increased probability of being unemployed, whereas tertiary education was not significant (Marelli and Vakulenko, 2016). One can argue that such may be potentially caused as a result of people within the age cohort of 15 to 24 are still in school, and most do not express an interest in engaging in labour market activity. However, in the Russian context, for young individuals, having secondary or tertiary education was not significant.

Roberts's (2022) cross-country analysis of England using longitudinal data to implement regime transitions, finds that the graduate unemployment levels of individuals aged between 21 and 30 reached a level of approximately 6 percent in 2020, after it fell steadily over 10 years since it had reached a peak level of 6.5 percent in 2012 (Roberts, 2022). The employment rate of the youth, in comparison to the economically active population, can be considered as having changed slightly more between 2007 and 2020. This could indicate that the employment of the

youth is disproportionately impacted by the shifting of particular structural variables in the economy of the country, opening possibilities for individuals to participate in the labour market (Roberts, 2022). Therefore, this signifies that graduates who are in the young cohort, age group 21 to 30, in England are able to attain employment due to structures that are placed in the labour market that can absorb them.

Robert (2022) argues that a coherent progression from tertiary education to the labour market is a critical element of an individual's subsequent professional career (Roberts, 2022). However, what makes this complicated is that new labour market participants usually lack the appropriate experience required for a particular job. Therefore, as more individuals enter the labour market with similar qualifications, the employment competitiveness among those who possess tertiary education qualifications expands and the skill requirement increases. Studies generally use age as a proxy for experience (Roberts, 2022).

Consistent with Robert's (2022) study, a study conducted by Oswald-Egg and Renold (2021) using a pooled cross-sectional data from the Swiss graduate survey, corroborates the idea of the importance of age and experience, illustrating a similar pattern of how these variables can influence an individual's employability. Oswald-Egg and Renold (2021) use a wide range of econometric models suitable for various labour market outcomes: probit models for internship participation and unemployment, a Cox proportional hazard model for job search duration, an ordered probit model for employment position, and tobit models for wages (Mincer specification). The study finds that people who possess relevant work experience are in high demand in the workforce because of their efficiency and effectiveness in the labour market, which is accompanied by more affordable training costs. Moreover, some higher education institutions have started incorporating mandatory internships that will equip graduates with the necessary experience due to the high demand for experienced employees. Literature indicates that work experience is valued by employers, and some students obtain experience whilst pursuing their tertiary education (Oswald-Egg and Renold, 2021).

Furthermore, studies show that the work experience that is attained during tertiary education, whether it is from an internship or a job, or vocational education and training has a substantial effect on the successful transition to the labour market, and it is something that also has an impact on earnings (Oswald-Egg and Renold, 2021). According to Oswald-Egg and Renold (2021), the graduate labour supply is characterised as being diverse and compartmentalised by specialised skills and technical knowledge.

Mira, Gardijan Kedžo, and Žmuk's (2023) study uses data collected from 27 European Union Member States for 2012 and 2021. The study concentrates on the parallels and variations among EU countries relating to the employment results of their education structures. With the focus on 2012 and 2021, the study implements Ward's cluster method using the hierarchical cluster approach. The study finds that the average employment rate among individuals aged 30-34 who possess some level of tertiary education is 88 percent, demonstrating that higher education serves as an effective conduit into the labour market. However, there are wide variations across countries, in Greece, individuals' employment level is 76 percent, and more than 90 percent in Malta, indicating that labour market returns are dependent on context, impacted by national economic circumstances, labour market dynamics and the compatibility between education and employment needs (Mira, Gardijan Kedžo, and Žmuk, 2023).

Roberts (2022) and Oswald-Egg & Renold (2021) find that age and experience are positively associated with favourable employment outcomes. In their work, Marelli and Vakulenko (2016) find that age is very significant for young individuals with a negative coefficient. The findings suggest that the likelihood of being unemployed among young individuals declines as age increases. Furthermore, in comparison to men, women exhibit a significantly higher probability of being unemployed, as evidenced by the statistically significant negative coefficient reported in the estimation (Marelli and Vakulenko, 2016).

While international studies have provided insight into how age and work experience influence labour market outcomes, it is essential to narrow the focus to the South African context and examine how these trends materialise. Kraak (2015) uses the Graduate Destination Survey to focus on a descriptive analysis and asserts that a dynamic structural shift occurred in the South African economy, moving away from jobs that possess low skills and are in labour-intensive industries to employment that requires high skill levels and is more knowledge intensive This corresponds with a change in the employers' preferences for employees who possess high-level skills. Employers often opt for individuals who have acquired good experience, who are more mature, above 35 years old in age, as opposed to younger employees who possess more qualifications (Pauw et al, 2006; Van der Berg and Van Broekhuizen, 2012; Oluwajodu et al, 2015; Anand, Kothari and Kumar, 2016). When tertiary education is combined with necessary work experience, one can argue that such expands the employability of a graduate.

The findings by Kraak (2015) are reflected in Van der Berg and Van Broekhuizen's (2012) study, which finds that narrow unemployment rates have been substantially low among

individuals who possess some level of tertiary education aged 30-39, only going above 5 percent temporarily in 2001, 2002, and in 2010. For the youngest age cohort, aged 20-29, the study revealed that narrow unemployment has generally been much higher, nearly reaching 10 percent over that period.

Raelin (1997) perceives work experience as the ability to make challenging decisions when faced with difficult and unfamiliar conditions. Gruber (1999) perceives work experience as a skill that can provide the individual with a competitive advantage over those who lack it in the labour market.

Graham, Williams, and Chisoro's (2019) exploration of age cohort analysis reveals that younger individuals, particularly those without prior work experience, frequently have greater unemployment rates than older individuals with greater connections and experience or expertise. The study uses primary data from self-created questionnaires and implements a mixed approach in the analysis. The findings are consistent with the estimation by Kingdon and Knight's (2004) study, which interrogates the incidence of unemployment. The study uses the 1994 October Household Survey and the 1993 South African Labour Research Unit (SALDRU) survey to implement binary probit models. The study finds that the probability of an individual being unemployed declines with age, however, at a diminishing rate. Individuals who have established themselves within the labour market can be protected by institutions or laws against competition from young individuals who are new entrants. It can be stated that reservation wages can potentially decline with age or time spent in periods of unemployment. However, on the other hand, younger people have a higher probability of being unemployed, which can be due to their higher degree of job mobility and lack of experience (Kingdon and Knight, 2004).

Van der Berg and Van Broekhuizen (2012) provide a more nuanced evaluation in their approach to their age cohort analysis by arguing that older graduates (aged 35 and above) with no relevant experience, find it more difficult than their younger counterparts to obtain suitable work after finishing their degrees and have lower returns in terms of career and salary outcomes (Van der Berg and Van Broekhuizen, 2012). One can argue that a contributing factor to this in South Africa is that internships, which usually equip graduates with the necessary experience, often discriminate against those who are older by targeting those in the age range of 18 to 35. These internships, hence, exclude any graduate who is above 35 years old and without

experience, therefore decreasing their likelihood of securing employment (Van der Berg and Van Broekhuizen, 2012).

The consistent theme across both international and South African studies is the recognition that different age groups have different levels of human capital, signalling strength, and employment outcomes. The studies underscore the value of an age cohort analysis, as experience is instrumental in shaping labour market outcomes. Such an approach captures the distinct employment trends, obstacles and opportunities encountered by different age groups. For example, younger individuals may be susceptible to higher levels of unemployment as they lack experience or the dynamics of the labour market are unable to absorb them, whereas older individuals might struggle with developments in technology or retirement, but often face more employment opportunities as compared to younger individuals.

2.2.3 Gender disparities

Gender is another crucial determinant that is frequently identified in the literature, with various studies highlighting persistent differences in employment opportunities, income, and labour market participation between men and women. A study conducted by Silim and Stirling (2014) uses descriptive statistics from the European Union Labour Force Survey to observe trends in women's labour market outcomes across seven European countries. The study finds that a part-time job enables women who have children to take care of their families while still being participants in the labour market. Marriage and having children are factors that reduce a woman's probability of being a participant in the labour market, another contributing factor being pensioners residing in the household (Silim and Stirling, 2014). The study further observes that mothers who are married in Italy often encounter difficulties when seeking entry to the labour market, as they are unable to reconcile employment with the demands of household and childcare responsibilities.

Cukrowska-Torzewska's (2016) study focuses on motherhood influences on labour market outcomes. The study examines twenty-eight European nations using the fixed effects model, which is then re-estimated using the Hausman and Taylor method for robustness. The study finds that motherhood and employment status are negatively correlated in most of the countries that are examined. Grimshaw and Rubery (2015) supports these assertions and articulate that mothers frequently look for jobs that have fewer working hours so that they can balance them with family obligations like childcare. After having a child, there is a growing tendency for

mothers to acquire part-time employment instead of full-time employment. Cukrowska-Torzewska's (2016) study further finds that women within Central and Eastern Europe have a higher probability of leaving employment and have long pauses in employment when compared to women who are located in Western European countries. This is largely a consequence of a deficiency of childcare facilities, accompanied by a labour market that has unfriendly leave regulations (Cukrowska and Torzewska, 2016).

Although international literature offers valuable insights into gender disparities when observing the connection between tertiary education and employment, it is necessary to situate the analysis within the South African context to assess how these dynamics manifest locally. Fredericks and Yu's (2018) study investigates employment discrimination by focusing on demographic indicators, race and gender from 1997 up to 2016 in South Africa. The study uses data from the 1997-1999 October Household Survey, 2000-2007 Labour Force Survey, and the 2008-2016 QLFS. The study applies probit models to determine labour force involvement, employment and occupational outcome probability. Subsequent to that analysis, the Oaxaca–Blinder decomposition was implemented. The study finds significant gender-specific employment differences, with African women experiencing the greatest disadvantage in the labour market, despite their educational qualifications or attainment. The results align with Posel and Casale's (2019) study, which uses a system mapping method of literature and finds that there are sex-based wage and labour market disparities in South Africa even after controlling for educational attainment and skill levels.

A study by Cortes and Pan (2018) corroborates the findings of Fredericks and Yu (2018) and Posel and Casale (2019). The study similarly demonstrates significant gender disparities when observing the connection between tertiary education and employment. The study by Cortes and Pan (2018) uses data from the United States Census and American Community Survey from 1980 to 2017, observing the United States, where occupational segregation is a bigger factor in gender differences. Using estimations of an occupation's routine and manual task inputs, along with a slightly modified routine-task intensity summary index. The findings show the United States labour market exhibits less overt racial and gender segregation. Women possessing a tertiary qualification have a greater likelihood of working in lower-paying industries like education and health, whereas men dominantly occupy higher-paying sectors such as engineering and technology (Cortes and Pan, 2018). This proposes the assumption that perhaps the industries that women tend to concentrate in allow for flexibility where they can also have time to engage in household production, should it necessitate.

Kingdon and Knight's (2004) study finds that in South Africa, women experience significantly higher levels of unemployment than men, and individuals who live in rural areas face higher levels of unemployment relative to those residing in urban areas. This can be attributed to the segregation strategies implemented during the apartheid regime that removed a large proportion of African individuals to live in rural parts, which consist of land that had poor quality and very limited employment prospects (Kingdon and Knight, 2004).

Ntuli's (2007) study examines the factors affecting African women's involvement in the labour market. Using the October Household Survey (the year 1995 and 1999) and the Labour Force Surveys (2004). The study applies logit models and the decomposition technique. The study reveals that marriage decreases the probability of South African women joining the labour market. The study establishes that education contributes substantially to determining whether women participate in the labour force. Being highly educated is linked with a higher likelihood of joining the labour market. It is indicated that women who live in rural parts, along with those who have children who are below the age of 15 at home, have lower probabilities of being involved in the labour market (Ntuli, 2007). The study discovers that non-labour income has a greater impact on lowering the likelihood of women's participation in the labour market, more than marital status and fertility (Ntuli, 2007).

The findings of Ntuli (2007) are consistent with those of Gustafsson and Worku (2006), whose study utilised the 2001 South African Census to estimate an ordered probit regression analysis that considered women as being mothers only if they reside with at least one of their children. The estimations of the study reveal that the likelihood of a woman entering the labour force expands discontinuously with age and level of education (Gustafsson and Worku, 2006). Nonetheless, the study found that married women who resided in rural areas have a substantially lower likelihood of being employed. The estimated results of the study also indicate that there is a substantial and negative relationship between motherhood and labour market involvement (Gustafsson and Worku, 2006).

Posel et al's (2024) study examines inequality among Africans in the South African labour market by exploring heterogeneity in the gender earnings gap. The study uses data from the 2017 Post-Apartheid Labour Market Series to implement the sorting method. The study finds that being married, living with children, and household structure are some of the critical characteristics distinguishing women who are least and most impacted by the gender disparity. In South Africa, the average educational attainment of women, especially African women, has

now surpassed that of men; however, unemployment amongst women remains extremely high (Roberts and Schöer, 2021).

The study conducted by Zizzamia and Ranchhod (2019) further supports the findings of Ntuli (2007) and Gustafsson and Worku (2006) and identifies women as being at a significantly disadvantaged position from a dynamic standpoint, as they are approximately 37 percent less likely than men to acquire work, controlling for all relevant variables. The study found that women who possess a matric or a tertiary education qualification have a high probability of obtaining employment, in comparison to those individuals who have a secondary education that is still being completed (Zizzamia and Ranchhod, 2019).

The consistent theme between international and South African studies is that men and women experience different returns to education when controlling for different factors such as age, location and household composition. As the existing literature suggests, gender often plays a significant role in labour market outcomes due to the time that must also be dedicated to the household (Posel and Casale, 2019; Roberts and Schöer, 2021). The studies highlight the importance of investigating the employment outcomes to education separately for men and women because just having a dummy for gender conceals heterogeneity.

International and South African literature consistently demonstrates that marriage and motherhood exert a significant influence on woman's employment outcomes, regardless of their level of education. The studies consistently show that factors such as household composition, childbearing, and family caring responsibilities shape women’s employment outcomes. This further highlights the importance of investigating employment returns to education separately for both men and women. The studies further demonstrate that marriage and motherhood are important variables that strongly influence women's allocation of time and employability, which also affects their participation in the labour market and outcomes. The obligations of motherhood frequently result in restrictions in employment due to interruptions that can occur, which limit career progression, favourable labour market outcomes and wage growth, and make it more difficult for mothers and married women to fully take advantage of their tertiary educational attainment.

2.2.2 Racial disparities

Beyond gender, racial disparities remain a defining feature of labour market outcomes. In South Africa, the lingering impact of apartheid continues to shape trends in employment, wages, and opportunities, with historically disadvantaged groups experiencing continuous obstacles to advancement. Narrowing the focus to this context enables for a nuanced understanding of how race interacts with education and employment.

Kim Baldry's (2016) study, which investigates the impact of socioeconomical and educational indicators of South African graduates on their employment outcomes, makes use of a binary logistic model. The study uses data from an online survey conducted through SurveyMonkey, comprising of a sample of 1 175 individuals who possess a tertiary qualification in the period 2006-2012. Baldry (2016) finds that for African graduates, those who spend a predominant period of their lives in rural areas and those who have low socioeconomic status face a more than average prevalence of unemployment. The study finds that Indian/Asian and White individuals are five times more likely to be employed than Africans. This is consistent with Fredericks and Yu's (2018) study, which finds that Coloured, Indian/Asian and White individuals possess a significantly greater likelihood of being employed than African individuals.

Kingdon and Knight (2004) find that among African individuals, 41 per cent are unemployed, but the unemployment rate for White individuals is just 6 percent. They observe that unemployment levels decline consistently with age, ranging from 51 percent for the youngest cohort to 17 percent for the eldest group. The findings also reveal notable differences in unemployment levels by region, gender, and education. For example, individuals with some level of tertiary education may face an unemployment level of 6 percent whereas those with primary schooling or less may experience a level close to 40 percent.

The consistent theme with these studies, with the ones by Van der Berg and Van Broekhuizen (2012), Fredericks and Yu (2018), is that they demonstrate that employment outcomes differ for race groups when controlling for different demographic and socioeconomic factors. Race is an important aspect due to the imbalances that were caused by the historical consequences of apartheid. The government implemented policies such as the Higher Education Act of 1997 and NSFAS, which assisted with equitable access to higher educational institutions. Since African individuals were the most affected group by apartheid and the group that benefits the most from policies, investigating their employment outcomes to education is imperative.

2.3 Conclusion

This chapter has explored the theory of labour participation and allocation of time which has provided an understanding of the complex decisions and collective bargaining that are taken by a household. The decision to participate in the labour market for a woman is not only influenced by her level of education and earning potential, but also by factors outside herself, like the number of children she has, if she is married, and her husband's income. A woman conventionally assumes the required responsibility of household production and trades off the prospect of working for remuneration.

The human capital theory states that individuals strive to do their best through self-improvement in the form of education and training that will enable them to have favourable labour market outcomes. It has also introduced the signalling theory to capture how different levels of educational attainment are able to indicate an individual's competence and productivity, and how it influences their labour market outcomes. These are the foundation upon which the understanding of the investigation of the relationship between tertiary education and employment in South Africa is built upon.

Spence's signalling theory provides a strong theoretical underpinning when investigating the relationship between tertiary education and employment. The theory presents an effective framework for interpreting how education serves as a signal to employers in the labour market. The theory underscores the importance of individuals acquiring skills while using educational attainment as a means of distinguishing themselves in the competitive labour market. This theory is relevant as Spence's idea of indices allows for a more nuanced evaluation of how education interacts with the different demographic characteristics to influence labour market outcomes.

Furthermore, empirical studies that have indicated the different kinds of themes that influence an individual's employability, such as a graduate's age and experience, have an influence on employability, as evidenced by the study conducted by Marelli and Vakulenko (2016) and Oswald-Egg and Renold (2021). It was more intriguing to observe how different themes and variables behaved similarly in both the international context and South Africa when exploring the relationship between tertiary education and employment. Literature also suggests that gender plays a significant role in the labour market outcomes; therefore, utilising the theory of labour participation and allocation of time can help one understand why men seem to have a higher probability of being employed than women. Most importantly, existing empirical

studies have indicated that the higher the level of educational attainment that an individual has, the higher the probability there is that he is employed. This shows the importance of the human capital theory that the more an individual improves themselves through training, learning and studying, the more favourable the labour market outcome.

This chapter has explored the different themes that influence the relationship between tertiary education and employment. It has provided a comprehensive understanding of why variables such as demographic factors and socioeconomic factors influence employability.

There are many elements that have an influence on an individual's employability in the labour market. The level of education is something that has been witnessed from a local and international perspective to play a substantial role in helping individuals attain employment. However, there exists limited literature that seeks to compare a graduate's employability across the different levels of tertiary education qualifications. This study seeks to investigate the relationship between tertiary education and employment status in South Africa across the different levels of tertiary education qualification and intends to fill the gap in the literature.

Chapter 3: Description of data and trends in employment and education

After exploring existing literature in the previous chapter, it is evident that whilst substantial strides have been achieved in understanding the relationship between education and employment outcomes in South Africa, there are notable gaps that persist. A prominent gap in the existing literature on this relationship is that many studies tend to categorise tertiary education as a singular and homogenous variable, whereas a limited number of studies have opted to employ the approach of disaggregating tertiary education into its respective NQF level. This dissertation intends to contribute to this limited body of evidence.

As demonstrated in the previous chapter, existing studies have consistently found a positive correlation between education and employment, internationally and in South Africa. This chapter seeks to further examine this relationship using a disaggregated tertiary education indicator based on data available from the 2022 General Household Survey. This chapter serves as a critical component in achieving the research objectives set out by this study, through its focus on establishing the key trends in education and employment outcomes. Undertaking such assists in providing a foundational understanding of the relationship between education and employment outcomes and highlight existing demographic disparities that may be prevalent. This chapter, therefore, provides a comprehensive analysis of the data, descriptive statistics, and graphs utilised in the investigation of the relationship between tertiary education and employment outcomes in South Africa.

This chapter commences in section 3.1 by detailing the nature, source, and relevance of the utilised data, and defining variables of interest. Following this, section 3.2 proceeds to explore how tertiary educational attainment differs across different demographic groups, providing a nuanced perspective into the heterogeneity of education and employment outcomes. This chapter, therefore, establishes an essential foundational precursor of the econometric analysis that will be explored in later chapters and assists with identifying key patterns and providing context for the econometric estimation.

3.1 Data

3.1.1 South African household surveys

Since 1994, South Africa has collected data for various censuses and nationally representative household surveys in order to measure service delivery, living conditions, and labour market

activities (Stats SA, 2024). This study aims to examine the relationship between education and employment. The South African surveys that collect this information include: the Census, the Quarterly Labour Force Survey (QLFS), the National Income Dynamics Study (NIDS) and GHS.

The GHS collects data on a wide range of socioeconomic factors, such as education, employment, health, gender, race, geographical location and household composition. These variables are crucial for the comprehension of the intricate relationships that influence an individual's employment outcomes. This dataset aligns with the cross-sectional objectives of this study, and it will play an instrumental role in assisting in achieving them. The information contained in the GHS sets it apart from the other surveys in order to address the research objectives of this dissertation and how it defines every level of tertiary educational attainment following the NQF levels. The 2022 GHS was the most recent at the time that this study commenced.

The GHS is a nationally representative cross-sectional survey that has been undertaken by Stats SA annually since 2002 (Stats SA, 2023). The GHS employs a sample design centred on the 2013 master sample, which was created to standardise and improve the accuracy of household surveys that are implemented by Statistics South Africa. It is important to note that the master sample was built utilising data from the 2011 Census, to ensure a sampling framework that is comprehensive and representative of the South African socioeconomic and geographic circumstances at that point in time (Stats SA, 2023).

To improve accurate representation and precision, the master sample applies a two-stage stratified sampling method. The first stage of the stratification occurred at the metropolitan area level, and the second stage utilised variables such as province, geography (urban/rural), household size, education, gender, industry and income. During the face-to-face data collection process of the 2022 GHS, a total of 19 531 households were interviewed, inclusive of circumstances of multiple households with a single dwelling (Stats SA, 2022). Employing face-to-face interviews ensures the accuracy and dependability of the collected data, as skilled fieldworkers interact directly with respondents, resolving any enquiries and minimising any potential misinterpretations (Stats SA, 2022). The large sample size does not only improve the representativeness of the survey findings but also ensures that a variety of demographic and geographic subgroups are sufficiently represented, which facilitates the analysis of household dynamics across various circumstances.

While the 2022 GHS is the selected dataset for the key information it collects on socioeconomic factors and its relevance to the cross-sectional focus of the study, it is imperative to acknowledge that alternative datasets, such as the Census, the QLFS, and the NIDS could be considered, but each presented unique advantages and limitations that merit a brief discussion.

After South Africa became a democracy in 1994, it necessitated the post-apartheid government to implement its first census, which was conducted in 1996, with the intent to achieve national representativeness and exhaustive coverage of the South African population. This was followed by a second one in 2001. After Stats SA expressed a lack of confidence in conducting a successful census in 2006, the Community Survey (CS) was implemented instead, with the census shifting to 2011 (South African History Online, 2011; Stats SA, 2024). This was followed by the CS that was implemented in 2016 and a census conducted in 2022. Stats SA only avails just a 10 percent sample of the census data for researchers to analyse, and that 10 percent is nationally representative of population-level characteristics (South African History Online, 2011; Stats SA, 2024).

Whilst the initial census had limited information on education, the latest version has been developed to the point that it contains extensive information on education, such as attendance and attainment. The education variable is disaggregated across the different NQF levels. However, a major drawback is that labour and employment data have not been included in the Census 2022 dataset, which is crucial for this study, as employment status is the dependent variable of the study. The other drawback is that the integrity and credibility of the Census 2022 has been called into question due to an undercount of 31% (a world record), where the adjustments made through enumeration may not truly reflect the distribution of the population through the different provinces (Moultrie and Dorrington, 2024).

The QLFS gathers comprehensive information on labour market activities and provides the official indicators and measures of employment and unemployment among people aged 15 and above. Stats SA collects data from about 30 000 households for the QLFS. (Stats SA, 2024)

The QLFS contains extensive data on education, such as the type of institution one is attending or has attended, the study field and disaggregated tertiary educational attainment. However, it does not contain information on perceived health and household composition (Stats SA, 2024). This is important to this study as such variables influence the decision to engage in the labour market and employment.

NIDS is a national household panel survey that is conducted by SALDRU. The survey collects data over multiple waves (5) from 2008-2017 at 2/3-year intervals, capturing critical demographic and socio-economic variables. It initially commenced with a sample of 28 000 people from over 7 000 households (SALDRU, 2023). The sample size in subsequent waves changes as a consequence of attrition and replacement. The advantage of using this dataset is that it gathers comprehensive information on education and labour market participation. However, with the cross-sectional focus of this dissertation, the NIDS dataset is not the most suitable for achieving the study's research objectives, as sample sizes are too small to disaggregate tertiary education into the different NQF levels and age cohorts, and therefore these data could not have been used to achieve the dissertation's objectives. The approach of using the entire panel may result in compounded measurement errors when conducting fixed-effect models.

Considering the strengths and restrictions of the alternative datasets, the 2022 GHS remains the most appropriate choice for this study, due to how it defines every level of tertiary educational attainment following the NQF levels and its focus on collecting a wide range of information on various socioeconomic factors. This is imperative to assist in achieving the main objective of this dissertation, which is to investigate the relationship between the different levels of tertiary education and employment outcomes.

3.1.2 Chosen sample

The sample used in this dissertation is restricted to individuals aged 21 to 59 years. The exclusion of individuals who are 20 and below is rationalised by the idea that in South Africa, an individual typically completes matric by the age of 18, and it typically takes 3 years for them to acquire some tertiary educational attainment. This is due to the possibility that people 20 years and under may still be studying and is consistent with a number of other studies that have examined the relationship between tertiary education and labour market outcomes (Kraak, 2015, Roberts, 2022; Van der Berg and Van Broekhuizen, 2016).

Given that the retirement age in South Africa begins at 60, individuals who are 60 and above are excluded from the sample (South African Government, 2022). Individuals of retirement age can no longer be regarded as being members of the economically active population because of their diminished participation in the labour market and withdrawal from full-time employment (Casale, 2003).

3.1.3 Key indicators

This section provides a breakdown of the key indicators that are used in this study; emphasis will be placed on what they measure and their relevance to the research objectives.

Employment status serves as the dependent variable in this study; it is measured as a binary outcome (1 if employed, 0 if unemployed). This dissertation adopts the strict definition of unemployment. According to this definition, to be classified as unemployed, an individual would have liked to work during the last week, would have been able to start work or a business in the last week had suitable work existed, and must have looked for a job or tried to start a business in the last four weeks (Stats SA, 2021; 2022; 2023). This approach is adopted to ensure comparability with other studies, both nationally and internationally, since the strict definition of unemployment is the official international definition used in global labour market studies as outlined by the International Labour Organization (Núñez and Livanos, 2010; Psacharopoulos and Patrinos, 2018; Oswald-Egg and Renold, 2021).

The key independent variable is educational attainment, which measures the highest level of education completed by individuals. It is a categorical variable that consists of individuals with no schooling, incomplete secondary education, matric, higher certificate, diploma, bachelors degree, honours degree and masters/doctorate degree. These categories are consistent with South Africa's NQF levels (except for the masters/doctorate degree variable that groups NQF levels 9 and 10 into a single variable as a result of how the survey was designed and data was collected). In the analysis, the disaggregated tertiary educational attainment variables are particularly important as they assist with filling a gap in existing literature where no distinction has been made between the different NQF levels. This assists in providing a more comprehensive investigation of the relationship between tertiary education and employment. Furthermore, a set of demographic control variables, namely age, gender and race will be included in the analysis. Age is measured in years and is a continuous variable.

This study intends to investigate the relationship between tertiary education and employment in South Africa across age cohorts and these are structured as follows: 21-29 years, 30-39, 40-49 and 50-59 years). The cohorts form a categorical variable that classifies individuals into specific age groups, which will provide nuanced insight into how different stages of an individual’s life influence their employment outcomes. The rationale to investigate the relationship across age cohorts is due to younger individuals, particularly those without prior work experience, frequently having greater unemployment rates compared to older individuals

with greater connections and experience or expertise (Van der Berg and Van Broekhuizen, 2012). In addition, the probability of an individual being unemployed declines with age, however, at a diminishing rate. Individuals who have established themselves within the labour market can be protected by institutions or laws against competition from young individuals who are new entrants (Kingdon and Knight, 2004).

Furthermore, apartheid policies such as The Extension of University Education Act, Act 45 of 1959, limited access to tertiary education for African individuals during the period 1959 to 1988 (Republic of South Africa, 1997). To redress these past policies, the Higher Education Act of 1997 and NSFAS were implemented, increasing access to tertiary education for African individuals and consequently increasing the number of individuals with tertiary education (Republic of South Africa, 1997). This, therefore, also serves as an appropriate rationale to investigate the relationship between tertiary education and employment across age cohorts due to legislative changes, as these cohorts may not be perfectly comparable; analysing them separately accounts for the educational policies of their respective time.

For the gender indicator, a binary variable is utilised to capture 1 if male, 0 if female. The race indicator is categorical and consists of four race groups (African, Coloured, Indian/Asian, and White). The other control variable that is included in the study is health, which is a categorical variable that measures the self-reported health status of individuals (Poor health = 1, Fair health = 2, Good health = 3, Very Good health = 4, and Excellent health = 5).

The marital status indicator is categorical and consists of three groups (married, divorced/separated, and never married). The married category consists of individuals who are married and those who are living together like husband and wife/partners. The divorced or separated category is made up of individuals who are divorced, widowed, and those who are separated, even though they are legally married. The never married category consists of individuals who are single but have lived together with someone as husband/wife before, and those who are single and have never been married or who have never lived together as husband/wife before.

Additionally, variables that measure household structure are included in the analysis, namely, variables that capture the number of children in the household, the number of adults in the working-age population in the household, and the number of adult pensioners in the household. The number of children in the household is a continuous variable that captures the total number of children (below the age of 15) living in the household. This variable is critical as it accounts

for childcare responsibilities that can limit participation in the labour market or influence an individual's employment choices (Ntuli, 2007; Zizzamia and Ranchhod, 2019).

The variable representing the number of working-age adults in the household is a continuous variable that captures the total number of individuals aged 15-59 who are living in the household. This variable is crucial in the analysis as it accounts for the household labour supply and resource distribution dynamics. The theory of labour force participation proposes that a large number of working-age adults in a household can potentially decrease the labour force participation of others or the type of employment that they engage in due to shared responsibilities (Mincer, 1962).

The other variable that captures household structure is the number of adult pensioners in the household. This is a continuous variable that measures the total number of individuals aged 60 years and above who live in the household. The rationale for the inclusion of this variable in this study is provided by the theory of labour force participation. The theory argues that pensioners in the household can potentially reduce financial burdens through income received from the pension, which can allow younger occupants of the household to pursue education or remain unemployed. On the other hand, with the presence of elderly individuals in the household, there is an increase in caregiving responsibilities that may limit the ability of working-age individuals to participate in the labour market or the employment choices that they make (Mincer, 1962). It can be noted that the presence of pensioners in the household may be a proxy for pension income.

The study contains indicators for geographic location, such as province and urban/rural location. The province variable is categorical and accounts for the nine provinces in South Africa (Eastern Cape, Free State, Gauteng, KwaZulu Natal, Limpopo, Mpumalanga, Northern Cape, North West, and Western Cape). The location variable is binary, such that the variable is equal to 1 if urban and 0 if rural. These variables are important in this study as they will capture the regional differences in labour market opportunities and employment outcomes.

3.2 Descriptive statistics

This section proceeds with determining who is economically active and who is not in the whole sample. It then breaks down the analysis by gender, the African population group, and gender in that race group by using a table, followed by the mean variables also in a table and a stacked

bar graph. This approach provides an essential fundamental understanding of the dynamics of the South African labour market, establishing a foundational context for examining the relationship between tertiary education and employment outcomes.

Table 3. 1: Frequency and percentage of people who are economically active

	Economically Inactive Population	Economically Active Population
Total:	7 534 198 (23.3)	24 809 403 (76.7)
Men	2 862 864 (17.9)	13 171 856 (82.1)
Women	4 671 335 (28.6)	11 637 546 (71.4)
African:	6 238 267 (23.6)	20 183 479 (76.4)
Men	2 419 647 (18.5)	10 665 779 (81.5)
Women	3 818 620 (28.6)	9 517 700 (71.4)

Source: Own calculations, GHS 2022.

Notes: Data have been weighted to represent population-level estimates. Estimates are given in frequencies and percentages in parentheses for individuals aged 21 - 59 years.

Table 3.1 above presents a distribution and percentages of the economically active and economically inactive population. This is then restricted to men and women. This is additionally restricted to Africans, and then men and women in the African group. The findings show that South Africa comprises of 24 809 403 economically active individuals and 7 534 198 economically inactive individuals. Of all the men in the sample, there are more than 13,1 million (82.1 percent) who are economically active and less than 2,9 million (17.9 percent) who are economically inactive. Of all the women in the sample, there are more than 11,6 million (71.4 percent) who are economically active, and less than 4,7 million (28.6 percent) are economically inactive. This shows that there is a larger percentage of women who are inactive relative to men. Women are therefore overrepresented in the economically inactive population.

The table also shows that there is a total of 20 183 479 economically active African individuals and a total of 6 238 267 economically inactive African individuals. Among African men, there are more than 10,6 million (81.5 percent) who are economically active and less than 2,5 million

(18.5 percent) who are economically inactive. Among African women, there are more than 9,5 million (71.4 percent) who are economically active and less than 3,9 million (28.6 percent) who are economically inactive. This shows that there is a larger percentage of African women who are inactive relative to African men. African women are therefore overrepresented in the economically inactive population.

The primary objective of this dissertation is to investigate the relationship between tertiary education and employment outcomes in South Africa which involves a focus on the economically active population, in particular. This consists of individuals who are willing and able to work and who are either employed or unemployed. The sample therefore excludes anyone considered to be out of the labour market or economically inactive. The previous table illustrates that a larger proportion of females are out of the labour force which may be due to childcare and household responsibilities (Mincer, 1962; Becker, 1965). Whilst this will not be the focus of this study, it is important to acknowledge for context purposes.

The descriptive statistics presented in Table 3.2 above compare the mean estimates of critical demographic, socioeconomic, and geographic characteristics by employment status (individuals who are employed or unemployed) for the whole sample. There is a significantly higher proportion of men who are employed than women, whereas there is a higher proportion of women who are unemployed than men.

The column percentages presented in Table 3.2 offer descriptive insights into how demographic and socioeconomic factors are distributed within the employed and unemployed groups, respectively. However, the reported significant levels do not test these within-group distributions; instead, they test whether the distributions differ significantly between those who are employed and unemployed.

Table 3. 2: Mean of key variables for the economically active population (whole sample)

VARIABLES	Employed	Unemployed
Demographic Indicators:		
Male	0.565	0.460***
	(0.004)	(0.006)
Female	0.435	0.540***

VARIABLES	Employed	Unemployed
	(0.004)	(0.006)
Age (in years)	38.749	33.612***
	(0.092)	(0.111)
African	0.758	0.919***
	(0.006)	(0.005)
Coloured	0.094	0.059***
	(0.004)	(0.004)
Asian/Indian	0.040	0.008***
	(0.004)	(0.002)
White	0.109	0.014***
	(0.005)	(0.002)
Married	0.516	0.274***
	(0.006)	(0.006)
Divorced/Widowed	0.048	0.027***
	(0.002)	(0.002)
Never Married	0.435	0.699***
	(0.006)	(0.007)
Education Categories:		
No Schooling	0.009	0.007*
	(0.001)	(0.001)
Primary	0.064	0.075**
	(0.002)	(0.003)
Incomplete secondary	0.300	0.430***
	(0.005)	(0.007)
Matric	0.376	0.397
	(0.005)	(0.007)
Higher Certificate	0.037	0.031**
	(0.002)	(0.002)
Diploma	0.079	0.032***
	(0.003)	(0.002)
Bachelors Degree	0.094	0.024***
	(0.003)	(0.002)
Honours Degree	0.024	0.004***
	(0.002)	(0.001)
Masters/Doctorate	0.018	0.002***
	(0.002)	(0.001)
Health Indicators:		
Poor Health	0.005	0.007
	(0.001)	(0.001)
Fair Health	0.034	0.032
	(0.002)	(0.002)
Good Health	0.358	0.356
	(0.008)	(0.010)
Very good Health	0.300	0.330***
	(0.007)	(0.010)
Excellent Health	0.303	0.275***

VARIABLES	Employed	Unemployed
	(0.008)	(0.010)
Household Composition:		
Number of Children in Household	1.086	1.577***
	(0.019)	(0.036)
Number of Working Age Adults in Household	1.782	2.374***
	(0.026)	(0.043)
Number of Pension Age Adults in Household	0.195	0.334***
	(0.006)	(0.011)
Location and Province:		
Urban	0.767	0.635***
	(0.005)	(0.009)
Rural	0.233	0.365***
	(0.005)	(0.009)
Western Cape	0.153	0.076***
	(0.005)	(0.005)
Eastern Cape	0.078	0.096***
	(0.003)	(0.005)
Northern Cape	0.021	0.019
	(0.001)	(0.002)
Free State	0.044	0.047**
	(0.002)	(0.003)
KwaZulu-Natal	0.169	0.219***
	(0.005)	(0.009)
North West	0.058	0.062
	(0.003)	(0.004)
Gauteng	0.322	0.307
	(0.006)	(0.009)
Mpumalanga	0.074	0.100***
	(0.003)	(0.005)
Limpopo	0.081	0.073***
	(0.003)	(0.005)
Sample	15506	8366
Population	16177755	8159173

Source: Own calculations, GHS 2022.

Notes: Data have been weighted to represent population-level estimates. Estimates are given as percentages for individuals aged 21 - 59 years. Standard errors are in parentheses. ***, **, and * indicate that estimates for employed individuals differ from those that are unemployed at 0.01, 0.05 and 0.1 significance levels.

The mean value for age is statistically significantly higher in the employed group than in the unemployed group. The average age of employed individuals is 39, and 34 years amongst unemployed individuals. This suggests that the unemployed group tends to be younger. These

findings are consistent with the literature, which suggests that age plays a substantial role in employment outcomes (Van der Berg and Van Broekhuizen, 2016). This indicates that the older an individual is (up to a certain point), the more likely they are to find employment. Therefore, if employed individuals are older, on average, it could potentially indicate that work experience and skill development enhance employability as advocated by the human capital theory and signalling theory (Becker, 1962; Spence, 1978).

For marital status indicators, there is a higher proportion of employed individuals who are married compared to the unemployed, while the unemployed are predominantly never married. The proportion of divorced or widowed individuals is slightly higher among the employed than the unemployed. These differences, all statistically significant, indicate that employment is positively associated with being married and negatively associated with being never married.

Educational attainment categories depict significant differences across all levels, except for matric, when comparing employed and unemployed individuals. Therefore, this shifts the focus to the actual proportion of individuals who are either employed or unemployed in each of the education categories. When measuring the proportion of unemployed individuals in each category of education, it can be identified that the highest proportion are those with incomplete secondary. The highest proportion of those who are employed are those with matric (but this is not statistically different from being unemployed with a matric). Furthermore, when moving to individuals who possess a tertiary qualification, there is a significantly higher proportion of those who are employed than those who are unemployed (Núñez and Livanos, 2010; Branson and Leibbrandt, 2013; Bhorat and Kimani, 2015; Psacharopoulos and Patrinos, 2018).

The matric variable not being statistically significant can be considered as the reflection of the notions proposed in the signalling theory, where the level of educational attainment loses its capacity to influence employment outcomes due to over saturation of a particular qualification in the market (Spence, 1978). The theory emphasises that the value of a signal, such as an educational qualification, is derived from its capacity to distinguish one candidate from another when observed by employers (Spence, 1978). The theory introduces the value of relative scarcity and how such serves as a signal of potential productivity in the labour market. With regards to the matric variable not being significant, such can be attributed to it being possessed by several people amongst those seeking employment, which reduces its ability to serve as a signal of potential productivity and thus not translate to improved labour market outcomes (Spence, 1978). This highlights the idea that the over-saturation of matric as a qualification

has potentially resulted in no substantial differences between employed and unemployed individuals significantly.

The significance of lower levels of education when compared to matric can be attributed to the types of employment that individuals engage in, that does not require any technical skills but may require physical labour. When observing the tertiary education variables, it can be identified that every level of tertiary education has a statistically significant influence on distinguishing individuals who are employed and unemployed. This justifies the rationale to disaggregate tertiary education into the different NQF levels as it provides the essential lens to investigate its crucial role in influencing the South African labour market. Tertiary education is a critical component in influencing employment outcomes as it equips individuals with tools and skills that enhance productivity and opportunities as proposed by human capital theory (Becker, 1964). This line of thought is also consistent with the signalling theory that tertiary education serves as a signal of productivity in the labour market and leads to favourable outcomes (Spence, 1978).

The results also indicate that among employed individuals, there is a significantly lower average number of children in the household when compared to unemployed individuals. This suggests that the more children a household has, the more likely it is for adults to be unemployed. This is likely due to childcare duties, which make it harder to search for work even if they do want to work (due to time constraints), which would typically push adults out of the labour force and not just into unemployment (Becker, 1965; Gustafsson and Worku, 2006; Ntuli, 2007; Zizzamia and Ranchhod, 2019).

There is a significantly lower average number of pensioners in the household for employed individuals when compared to unemployed individuals. This suggests that the more pensioners a household has, the more likely for individuals to be unemployed. This may be a result of the increase in caring responsibilities in the household, where more time is spent caring for them and less time is spent searching for work as captured in the theory of labour force participation and allocation of time (Becker, 1965).

Subsequent to the presentation and discussion of Table 3.2, it is important to note that some South African studies use a more inclusive, broad definition of unemployment. Under the broad definition, individuals who satisfy the criteria of expressing a desire to work and being available to commence employment or start a business during the last week, but who have not

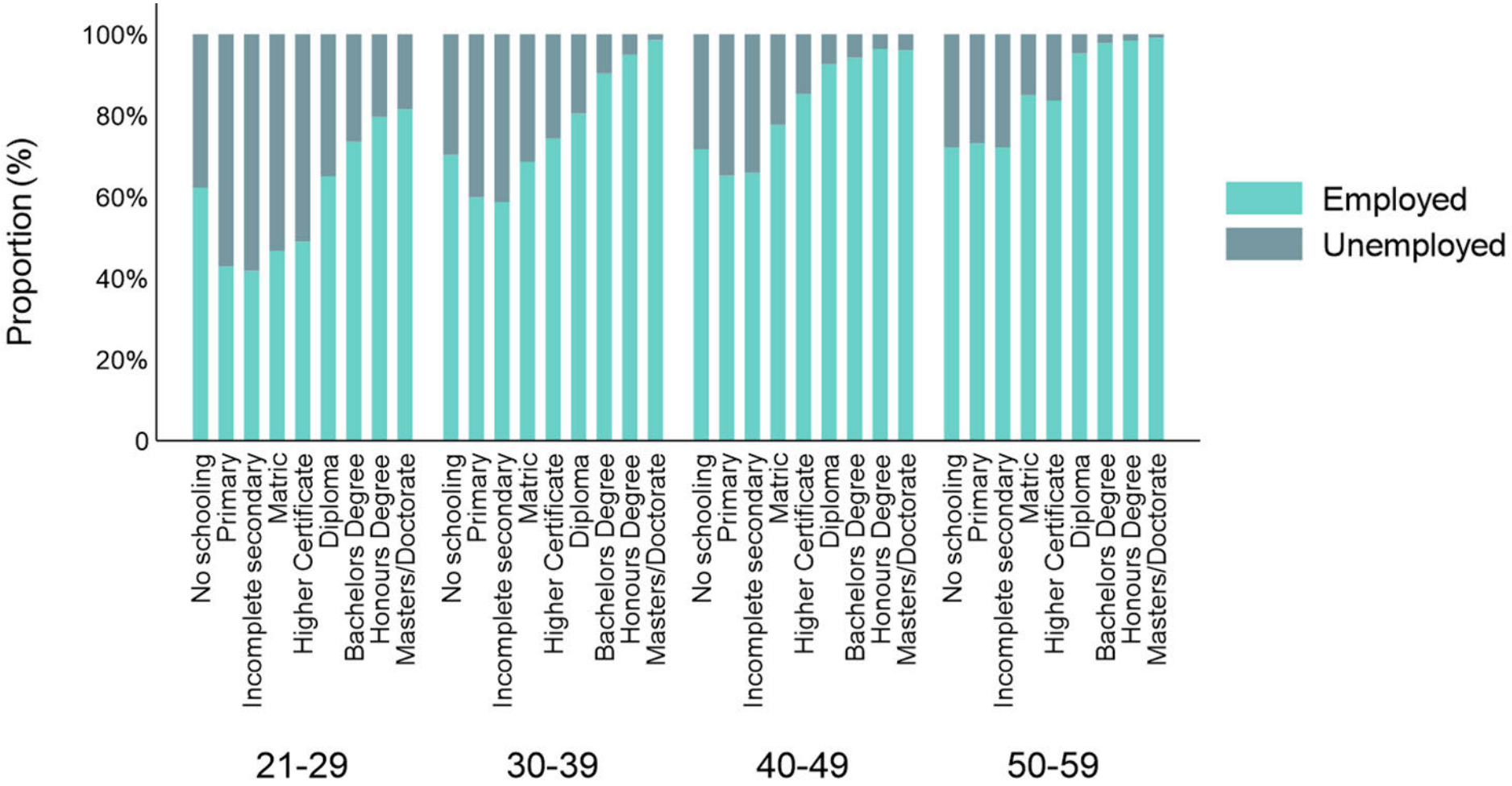
actively looked for work or attempted to start a business within the preceding four weeks, are nonetheless categorised as unemployed (Stats SA, 2021; 2022).

Table A3.1, presented in the appendix, replicates Table 3.2 with the addition of a third column that reports descriptive statistics for the non-searching (broad definition) unemployed subgroup. The key similarity between the tables is that there is a higher proportion of employed individuals with higher levels of education, and lower levels are concentrated among the unemployed, particularly those not actively seeking work. This could potentially suggest that limited educational attainment is not only a barrier to employment but may also contribute to discouragement and labour force detachment.

The proportion of individuals with matric is quite similar among the employed (37.6 percent) and searching unemployed (39.7 percent), and the difference is not statistically significant, suggesting matric does not differentiate between employment and active job search. However, the notable difference between Table A3.1 and Table 3.2 is that there is a significantly lower proportion of individuals with matric among non-searching unemployed individuals than those who are employed with the same education level. This suggests that matric is positively associated with labour market engagement. Thus, matric functions less as a predictor of employment and more as a threshold for continued participation in the labour force.

For the remainder of the study, it is important to acknowledge that the strict definition of unemployment, consistent with International Labour Organisation (2024) guidelines, will be used. While this approach ensures comparability with international statistics, it may not fully capture the extent of labour underutilisation, in particular the segment of discouraged work-seekers, therefore possibly understating the broader challenge of joblessness within the studied context.

Figure 3. 1: Distribution of employment status across the different levels of educational attainment and age cohorts.



Source: Own calculations, GHS 2022.

Notes: Data have been weighted to represent population-level estimates. The sample is restricted to individuals aged between aged 21-59.

Figure 3.1 above is a stacked bar graph that illustrates the distribution of employment status (employed group vs. unemployed group) across the different levels of educational attainment and age cohorts. The bars in the graph have been split into the proportion of individuals who are employed (lower segment) and unemployed (upper segment).

The stacked bar graph conveys a general trend of high employment rates (above 60 percent) across all age cohorts and educational attainment levels, except for the 21-29 age group, where people with primary, incomplete secondary, matric, and higher certificates are mostly unemployed compared to being employed. This confirms the findings from Table 3.2, whereby young people are more likely to be unemployed. In addition, it corroborates the findings made by Stats SA (2022) that individuals aged 15-24 and 25-34 years, recorded the highest unemployment rates of 61,0 and 39,9 percent, respectively.

For each age cohort, the largest proportion of employed people are people with masters or doctorate degrees, followed by those with an honours degree and those with bachelors degrees. Therefore, such indicates that the higher the level of education an individual has, the more likely they are to be employed (Becker, 1964 and Spence, 1974).

Table A3.4 (see Appendix) shows that in each age group, individuals holding a masters or doctoral degree constitute the smallest proportion compared to other educational attainment levels. However, as presented in Figure 3.1, the largest share of employed individuals is observed among those with a masters or doctoral degree for each age group. This reflects the value of possessing higher levels of education and how the scarcity of a qualification leads to favourable employment outcomes as captured in the signalling theory (Spence, 1978).

Furthermore, when observing the 21-29, 30-39, and 40-49 age groups, a trend can be identified where the number of employed individuals with no schooling, exceeds the number of employed individuals with primary and incomplete secondary education. For the youngest cohort (21-29), this extends to employed individuals with matric and higher certificates. For those in the 30-39 age group, this pattern includes employed individuals with matric only. This may potentially be a result of individuals with no schooling entering the labour force early and acquiring experience that improves their employment likelihood. It is also imperative to consider that the survey's definition of employment incorporates work in kind (non-salaried forms of labour), which may inflate the proportion of employed individuals with lower levels of education. Table A3.2 (see Appendix), shows that there are 450 802 individuals who were found to be working without any remuneration.

For the youngest cohort (aged 21–29), the proportions across education categories appear lower compared to older age groups. This is largely attributable to the exclusion of a substantial share of individuals from the sample presented in Figure 3.1 due to their economically inactive status. As indicated in Table A3.3 (see Appendix), 29.7 percent of individuals within this age group are economically inactive. This may reflect the fact that many are still engaged in educational pursuits and have not yet entered the labour market. Furthermore, Table A3.3 reveals that within this cohort, a greater proportion of individuals are unemployed (36.3 percent) than employed (34 percent), further highlighting their transitional position in the labour market.

The youngest cohort entered the education system following the enactment of the South African Schools Act 84 of 1996, which made education compulsory up to Grade 9 or age 15 (Republic of South Africa, 1996). However, the older cohorts, particularly those aged 40-49 and 50-59, were educated under the apartheid regime, where compulsory education was either absent or inadequately enforced for the majority of the population, particularly Africans. During this period, the education system was racially segregated and very unequal, forcing many individuals to drop out of school prematurely to join the labour market (Van der Berg, 2007).

Under earlier labour market conditions, experience may have counted more than higher formal qualifications, which may explain why older cohorts tend to be employed regardless of their educational attainment. However, in the contemporary labour market, there is a much higher percentage of people employed who have a tertiary education, which cuts across all age cohorts. Across all age groups, the proportion of employed individuals increases significantly at the diploma level, showing a consistent labour market premium associated with tertiary qualifications. This implies that, regardless of age or historical context, possessing some level of tertiary education is an important determinant of employment. This demonstrates the enduring value of formal education across generations.

Table 3. 3: Mean of key variables for the economically active population (Africans only)

VARIABLES	Employed Africans	Unemployed Africans
Demographic Indicators:		
Male	0.570	0.458***
	(0.005)	(0.007)

VARIABLES	Employed Africans	Unemployed Africans
Female	0.430	0.542***
	(0.005)	(0.007)
Age (in years)	38.380	33.546***
	(0.095)	(0.114)
Married	0.466	0.265***
	(0.007)	(0.007)
Divorced/Widowed	0.046	0.025***
	(0.002)	(0.002)
Never Married	0.488	0.710***
	(0.006)	(0.007)
Education Categories:		
No Schooling	0.011	0.008**
	(0.001)	(0.001)
Primary	0.076	0.075
	(0.003)	(0.004)
Incomplete secondary	0.335	0.430***
	(0.006)	(0.007)
Matric	0.366	0.398***
	(0.006)	(0.007)
Higher Certificate	0.037	0.031**
	(0.002)	(0.002)
Diploma	0.070	0.031***
	(0.003)	(0.002)
Bachelors Degree	0.075	0.023***
	(0.003)	(0.002)
Honours Degree	0.018	0.003***
	(0.002)	(0.001)
Masters/Doctorate	0.012	0.002***
	(0.002)	(0.001)
Health Indicators:		
Poor Health	0.005	0.007
	(0.001)	(0.001)
Fair Health	0.034	0.031
	(0.002)	(0.002)
Good Health	0.365	0.353
	(0.008)	(0.011)
Very good Health	0.310	0.339***
	(0.008)	(0.011)
Excellent Health	0.286	0.270*
	(0.008)	(0.010)
Household Composition:		
Number of Children in Household	1.151	1.609***
	(0.023)	(0.038)
Number of Working Age Adults in Household	1.778	2.372***

VARIABLES	Employed Africans	Unemployed Africans
	(0.031)	(0.046)
Number of Pension Age Adults in Household	0.159	0.323***
	(0.006)	(0.012)
Location and Province:		
Urban	0.715	0.607***
	(0.007)	(0.010)
Rural	0.285	0.393***
	(0.007)	(0.010)
Western Cape	0.064	0.046***
	(0.004)	(0.004)
Eastern Cape	0.080	0.097***
	(0.003)	(0.006)
Northern Cape	0.015	0.011***
	(0.001)	(0.001)
Free State	0.048	0.049
	(0.003)	(0.003)
KwaZulu-Natal	0.180	0.229***
	(0.005)	(0.009)
North West	0.069	0.067
	(0.003)	(0.005)
Gauteng	0.351	0.313***
	(0.008)	(0.009)
Mpumalanga	0.091	0.108***
	(0.004)	(0.006)
Limpopo	0.101	0.080***
	(0.004)	(0.005)
Sample	12147	7638
Population	12259112	7498730

Source: Own calculations, GHS 2022.

Notes: Data have been weighted to represent population-level estimates. Estimates are given as percentages for African individuals aged 21 - 59 years. Standard errors are in parentheses. ***, **, and * indicate that estimates for employed African individuals differ from those who are unemployed at 0.01, 0.05 and 0.1 significance levels.

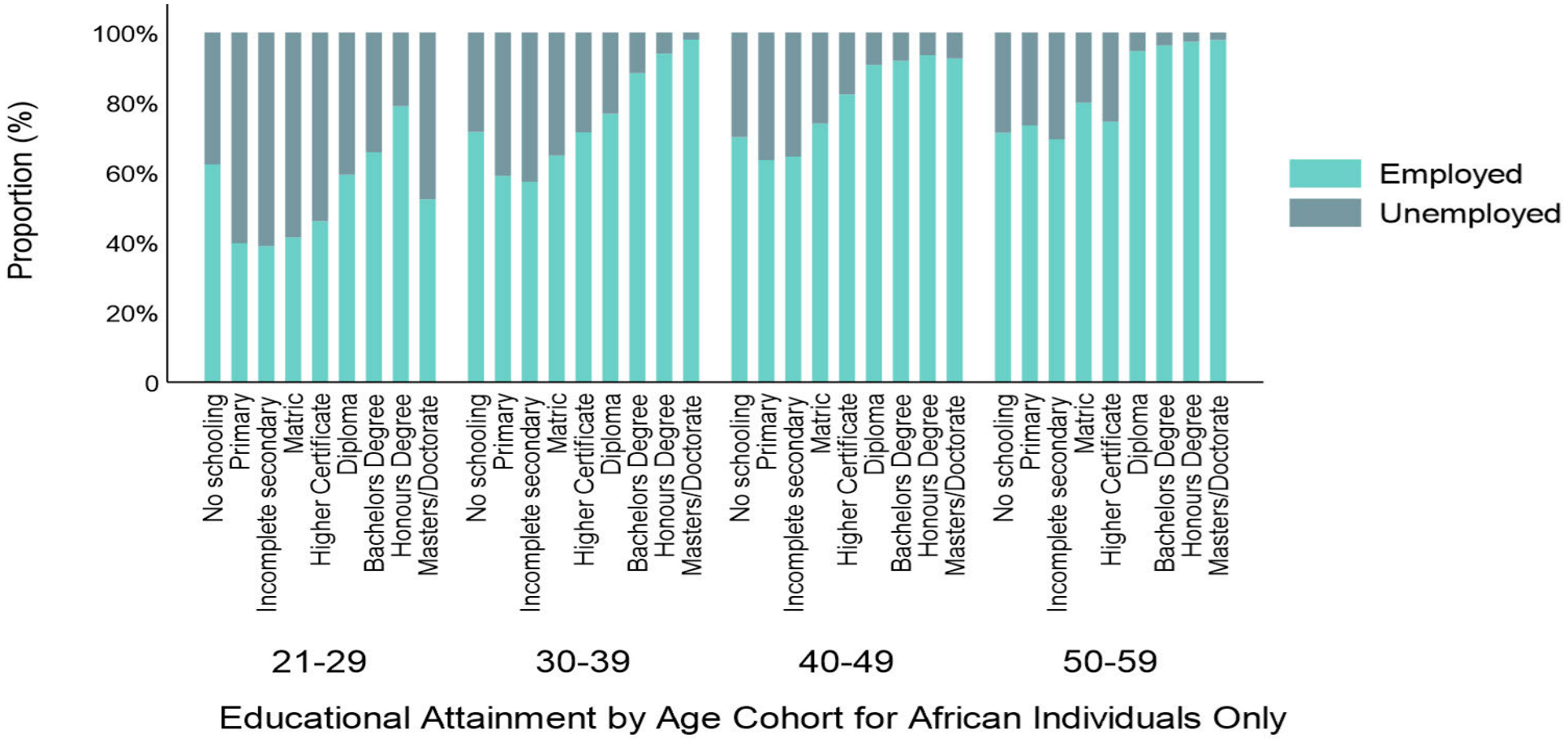
The descriptive statistics presented in Table 3.3 above compare the mean estimates of critical demographic, socioeconomic, and geographic characteristics by employment status (individuals who are employed or unemployed) amongst African individuals only.

Table 3.3 exhibits patterns that are broadly similar to those in Table 3.2, with only minor differences. This similarity can be attributed to the fact that the African population constitutes the majority of the economically active population, 20 183 479 out of 24 809 403, as indicated in Table 3.1.

The notable difference between Table 3.2 and Table 3.3, when analysing the mean values of key characteristics for the economically active population across the full sample in Table 3.2, the matric variable is not statistically significant, suggesting no meaningful difference in matric attainment between employed and unemployed individuals overall. The lack of statistically significant difference in the matric variable between the employed and unemployed suggests that matric is not a consistent predictor of employment status across the population. However, when the analysis was restricted to African individuals in Table 3.3, the matric variable is statistically significant. This suggests that within the African subgroup, having a matric qualification is more closely associated with employment status. This highlights the potential underlying heterogeneity, where the impact of matric differs across race and socioeconomic status.

Among African individuals, the mean value of the matric variable is significantly higher for the unemployed (39.8 percent) compared to the employed (36.6 percent). These results reflect that, within the African economically active populace, having matric as the highest education attainment does not necessarily guarantee employment. Instead, it may reflect a saturation of matric-level qualifications in the labour market as captured in the signalling theory (Spence, 1978).

Figure 3. 2: Distribution of employment status across the different levels of educational attainment and age cohorts (Africans only)



Source: Own calculations, GHS 2022.

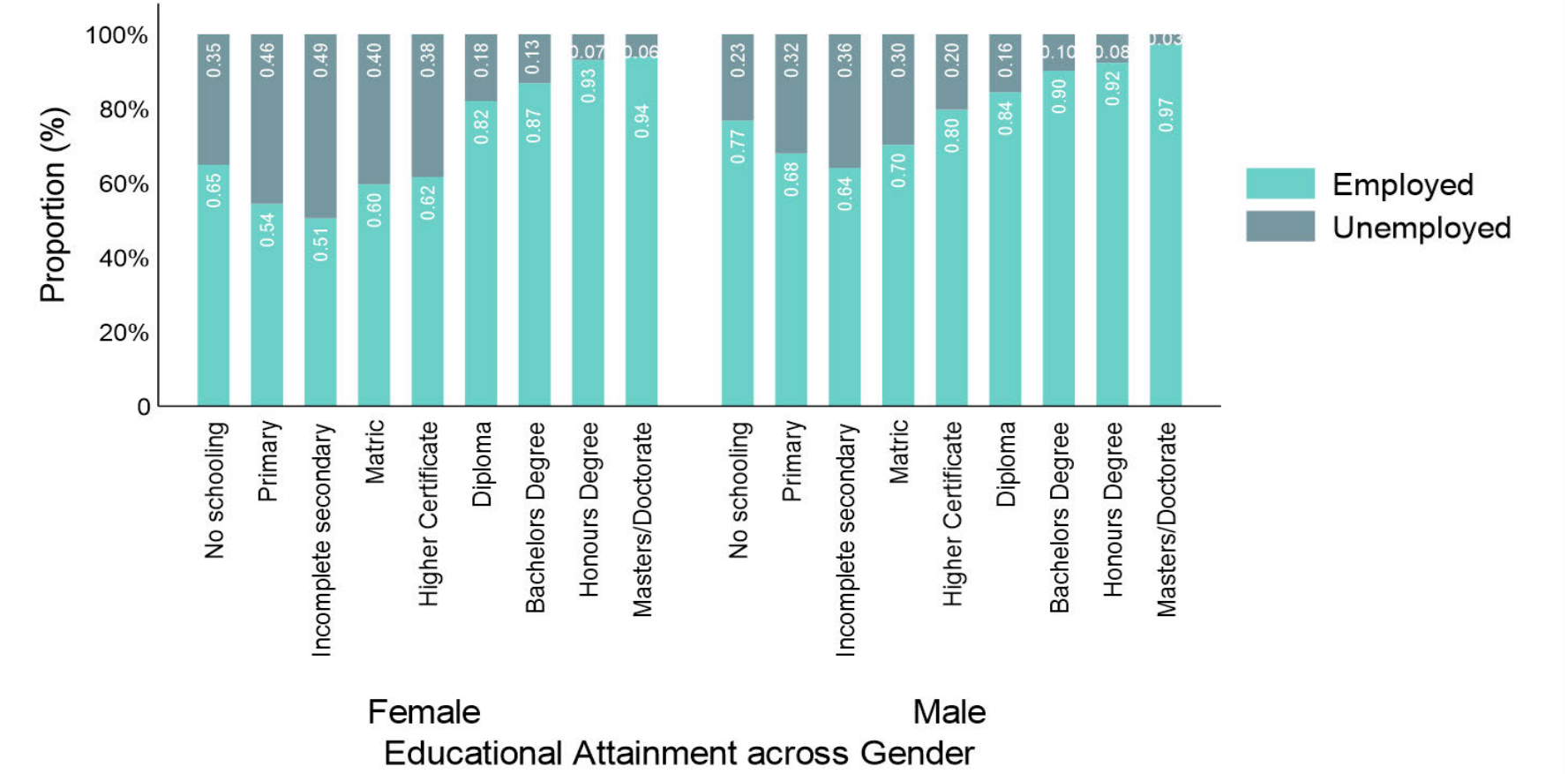
Notes: Data have been weighted to represent population-level estimates. The sample is restricted to individuals aged between aged 21-59.

Figure 3.2 above depicts a stacked bar graph that illustrates the distribution of employment status (employed group vs. unemployed group) across the different levels of educational attainment and age cohorts for Africans only. The bars in the graph have been split into the proportion of individuals who are employed (lower segment) and unemployed (upper segment).

Figure 3.2 exhibits patterns that are broadly similar to those in Figure 3.1, with only minor differences. This similarity can be attributed to the fact that the African population constitutes the majority of the economically active population.

The notable difference is that, in Figure 3.1, the proportion of individuals aged 21-29 who have a masters or doctoral degree are largely employed than unemployed. In fact, this education category constitutes the highest proportion of employed individuals within this age category. However, in Figure 3.2, when the analysis is restricted to Africans only, the proportion of individuals who are unemployed in this age group with the same level of education slightly exceeds those who are employed.

Figure 3. 3: Distribution of employment status across the different levels of educational attainment and gender.



Source: Own calculations, GHS 2022.

Notes: Data have been weighted to represent population-level estimates. The sample is restricted to individuals aged between aged 21-59.

The stacked bar graph depicted above in Figure 3.3 illustrates the employment status of men and women (Employed group vs the Unemployed group) across educational attainment categories. The bars in the graph have been split into the proportion of individuals who are employed (lower segment) and unemployed (upper segment).

The stacked bar graph conveys a general trend where the proportion of individuals who are employed exceeds those who are unemployed, regardless of educational level for both men and women. For both men and women, the largest proportion of employed people are people with masters or doctorate degrees, followed by those who have an honours degree, a bachelors degree and then those who possess a diploma. Furthermore, when observing the employment outcomes of men and women, a trend can be identified where the proportion of employed individuals with no schooling, exceeds the number of employed individuals with primary and incomplete secondary education and matric. For women, this trend extends to employed individuals with higher certificates. There is a higher percentage of men with no schooling who are employed compared to the percentage of women with no schooling who are employed. The gap between men and women closes as education level increases (diploma and above)

On Table A3.5 (see Appendix), the mean values for women who have some level of tertiary education (from higher certificate up to masters or doctorate degree) are higher than those of males with the same level of education. This signifies that there is a greater proportion of women who possess higher certificates, diplomas, bachelors degrees, and postgraduate degrees than men. This suggests that the possession of higher education and the associated higher earnings potential may incentivise women to enter the labour market (Spence, 1978). However, the stacked bar graph depicted in Figure 3.3, shows that men are more likely to be employed for every level of education except for the honours degree level when compared to women. Although the magnitude of the difference is small, the outcome is rather intriguing as women have a higher proportion of individuals with each level of tertiary education, which prompts a deeper investigation, which is explored in the subsequent section.

3.3 Conclusion

Research that seeks to understand the relationship between education and employment outcomes in South Africa has mainly focused on categorising tertiary education as a singular and homogenous variable. This study adds to the body of research by disaggregating tertiary education into its respective NQF levels. To investigate this relationship, data from the 2022 GHS was used because it collects data on a wide range of socioeconomic factors and, more importantly, how it defines every level of tertiary educational attainment following NQF levels better than any other survey. This dataset aligns with the cross-sectional focus of this study.

The descriptive statistics in this chapter commenced with a look into the economically active population. There was a larger percentage of women who are inactive relative to men. Women are therefore overrepresented in the economically inactive population, and this was also consistent when the sample was restricted to African individuals only. This could partially be explained by childcare and household responsibilities that may force women out of the labour force (Mincer, 1962; Becker, 1965).

This was followed by the mean estimates of critical demographic, socioeconomic, and geographic characteristics by employment status for the whole sample. Educational attainment categories depict significant differences across all levels, except for matric, when comparing employed and unemployed individuals. The matric variable was not statistically significant, potentially reflecting the notions proposed in signalling theory, where over-saturation of matric as a qualification may, to some extent, explain the lack of significance. The significance of lower levels of education when compared to matric was attributed to the kind of jobs that individuals participate in, which may require just physical labour.

This sample was then restricted to African individuals only, where patterns broadly mirrored those of the whole sample, with only minor differences. This was a result of Africans comprising of the majority of the economically active population. The main difference was that, for Africans the matric variable was statistically significant. This indicated that within the African subgroup, having a matric qualification is more closely associated with employment status. This stressed the potential underlying heterogeneity, where the impact of matric differs across race and socioeconomic status.

A stacked bar graph that illustrated the distribution of employment status across the different levels of educational attainment and age cohorts was then presented. For each age cohort, the largest proportion of employed people are those who hold a masters or doctorate degree,

followed by those with an honours degree and those with bachelors degrees. This was also consistent when the analysis was disaggregated by gender in Figure 3.3. This suggests that the higher the level of education an individual has, the more likely they are to be employed. This, to some degree, supports the claims of human capital theory, that education equips individuals with tools and skills that enhance productivity and opportunities (Becker, 1964), and signalling theory, that education serves as a signal of competence and leads to favourable employment outcomes (Spence, 1978). However, when the stacked bar graph was restricted to African individuals, those aged 21-29, the proportion of individuals with a masters or doctoral degree who were employed was slightly less than those who were unemployed.

The stacked bar graph that disaggregated by gender also illustrated a general trend where the proportion of individuals who are employed exceeds those who are unemployed, regardless of educational level, for both men and women, suggesting relatively higher employment participation within the observed sample.

Ultimately, descriptive statistics have provided the necessary background for the main research objectives. The relationship between education and employment and the differences in employment outcomes across different age cohorts, gender and amongst Africans will be explored at length in Chapter 4.

Chapter 4: Analysis and discussion

The previous chapter showed that at a descriptive level, the employment status of individuals as a whole, and of African individuals specifically, at each level of education varied considerably across age cohorts and by gender. This descriptive analysis further showed how other personal and household characteristics differed across these groups. This chapter extends the analysis by utilising a logit model to estimate the relationship between tertiary education and employment in South Africa in a multivariate context.

The purpose of this chapter is to examine how different socioeconomic factors are associated with the employment probabilities of an individual who possesses different tertiary educational attainment, with a particular emphasis on disaggregating across gender, age cohorts, and race. The disaggregation provides a more nuanced perspective and understanding of how different groups of individuals with tertiary educational attainment fare in the labour market.

There are five sections in this chapter. Section 4.1 provides an explanation of the models to be utilised, and the estimation approach. Section 4.2 presents the results and the interpretations of the econometric models, while Section 4.3 discusses the meaning of the results, linking them to the literature and context. Section 4.4 acknowledges the limitations of the analysis, while Section 4.5 provides a summary of the main findings and concludes the chapter.

4.1 Methods

This part of the chapter provides a comprehensive explanation of the econometric modelling and estimation approach used in this study.

4.1.1 Econometric modelling

This study uses a binary logistic model to estimate the relationship between tertiary education and employment in South Africa, following the work of Yahong and Khan (2021) on the cross-sectional analysis of employment returns to education and health status in China. The decision to utilise the logit model is driven by the binary nature of the dependent variable, which takes the value of 1 if the individual is employed and 0 if they are unemployed. Therefore, such makes it an appropriate instrument to analyse employment probabilities.

The general form of the logit model is given by

$$\Pr(y_i = 1|\boldsymbol{X}) = F(\boldsymbol{X}_i{}'\boldsymbol{\beta}) = \frac{e^{\boldsymbol{X}'\boldsymbol{\beta}}}{1 + e^{\boldsymbol{X}'\boldsymbol{\beta}}}$$

where the probability that the binary outcome variable y_i takes on the value of 1 is expressed using the cumulative distribution function *F*, which takes the form of the logistic distribution, with $\boldsymbol{X}$ representing the vector of covariates and $\boldsymbol{\beta}$ representing the vector of unknown parameters to be estimated (Cameron and Trivedi, 2009).

The estimation of the employment equation will take the following form:

$$\boldsymbol{X}_i'\boldsymbol{\beta} = \beta_0 + \beta_1 Edu_i + \beta_2 Dem_i + \beta_3 I_i + \beta_4 H_i + \beta_5 P_i \ + u_i$$

The dichotomous dependent variable takes on the values of 0 and 1, where 1 represents those who are employed and 0 otherwise, within the sample of economically active individuals. The main variable of interest is represented by Edu_i, a series of dummy variables for educational attainment. The model also includes several vectors of control variables, where Dem_i represents demographic characteristics, I_i is other individual characteristics, H_i is household composition, and P_i is province of residence. The error term is represented by u_i in the estimation equation.

4.1.2 Estimation approach

The principal objective of this dissertation is to investigate the relationship between tertiary education and employment status, across the varying tertiary education qualifications in South Africa. Doing this provides the opportunity to explore how different levels of tertiary education, such as diplomas, bachelor's degrees, and honours degrees, corresponding to different NQF levels, influence employability instead of treating tertiary education as a homogenous category. To investigate this relationship, the dissertation will use an unfolding series of model specifications. Thereafter, the robustness of the results will be assessed by comparing the findings across different subsamples. Throughout the analysis, the estimation results are displayed as average marginal effects to allow for an interpretation of the results in terms of employment probabilities. This section briefly describes this estimation approach, before the results are presented in the next section.

In the first step of the analysis, the study assesses what value is added by disaggregating tertiary education according to level of educational attainment or NQF level. This disaggregated model is compared to a baseline model, in which all levels of tertiary education are grouped into a single category, as is standard in much of the literature (Bhorat and Kimani, 2015; Psacharopoulos and Patrinos, 2019; Zizzamia and Ranchhod, 2019). These models are estimated in both a basic specification and an expanded model specification. The basic model encompasses a restricted set of demographic control variables, namely age (as a quadratic), gender and race. The expanded model incorporates supplementary control variables that are associated with an individual's probability of being employed, including further individual factors (health status and marital status), household composition, and geographical location.

The remainder of the regression analysis investigates the extent to which the tertiary education and employment relationship is consistent for different sub-groups of the population, based on age, race and gender. Studies by Baldry (2016), Van der Berg and Van Broekhuizen (2016) and Asavanirandorn, Pechdin and Trang (2022) found that labour market outcomes vary considerably across age cohorts due to differences in career stage, experience, and life cycle influences as depicted by the theory of labour force participation. In addition, access to education in South Africa expanded rapidly over the post-apartheid period, which affected attainment levels across age cohorts. Therefore, the disaggregated logit model is estimated separately in the five age cohorts as presented in Chapter 3.

Race, just like gender, significantly influences employment outcomes in South Africa as evident in the work by Kingdon and Knight (2004) and Baldry (2016). Following the country's history of apartheid and structural inequalities that limited access to tertiary education and economic opportunities, policy reforms have resulted in an increase in access to education and the number of individuals with tertiary educational attainments especially for African individuals who were historically marginalized. Therefore, in addition to controlling for race in the previous models, the relationship between education and employment is estimated separately for African individuals across the age cohorts.

Finally, the disaggregated logit model is estimated separately by gender. Studies by Fredericks and Yu (2018), Posel and Casale (2019), and Cortes and Pan (2018) found that educational attainment may yield different returns for men and women even if they are at a similar level. Their findings suggest that women face greater barriers to employment due to social and cultural factors as captured by the theory of labour force participation, time allocation, and

human capital theory. Examining the gendered effects of tertiary education on employability provides a nuanced understanding of how different social identities interact with tertiary education qualifications to influence labour market outcomes in South Africa.

4.2 Results and interpretation

This part of the chapter presents and discusses the results of the logit estimations used in this analysis, as described in the estimation approach. For each set of estimations, the sample has been restricted to individuals aged 21 to 59 who are economically active, and the coefficients have been converted into average marginal effects.

Table 4.1 presents logit estimates for basic and expanded model specifications to investigate the relationship between tertiary education and employment. In all four of the model specifications, education levels of matric and above are associated with significantly greater probabilities of being employed, compared to having primary schooling or less. There is no significant employment probability difference between having incomplete secondary education and having primary or no schooling. As a whole, tertiary education has a positive and substantial influence on an individual's probability of being employed. When tertiary education is disaggregated across the different levels of attainment, all levels of tertiary education are positively and substantially associated with an individual's employment outcomes when compared to individuals who have primary or no schooling.

Table 4. 1 Logit estimation of employment, by grouped and disaggregated tertiary educational attainment

VARIABLES	Basic Grouped	Basic Disaggregated	Expanded Grouped	Expanded Disaggregated
Education Categories:				
Incomplete Secondary	-0.002	-0.002	-0.011	-0.011
	(0.012)	(0.012)	(0.012)	(0.012)
Matric	0.071***	0.070***	0.059***	0.060***
	(0.013)	(0.013)	(0.012)	(0.012)
Tertiary	0.240***		0.205***	
	(0.015)		(0.014)	

VARIABLES	Basic Grouped	Basic Disaggregated	Expanded Grouped	Expanded Disaggregated
Higher Certificate		0.119***		0.094***
		(0.021)		(0.020)
Diploma		0.226***		0.194***
		(0.019)		(0.018)
Bachelors Degree		0.302***		0.263***
		(0.021)		(0.021)
Honours Degree		0.372***		0.325***
		(0.048)		(0.045)
Masters and Doctorates		0.429***		0.375***
		(0.078)		(0.073)
Demographics Indicators:				
Age (in years)	0.041***	0.041***	0.032***	0.032***
	(0.002)	(0.002)	(0.002)	(0.002)
Age Square (/1000)	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.103***	0.103***	0.092***	0.093***
	(0.006)	(0.006)	(0.006)	(0.006)
White	0.354***	0.343***	0.297***	0.288***
	(0.025)	(0.025)	(0.023)	(0.024)
Coloured	0.139***	0.138***	0.078***	0.078***
	(0.015)	(0.015)	(0.018)	(0.017)
Asian/Indian	0.277***	0.265***	0.235***	0.225***
	(0.044)	(0.045)	(0.041)	(0.041)
Married			0.081***	0.080***
			(0.007)	(0.007)
Divorced/Widowed			0.071***	0.069***
			(0.017)	(0.017)
Health Indicators:				
Fair Health			0.064	0.065
			(0.040)	(0.040)
Good Health			0.106***	0.106***
			(0.038)	(0.038)
Very good Health			0.092**	0.092**
			(0.038)	(0.038)
Excellent Health			0.117***	0.116***
			(0.038)	(0.038)
Household Composition:				
Number of Children in Household			-0.008***	-0.007***
			(0.003)	(0.003)
Number of Working Age Adults in Household			-0.018***	-0.018***
			(0.003)	(0.003)
Number of Pension Age			-0.066***	-0.067***

VARIABLES	Basic Grouped	Basic Disaggregated	Expanded Grouped	Expanded Disaggregated
Adults in Household				
			(0.007)	(0.007)
Location and Province:				
Urban			0.062***	0.061***
			(0.010)	(0.009)
Western Cape			0.095***	0.095***
			(0.017)	(0.017)
Eastern Cape			0.019	0.020
			(0.014)	(0.014)
Northern Cape			0.027	0.030
			(0.021)	(0.021)
Free State			-0.007	-0.004
			(0.016)	(0.016)
KwaZulu Natal			0.032***	0.032**
			(0.012)	(0.012)
North West			0.035**	0.037**
			(0.016)	(0.016)
Mpumalanga			0.014	0.017
			(0.015)	(0.015)
Limpopo			0.092***	0.095***
			(0.017)	(0.017)
Sample	23886	23886	23872	23872
Population	24357521	24357521	24336928	24336928

Source: Own calculations, GHS 2022.

Notes: The values displayed are average marginal effects. Standard errors are in parentheses. Data have been weighted to represent population-level estimates. *** p<0.01, ** p<0.05, * p<0.1. The sample is restricted to individuals aged between aged 21-59. Reference categories for categorical variables; Education: No Schooling or Primary Education; Gender: Female; Race: African; Marital Status: Never Married; Health: Poor Health; Location: Rural; Province: Gauteng.

In the basic model, where tertiary education is grouped as one variable and only basic demographic characteristics are controlled for, the probability of employment increases by 24 percentage points when an individual has some level tertiary education compared to those with primary or no schooling. In the expanded grouped model, which includes further controls, the magnitude of this marginal effect declines somewhat to a 20.5 percent point greater probability of being employed, suggesting that a portion of the initial correlation observed in the basic model could be ascribed to additional variables included in the expanded model. Nonetheless, these results suggest a strong and significant correlation between having any level of tertiary education and improved employment outcomes.

In the disaggregated basic model, each subsequent level of tertiary education (or each subsequent NQF level) has a larger magnitude of marginal effect. For example, the probability of being employed increases by 11.9 percentage points when an individual has a higher certificate than an individual who has primary or no schooling, whereas individuals who have masters or doctorate degrees have a 42.9 percentage point higher probability of being employed than those that possess primary or no schooling. Similarly to the grouped model, controlling for further characteristics that influence employment reduces these magnitudes, but the pattern persists, and they remain significant.

The control variables indicate that a range of individual, household and locational characteristics are significantly associated with the probability of being employed. Across all the models, employment probability increases at a decreasing rate with age and is significantly higher for men than for women. Individuals in all other race groups have a significantly greater probability of being employed when compared to African individuals. The role of these demographic characteristics is discussed in more detail in the later models. In the expanded models, individuals who are married, or those who are divorced or widowed, are more likely to be employed than those who have never been married. Individuals who are in better health are more likely to be employed than those who are in poor health. Individuals who live in larger households have lower probabilities of being employed. A larger number of children is associated with a small decline in the probability of being employed, which is consistent with the theory of labour force participation and time allocation discussed in Chapter 2, as children require household production responsibilities (Becker, 1965; Ntuli, 2007; Posel and Casale, 2019; Roberts and Schöer, 2021). A larger number of adults, especially pension age adults, also decreases the probability of being employed. This may be due to the reduction in financial stress in the household due to income received by pensioners from retirement funds and social grants (Mincer, 1962; Becker, 1965).

The expanded models also include the type of geographical area and province of residence, as partial controls for local labour market conditions. Urban residents have a significantly greater probability of being employed than those living in rural areas. In addition, those living in the Western Cape, KwaZulu-Natal and Limpopo are more likely to be employed than individuals in Gauteng, when controlling for all other included characteristics.

Chapter 3 showed that, at a descriptive level, the employment status of individuals at each level of education varied considerably across age cohorts. Table 4.2, therefore, displays logit

estimations of how the relationship between tertiary education and employment varies across age cohorts when controlling for other factors, using the expanded disaggregated specification. The first column reproduces the results for the full sample from Table 4.1, for comparison purposes.

Table 4. 2 Logit estimation of employment, by age cohort

VARIABLES	Full Sample	Age 21-29	Age 30-39	Age 40-49	Age 50-59
Education Categories:					
Incomplete Secondary	-0.011	-0.023	-0.007	0.007	-0.005
	(0.012)	(0.030)	(0.023)	(0.021)	(0.006)
Matric	0.060***	0.028	0.074***	0.095***	0.019*
	(0.012)	(0.031)	(0.024)	(0.025)	(0.010)
Higher Certificate	0.094***	0.045	0.124***	0.167***	0.004
	(0.020)	(0.041)	(0.036)	(0.048)	(0.018)
Diploma	0.194***	0.157***	0.182***	0.312***	0.066**
	(0.018)	(0.048)	(0.034)	(0.055)	(0.033)
Bachelors Degree	0.263***	0.199***	0.313***	0.325***	0.100*
	(0.021)	(0.054)	(0.043)	(0.058)	(0.053)
Honours Degree	0.325***	0.257***	0.396***	0.377***	0.117*
	(0.045)	(0.090)	(0.087)	(0.141)	(0.068)
Masters and Doctorates	0.375***	0.222**	0.650***	0.382**	0.132*
	(0.073)	(0.102)	(0.199)	(0.169)	(0.074)
Demographic Indicators:					
Age (in years)	0.032***	0.070	0.048	0.058	-0.059***
	(0.002)	(0.062)	(0.054)	(0.068)	(0.009)
Age Square (/1000)	-0.000***	-0.001	-0.001	-0.001	0.001***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
Male	0.093***	0.116***	0.105***	0.095***	0.006
	(0.006)	(0.022)	(0.012)	(0.017)	(0.006)
White	0.288***	0.320***	0.318***	0.297***	0.063**
	(0.024)	(0.070)	(0.052)	(0.059)	(0.029)
Coloured	0.078***	0.120***	0.059*	0.098***	0.006
	(0.017)	(0.034)	(0.032)	(0.033)	(0.010)
Asian/Indian	0.225***	0.283***	0.226***	0.183**	0.064
	(0.041)	(0.075)	(0.073)	(0.075)	(0.039)
Married	0.080***	0.099***	0.094***	0.060***	0.015*
	(0.007)	(0.023)	(0.013)	(0.016)	(0.008)
Divorced/Widowed	0.069***	0.136	0.000	0.055**	0.014
	(0.017)	(0.108)	(0.045)	(0.026)	(0.009)
Health Indicators:					

VARIABLES	Full Sample	Age 21-29	Age 30-39	Age 40-49	Age 50-59
Fair Health	0.065	0.085	0.117	0.110	-0.003
	(0.040)	(0.143)	(0.092)	(0.078)	(0.018)
Good Health	0.106***	0.173	0.182**	0.133*	0.007
	(0.038)	(0.130)	(0.086)	(0.073)	(0.017)
Very good Health	0.092**	0.150	0.172**	0.139*	-0.005
	(0.038)	(0.130)	(0.086)	(0.072)	(0.017)
Excellent Health	0.116***	0.170	0.194**	0.165**	0.005
	(0.038)	(0.130)	(0.086)	(0.074)	(0.018)
Household Composition:					
Number of Children in Household	-0.007***	-0.010*	-0.011***	0.002	-0.003
	(0.003)	(0.005)	(0.004)	(0.006)	(0.002)
Number of Working Age Adults in Household	-0.018***	-0.027***	-0.015***	-0.018***	-0.001
	(0.003)	(0.008)	(0.004)	(0.006)	(0.002)
Number of Pension Age Adults in Household	-0.067***	-0.054***	-0.065***	-0.105***	-0.021**
	(0.007)	(0.015)	(0.012)	(0.019)	(0.010)
Location and Province:					
Urban	0.061***	0.068***	0.056***	0.075***	0.010
	(0.009)	(0.020)	(0.015)	(0.019)	(0.007)
Western Cape	0.095***	0.112***	0.111***	0.066**	0.023
	(0.017)	(0.033)	(0.031)	(0.029)	(0.015)
Eastern Cape	0.020	0.002	0.016	0.046*	0.006
	(0.014)	(0.025)	(0.023)	(0.027)	(0.008)
Northern Cape	0.030	0.026	0.045	0.023	0.009
	(0.021)	(0.035)	(0.035)	(0.040)	(0.012)
Free State	-0.004	0.002	-0.028	0.023	0.009
	(0.016)	(0.028)	(0.026)	(0.029)	(0.010)
KwaZulu Natal	0.032**	-0.005	0.046**	0.073***	0.002
	(0.012)	(0.023)	(0.020)	(0.023)	(0.007)
North West	0.037**	-0.016	0.039	0.075**	0.025*
	(0.016)	(0.032)	(0.027)	(0.033)	(0.015)
Mpumalanga	0.017	0.008	0.021	0.024	0.003
	(0.015)	(0.025)	(0.023)	(0.028)	(0.008)
Limpopo	0.095***	0.084***	0.096***	0.119***	0.025*
	(0.017)	(0.032)	(0.024)	(0.031)	(0.014)
Sample	23872	6277	7615	6119	3861
Population	24336928	6310337	8803886	5986726	3235979

Source: Own calculations, GHS 2022.

Notes: The values displayed are average marginal effects. Standard errors are in parentheses. Data have been weighted to represent population-level estimates. *** p<0.01, ** p<0.05, * p<0.1. The sample is restricted to individuals aged between aged 21-59. Reference categories for categorical variables; Education: No Schooling or Primary Education; Gender: Female; Race: African; Marital Status: Never Married; Health: Poor Health; Location: Rural; Province: Gauteng.

The results indicate some nuanced relationships across age cohorts. In the youngest cohort, the marginal effects for matric and higher certificates are both positive but statistically insignificant at all levels. This implies that there is no difference in employability for individuals who possess matric and higher certificates compared to those with no schooling or primary education. This reflects the ideas proposed by the signalling theory that the increasing prevalence of certain qualifications diminishes their effectiveness as a signal of competence to improve employment outcomes (Spence, 1978).

However, the higher levels of tertiary education are significant for this cohort, but all have smaller marginal effects than for the whole population, suggesting that the benefit of those qualifications is lower in this age group. Without disaggregating across age and the different levels of tertiary education attainment, this is something that would not have been identified. This result may be a consequence of young individuals lacking work experience, as captured by the human capital theory (Schultz, 1961; Mincer, 1962; and Becker, 1964) and signalling theory (Spence, 1974).

For individuals in the age cohorts of 30-39 and 40-49, there are positive and significant employment returns to all levels of tertiary education, which are typically greater than for the full sample. These age groups appear to benefit the most from their tertiary education. The magnitude of this effect may be boosted by other characteristics that individuals in those age groups possess, such as accumulated work experience.

Finally, for individuals in the 50-59 age cohort, matric and every level of tertiary education (except higher certificates) are significantly and positively associated with employment compared to individuals with no schooling or primary schooling. However, the magnitude of the marginal effects is the smallest of all age cohorts, suggesting that education has a weak association with employment for this group. Given their age, most of the individuals in this cohort would have completed their education at least three decades previously. Characteristics related to their work history may therefore play a more pronounced role in determining their current employment status.

The control variables in Table 4.2 have similar marginal effects to those in Table 4.1 with the exception of some age cohorts. For example, the results for gender, race, individuals who live in larger households, urban residents, and those living in the Western Cape in Table 4.2 are similar to those in Table 4.1 except for individuals aged 50-59. Furthermore, the control

variables results for marital status, a larger number of adults, especially pension-age adults, and those living in Limpopo across all age cohorts are similar to those in Table 4.1

However, the differences in Table 4.2 compared to Table 4.1 can be seen on the age variable for individuals aged 50-59, where employment probabilities reduce at a decreasing rate with age. This suggests a stabilisation in employment rates for some older individuals, potentially because of a stable employment environment and roles for those who remain in the workforce.

Table 4.2 showed differences across age cohorts in the relationship between education and employment in South Africa. While such variations may result from changes in employment across the life cycle, they may also result from changes in access to education over time. Given that African individuals were most affected by the restrictions in access to education under apartheid, and the subsequent post-apartheid policies to expand access, Table 4.3 therefore focuses on this race group specifically. Chapter 3 showed that, at a descriptive level, the employment status of African individuals at each level of education varied considerably across age cohorts.

Similarly to Table 4.2, the first column presents the estimates for the full sample for Africans only, while subsequent columns disaggregate the African sample into age cohorts. For the whole sample, individuals who possess tertiary educational attainment have a higher probability of being employed when compared to individuals who possess no schooling or primary education, with the magnitudes of the marginal effects for Africans for all tertiary levels other than masters and doctorates being larger than for the full sample.

Table 4. 3 Logit estimation of employment for African group, by age cohort

VARIABLES	Full Sample	Age 21-29	Age 30-39	Age 40-49	Age 50-59
Education Categories:					
Incomplete Secondary	-0.010	-0.026	-0.009	0.021	-0.008
	(0.013)	(0.034)	(0.025)	(0.023)	(0.006)
Matric	0.057***	0.019	0.068***	0.103***	0.019**
	(0.014)	(0.034)	(0.026)	(0.027)	(0.009)
Higher Certificate	0.097***	0.038	0.128***	0.177***	-0.003
	(0.022)	(0.045)	(0.039)	(0.053)	(0.020)
Diploma	0.204***	0.161***	0.180***	0.345***	0.081**
	(0.020)	(0.048)	(0.037)	(0.061)	(0.033)
Bachelors Degree	0.279***	0.206***	0.336***	0.347***	0.100**

VARIABLES	Full Sample	Age 21-29	Age 30-39	Age 40-49	Age 50-59
	(0.023)	(0.054)	(0.046)	(0.063)	(0.049)
Honours Degree	0.376***	0.329***	0.475***	0.369**	0.111*
	(0.054)	(0.089)	(0.101)	(0.148)	(0.061)
Masters and Doctorates	0.345***	0.101	0.667***	0.336*	0.118*
	(0.078)	(0.121)	(0.209)	(0.178)	(0.063)
Demographic Indicators:					
Age (in years)	0.037***	0.092*	0.065	0.053	-0.071***
	(0.003)	(0.048)	(0.058)	(0.078)	(0.012)
Age Square (/1000)	-0.000***	-0.001	-0.001	-0.001	0.001***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)
Male	0.102***	0.128***	0.114***	0.104***	0.007
	(0.007)	(0.019)	(0.013)	(0.019)	(0.006)
Married	0.083***	0.104***	0.100***	0.056***	0.015*
	(0.008)	(0.022)	(0.013)	(0.017)	(0.008)
Divorced/Widowed	0.090***	0.170	0.014	0.071**	0.015*
	(0.018)	(0.115)	(0.054)	(0.030)	(0.009)
Health Indicators:					
Fair Health	0.100**	0.315*	0.201*	0.118	-0.007
	(0.044)	(0.187)	(0.112)	(0.084)	(0.019)
Good Health	0.139***	0.364**	0.256**	0.146*	0.006
	(0.042)	(0.177)	(0.106)	(0.079)	(0.018)
Very good Health	0.117***	0.332*	0.240**	0.143*	-0.010
	(0.042)	(0.176)	(0.106)	(0.079)	(0.018)
Excellent Health	0.138***	0.348**	0.257**	0.178**	-0.005
	(0.042)	(0.176)	(0.106)	(0.081)	(0.019)
Household Composition:					
Number of Children in Household	-0.008***	-0.010	-0.014***	0.003	-0.003
	(0.003)	(0.006)	(0.005)	(0.006)	(0.002)
Number of Working Age Adults in Household	-0.019***	-0.028***	-0.014***	-0.021***	-0.001
	(0.003)	(0.007)	(0.005)	(0.007)	(0.002)
Number of Pension Age Adults in Household	-0.075***	-0.057***	-0.068***	-0.125***	-0.030***
	(0.008)	(0.016)	(0.013)	(0.022)	(0.011)
Location and Province:					
Urban	0.079***	0.098***	0.069***	0.091***	0.011
	(0.010)	(0.022)	(0.017)	(0.021)	(0.007)
Western Cape	0.054***	0.056	0.054	0.055	0.020
	(0.021)	(0.038)	(0.036)	(0.034)	(0.016)
Eastern Cape	0.021	0.019	0.003	0.051*	0.004
	(0.016)	(0.028)	(0.025)	(0.030)	(0.009)
Northern Cape	0.093***	0.081*	0.115**	0.115**	0.015
	(0.029)	(0.049)	(0.053)	(0.052)	(0.016)

VARIABLES	Full Sample	Age 21-29	Age 30-39	Age 40-49	Age 50-59
Free State	-0.013	-0.018	-0.037	0.027	0.004
	(0.017)	(0.032)	(0.028)	(0.031)	(0.010)
KwaZulu Natal	0.039***	0.012	0.046**	0.080***	0.001
	(0.013)	(0.024)	(0.021)	(0.025)	(0.008)
North West	0.040**	-0.009	0.036	0.088**	0.023*
	(0.018)	(0.035)	(0.029)	(0.037)	(0.013)
Mpumalanga	0.020	0.014	0.018	0.035	0.002
	(0.016)	(0.027)	(0.025)	(0.030)	(0.008)
Limpopo	0.106***	0.103***	0.099***	0.132***	0.026*
	(0.018)	(0.034)	(0.026)	(0.033)	(0.013)
Sample	19785	5335	6500	5019	2931
Population	19757842	5261964	7452430	4766776	2276672

Source: Own calculations, GHS 2022

Notes: The values displayed are average marginal effects. Standard errors are in parentheses. Data have been weighted to represent population-level estimates. *** p<0.01, ** p<0.05, * p<0.1. The sample is restricted to individuals aged between aged 21-59. Reference categories for categorical variables; Education: No Schooling or Primary Education; Gender: Female; Marital Status: Never Married; Health: Poor Health; Location: Rural; Province: Gauteng.

In the youngest cohort, the marginal effects for matric and higher certificates in Table 4.3 are similar to those in Table 4.2. Employment returns to tertiary education for African individuals that fall in the age cohorts of 30-39 and 40-49 in Table 4.3 are also similar to Table 4.2, and they are typically greater than for the full sample except for individuals aged 30-39 with a diploma. The employment returns to tertiary education in Table 4.3 are similar to those in Table 4.2. Just like in Table 4.2, the magnitude of the marginal effects for African individuals aged 50-59 is the smallest of all age cohorts. The insignificant effects for the age 21-29 are probably due to small sample sizes for those with masters or doctoral degrees.

The control variables results in Table 4.3 are also typically similar to those in Table 4.2, with a few exceptions in some age cohorts. For example, unlike Table 4.2, in the youngest age cohort, individuals who are in better health are more likely to be employed than those with poor health. The other main difference between Table 4.3 and Table 4.2 is the control variables that capture the province in which an individual lives. For example, unlike Table 4.2, across all the age cohorts, residing in the Western Cape does not significantly improve an African individual's employment probabilities when compared to an individual living in Gauteng.

All of the models presented thus far include a gender dummy variable as a crude measure of employment differences between men and women. However, the gender dummy variable alone

does not sufficiently explain the complex interaction of factors that contribute to gender disparities. It does not allow an exploration of the effects of the different levels of tertiary education on employment for men and women when controlling for other factors. The descriptive analysis in Chapter 3 showed that the employment status of individuals at each level of education varied considerably for both men and women. The final set of estimates, Table 4.4, therefore displays logit results separately for men and women, to identify gender-specific variations in employability and tertiary educational returns. However, these results are not presented separately by age cohort in the chapter, as there are insufficient individuals in some education-age-gender cells to produce meaningful estimates. Due to these small sample size challenges, marginal effects could not be estimated, but Tables A4.1 and A4.2 in the appendix presents the table of age cohort coefficient estimates for completeness.

Table 4. 4 Logit estimation of employment, by gender

VARIABLES	Men	Women
Education Categories:		
Incomplete Secondary	-0.028*	0.013
	(0.015)	(0.018)
Matric	0.024	0.105***
	(0.016)	(0.019)
Higher Certificate	0.074**	0.131***
	(0.031)	(0.027)
Diploma	0.103***	0.282***
	(0.026)	(0.026)
Bachelors Degree	0.170***	0.355***
	(0.030)	(0.029)
Honours Degree	0.197***	0.441***
	(0.061)	(0.063)
Masters and Doctorates	0.318**	0.451***
	(0.149)	(0.076)
Demographic Indicators:		
Age (in years)	0.028***	0.038***
	(0.003)	(0.004)
Age Square (/1000)	-0.000***	-0.000***
	(0.000)	(0.000)
White	0.283***	0.301***
	(0.037)	(0.032)
Coloured	0.033	0.129***
	(0.023)	(0.022)

VARIABLES	Men	Women
Asian/Indian	0.261***	0.178***
	(0.064)	(0.050)
Married	0.171***	0.010
	(0.011)	(0.010)
Divorced/Widowed	0.050*	0.059***
	(0.027)	(0.021)
Health Indicator:		
Fair Health	0.074	0.072
	(0.060)	(0.056)
Good Health	0.119**	0.109**
	(0.058)	(0.053)
Very good Health	0.108*	0.097*
	(0.058)	(0.053)
Excellent Health	0.133**	0.120**
	(0.058)	(0.053)
Household Composition:		
Number of Children in Household	-0.005	-0.014***
	(0.004)	(0.004)
Number of Working Age Adults in Household	-0.028***	-0.010**
	(0.004)	(0.004)
Number of Pension Age Adults in Household	-0.078***	-0.045***
	(0.009)	(0.009)
Location and Province:		
Urban	0.047***	0.078***
	(0.012)	(0.013)
Western Cape	0.106***	0.089***
	(0.024)	(0.022)
Eastern Cape	0.001	0.044**
	(0.018)	(0.018)
Northern Cape	0.007	0.054*
	(0.028)	(0.028)
Free State	-0.021	0.004
	(0.020)	(0.023)
KwaZulu Natal	0.023	0.045***
	(0.016)	(0.016)
North West	0.022	0.047*
	(0.020)	(0.025)
Mpumalanga	-0.010	0.050**
	(0.018)	(0.020)
Limpopo	0.084***	0.112***
	(0.020)	(0.022)
Sample	12228	11644

VARIABLES	Men	Women
Population	12896179	11440749

Source: Own calculations, GHS 2022.

Notes: The values displayed are average marginal effects. Standard errors are in parentheses. Data have been weighted to represent population-level estimates. *** p<0.01, ** p<0.05, * p<0.1. The sample is restricted to individuals aged between aged 21-59. Reference categories for categorical variables; Education: No Schooling or Primary Education; Race: African; Marital Status: Never Married; Health: Poor Health; Location: Rural; Province: Gauteng.

In Table 4.4, tertiary education is positively associated with employability for both genders when compared to those who possess no schooling or primary education, as indicated by the coefficients being positive and significant. However, there are a number of substantial gender differences in the results. For men, incomplete secondary is both negative and statistically significant, whereas it is not significant for women. Matric is another interesting estimate for the male sample as it is not significant at any level, but significant at all levels for women. The results reflect that women have a stronger association between tertiary education and employment than men. This is evident as the marginal effects for each level of tertiary education are almost doubled for women when compared to the marginal effects for men. For example, possessing a bachelors degree increases the probability of being employed by 17.0 percentage points for men, whereas women have a 35.5 percentage point higher probability of being employed, compared to someone with primary or no schooling. This may suggest that tertiary education helps women to overcome labour market disadvantages, or to access certain types of jobs where employment is more likely.

The control variables' results in Table 4.4 are similar to those in the full sample in Table 4.1. The main difference is that, for women, a larger number of children is associated with a small but significant decline in employment probability, however this variable is insignificant for men. This is consistent with the theory of labour force participation and time allocation discussed in Chapter 2, as children require household production responsibilities, which are often assumed by women due to specialisation and traditional gender roles (Mincer, 1962; Becker, 1965; Goldin, 1989; Ntuli, 2007). This suggests that women's employment probability is less sensitive to the number of other working-age and pension-age adults in the household, indicating that women may be less able than men to share in household resources. For women, those residing in any province (except for the Free States) are more likely to be employed than an individual in Gauteng, when controlling for all other included characteristics. Whereas for

men, it is only those residing in the Western Cape and Limpopo who are more likely to be employed than an individual who resides in Gauteng.

4.3 Discussion of results

This section provides insight into the meaning of the results from Section 4.2 and links them with literature and South African context. The initial results confirm the finding of other literature that having a tertiary education qualification is advantageous for finding employment in the South African labour market (Branson and Leibbrandt, 2013; Bhorat and Kimani, 2015; Zizzamia and Ranchhod, 2019). When tertiary education is disaggregated, in line with the study's second research objective, the estimates indicate that higher levels of tertiary education provide additional benefits to employment outcomes. The results reflect that, within tertiary education, each higher qualification, corresponding to a higher NQF level, yields better employment outcomes.

These results correspond with theoretical expectations, as tertiary education sends signals of productivity to the employers that the individual possesses essential abilities, skills and competencies that enhance their competitiveness as captured by Spence (1974) in the signalling theory. Furthermore, the results are consistent with the human capital theory, as Schultz (1961) argues that if an individual continuously invests in their human capital, this will be accompanied by an expansion in their value in the marketplace as they provide more skills and productivity at their jobs. If human capital expands with more education, it can be argued that the worker's market value could hypothetically rise in relation to the amount of education they may have received (Schultz, 1961).

However, existing empirical research has typically grouped tertiary education into a single category when observing employment outcomes (for example, Branson and Leibbrandt, 2013; Fredericks and Yu, 2018). Therefore, this dissertation's findings stress the importance of disaggregating tertiary education into its respective NQF levels as it unveils a nuanced understanding of what is concealed within the tertiary category.

Further nuances are revealed by disaggregating the estimates across different demographic subsamples, which helps achieve the third research objective of this study. For the youngest cohort, matric and higher certificates have positive but statistically insignificant relationships with employment at all levels. This highlights how the effectiveness of a signal lies in its

relative scarcity and thus providing substantial information about the candidate's potential productivity (Spence, 1978). Therefore, as more individuals acquire the same qualification, the signalling value of the credentials diminishes. When a signal becomes too prevalent, it loses the ability to convey distinctive information about a candidate's productivity, resulting in market saturation (Weiss, 1995). The results, therefore, suggest that the pervasiveness of matric among the youngest cohort may have substantially reduced its value in determining employment status.

These findings are consistent with the idea proposed by Bhorat, Stanwix and Thornton (2021), that the labour market value of possessing a high school certificate has decreased over time and further add that this is in line with previously expressed concerns about the diminishing quality of the schooling system.

The models reveal insights into how tertiary education relates to employability differently across life stages. For the youngest age cohort, the higher levels of tertiary education are statistically significant, but have smaller marginal effects than for the whole population, suggesting that the benefit of those qualifications is lower in this age group. This follows Figure 3.1 in the descriptive analysis in Chapter 3, where individuals in this age cohort had the lowest proportion of employed individuals when compared to other cohorts with equivalent education (for all levels). Typically, most of the young cohorts are new entrants into the labour market, and although they may be educated, they lack experience. These findings are similar to those of Mncayi (2016), Baldry (2016), and Graham, Williams, and Chisoro's (2019), who also observed low employment returns for young individuals in their analyses.

However, for individuals in the mid-career (30-39 and 40-49) of their life cycle, their employment returns to tertiary education are typically greater than for the full sample. These findings are supported by the human capital theory (Schultz, 1961; Mincer, 1962; Becker, 1964) that indicates that returns to education are optimised when it is combined with appropriate experience. For individuals in these age group (30-39 and 40-49), any level of tertiary education yields high returns in employment outcomes, as these individuals may be more suited for roles that require a combination of theoretical knowledge and practical skills. These results are consistent with local studies, such as those by Van der Berg and Van Broekhuizen (2012), Mncayi (2016), and Baldry (2016), which found that possessing education and practical experience enhances an individual's employment outcomes. Moreover, it aligns with international studies such as Mira, Gardijan Kedžo, and Žmuk (2023), which observed a

similar relationship across several European countries, as well as Roberts (2022) in the context of England.

For individuals in the later stages of their careers (age 50-59), the magnitude of the marginal effects is the smallest of all age cohorts, suggesting that education has a weak association with employment for this group. Given their age, it is likely that the majority of individuals in this age cohort completed their formal education some time ago. Consequently, factors associated with their employment history, such as practical experience accrued over time and previous job stability, may exert a more substantial influence on their present employment outcomes. It can further be argued that this limited magnitude could potentially be a consequence of a mismatch between the kinds of skills they acquired in formal education some decades ago, and the current needs of the labour market as captured by Van der Berg and Van Broekhuizen (2012) and Mncayi (2016).

Given the historical context of being the most disadvantaged group under apartheid and the pronounced impact of post-apartheid policies that have led to the expansion of access to education and the labour market, which have most impacted them, the analysis subsequently narrowed its focus to African individuals. Further distinctions are discovered by disaggregating the estimates across different demographic subsamples, which assists in addressing the fourth objective of this research. The employment returns to tertiary education for the African group are similar to those of the whole sample (Table 4.3 is similar to those in Table 4.2). This reflects the substantial role played by the Higher Education Act of 1997 and NSFAS, and other funding opportunities in improving access to education for African individuals. This is complemented by affirmative action policies such as the Employment Equity Act 55 of 1998 and the Broad-Based Black Economic Empowerment Act No. 53 of 2003 that aim to increase economic participation and employment of African people.

African individuals who possess a masters or doctoral degree in the 30-39 age cohort have a 66.7 percent greater probability of being employed than those who have primary or no schooling. This is the largest magnitude employment return to education for any of the analysed cohorts, suggesting that tertiary education and work experience may have combined with affirmative action policies, leading to favourable employment outcomes for African individuals.

This observation of the findings continues to the African individuals in the models for 40-49 and 50-59 age groups, where those who possess a masters or doctoral degree are associated

with greater probabilities of being employed than those who have primary or no schooling by 32.8 and 11.8 percentage points, respectively. This is somewhat similar to the findings in Table 4.2. However, the effects vary. Among Africans, the employment returns to higher education may reflect not only improved productivity, as per human capital theory and signalling theory, but also education's capacity to counteract historical labour market marginalisation. Therefore, although the findings approximate those of the general population, the fundamental social and structural factors render the effect more significant within this group. This nuance is consistent with findings by Lam, Hofmeyr, Branson (2014) and Leibbrandt and Pabón (2021), who emphasise the distinct value of education across the racial and historical context of South Africa.

The final piece of analysis estimated employment probabilities separately for men and for women, in order to allow for the identification of heterogeneous effects that might be concealed if estimation is done for the whole sample. This is because men and women frequently face distinct social and economic conditions, which can influence their labour market behaviour, employment opportunities, and responsiveness to factors such as education, age or location.

Observing the employment outcomes closely for both genders, it can be established that women have greater employment returns to tertiary education than men. For women, educational attainment may act as an indicator of ability, productivity, skill and commitment in the labour market, which combats prejudices or biases that could normally restrict or impede their employment possibilities (Spence, 1974; Casale, Posel, and Mosomi, 2021). The increased tertiary educational attainment can be particularly beneficial in differentiating women and serving as a signal of competence in industries where they are not adequately represented or encounter issues in career advancement (Roberts and Schöer, 2021). Some of the jobs that women typically access with tertiary education include teaching and nursing, which are historically female-dominated and financially stable, although not highly remunerated (Van Broekhuizen and Spaull, 2017; Gradín, 2021; Roberts and Schöer, 2021).

An alternative rationale is that higher levels of tertiary educational attainment are frequently associated with increased social mobility and financial autonomy for women. It can be argued that the opportunity to acquire financial independence and obtain high-status positions can inspire higher employment returns to education for women. Possessing tertiary educational attainment enables women to access higher-remunerating jobs in fields that are generally dominated by men, therefore enhancing their employment outcomes at a greater magnitude

relative to men who might not encounter the same obstacles (Roberts and Schöer, 2021; Casale, Posel, and Mosomi, 2021; and Posel et al, 2024). Women's financial autonomy may be increasingly important in the South African context of low and declining marriage rates (Ahituv and Lerman, 2007), where they cannot rely on income from a spouse. In South Africa, the average educational attainment of women, particularly African women, has now surpassed that of men (although unemployment amongst women remains extremely high) (Roberts and Schöer, 2021).

Across all four model specifications, the control variables, including demographic, geographic, health and household indicators, consistently demonstrated significant association with employment outcomes. These findings stressed the importance of taking into account factors such as marital status, health, household composition and geographic location when analysing employment outcomes.

4.4 Limitations

While this chapter offered a valuable and nuanced analysis of the relationship between tertiary education and employment in South Africa, there are limitations to this analysis that have to be acknowledged. These limitations originate from methodological and data challenges that could compromise the robustness of the findings. This section outlines these limitations and how they impact the study.

One key limitation of the analysis of this study is its inability to account for selection into labour force participation. Education influences both the decision to participate and the probability of finding employment once participating. Without controlling for this selection process, this may result in sample selection bias, resulting in an overestimation or underestimation of the true effect of education on employment outcomes (Cameron and Trivedi, 2009; Wooldridge, 2019). Ideally, this problem could be solved by using a sample selection model, such as the Heckman two-step approach, which requires the use of exclusion restrictions, variables that influence the probability of labour force participation but not employment outcomes explicitly. However, the GHS does not contain sufficient information on variables such as non-labour income, specific household characteristics, or reservation wages, which are frequently used to ascertain the selection equation. Consequently, this limitation should be taken into account when interpreting the results because the analysis proceeds without correcting for it.

The second limitation to the analysis is that there may be endogeneity concerns, as there are omitted variables (unobserved factors such as ability, motivation or family background) that influence employment and that are correlated with education. Therefore, this also has the potential to bias the education estimates (Hill, Griffiths, and Lim, 2018; Wooldridge, 2019), likely in an upward direction. The GHS data are cross-sectional, and therefore, it is not possible to use fixed effects estimation to control for unobserved heterogeneity. Although panel data are available, in the form of NIDS, as discussed in Chapter 3, the NIDS sample sizes are too small to disaggregate tertiary education into the different NQF levels and age cohorts, and therefore, these data could not have been used to achieve the dissertation's research objectives.

The third and last limitation of this analysis is the potential presence of measurement error. Data on educational attainment and employment status are self-reported, which increases the possibility of social desirability bias. The respondents may inaccurately report their highest educational attainment or current employment status, resulting in measurement errors in critical explanatory and outcome variables (Wooldridge, 2019). Under the assumption of classical measurement error for education levels, the education coefficients would suffer from attenuation bias. Therefore, the true magnitudes of the relationship between education and employment may be larger than those estimated here. The standard errors may be inflated by measurement error in employment status.

Considering the abovementioned limitations, it is essential to recognise that the results of this analysis cannot be interpreted as providing direct causal relationships between tertiary education and employment outcomes. Instead, the results indicate associations or correlations between the variables. They offer substantial insights into the relationship but cannot definitively establish that tertiary education directly causes changes in employment probabilities (Cameron and Trivedi, 2009; Hansen, 2022).

4.5 Conclusion

This chapter presented the main empirical analysis of the dissertation, using a binary logistic model to estimate the relationship between tertiary education and employment in South Africa. The subsequent regression analysis investigates the extent to which the tertiary education and employment relationship is consistent for different sub-groups of the population, based on age, race and gender.

In the initial analysis, tertiary education was shown to have a positive and substantial relationship with an individual's probability of being employed. When tertiary education is disaggregated across the different levels of attainment corresponding to NQF levels, all levels of tertiary education are positively and substantially associated with an individual's employment outcomes when compared to individuals who have primary or no schooling. This finding justified the focus of the research, revealing insight into what is concealed when tertiary education is grouped into a single category, which is usually done by existing literature.

More nuances were discovered by disaggregating the estimates across different demographic subsamples. For the youngest cohort, the marginal effects for matric and higher certificates are both positive but statistically insignificant at all levels, showing the validity of Spence's (1974) signalling theory. For this group, the higher levels of tertiary education are significant but have smaller marginal effects than for the whole population. For individuals that fall into the age cohorts of 30-39 and 40-49, benefit most from the tertiary education as they are bolstered by work experience, with individuals in the 50-59 age cohort, education has a weak association with employment.

The analysis then narrowed to African individuals across different demographic subsamples because they were most affected by the restrictions in access to education under apartheid, and the subsequent post-apartheid policies to expand access. Individuals aged 30-39, who have a masters or doctorate, are associated with the highest employment return to tertiary education compared to other age groups for the whole population and the African group. The findings were mostly similar to those found in the second step, with a few exceptions for control variables.

Employment probabilities were then estimated separately for both men and women. The results showed that tertiary education positively influences employability for both genders when compared to those who possess no schooling or primary education, as indicated by the coefficients being positive and significant. The results reflected that women have a stronger association between tertiary education and employment than men.

The limitations of the analysis then followed, including the inability to account for selection into labour force participation as well as possible endogeneity concerns resulting from unobserved factors. The third limitation of this analysis is the potential presence of measurement error. As a result, the estimates in this chapter were interpreted as indicating associations or correlations, but not as causal relationships.

Chapter 5: Conclusion

Various studies have found a positive relationship between tertiary education and employment outcomes (Kingdon and Knight, 2004; Kraak, 2015; Branson and Leibbrandt, 2013; Fredericks and Yu, 2018; Oswald-Egg and Renold, 2021). Whilst substantial strides have been made in this area of research, there are still notable gaps within the literature. Very few studies in South Africa have disaggregated tertiary education into its respective NQF level (Van der Berg and Van Broekhuizen, 2012). The overall objective of this dissertation was, therefore, to adopt this approach and explore how the different levels of tertiary education influence employment outcomes in South Africa. More specifically, this relationship was explored across different age cohorts, the African sub-sample, and gender in South Africa.

A lack of a recent comprehensive empirical analysis on the influence of each level of tertiary education on employment outcomes within the South African context represents a significant research gap. This is particularly of interest given the allocation of extensive resources and policies geared towards increasing access to tertiary education, which has contributed to a significant increase in the number of individuals with tertiary education.

Chapter 2 explored the relevant theoretical and empirical literature on the influence of tertiary education on employment outcomes and how this relationship varies across different demographic characteristics. Three theoretical frameworks are most prominent in understanding how education influences employment outcomes. The theory of labour force participation and allocation of time, and the human capital theory demonstrated how demographic and socioeconomic indicators can affect an individual's participation in the labour market and employment outcomes (Mincer, 1962; Becker, 1965). The signalling theory stressed the importance of education as a measure of competence and productivity (Spence, 1978).

A consistent pattern observed between international and South African studies is how employment outcomes of tertiary education vary with age and experience (Van der Berg and Van Broekhuizen, 2012; Mncayi, 2016; Oswald-Egg and Renold, 2021; Roberts, 2022). They argue that age is often used as a proxy for experience in the labour market and that new entrants into the labour market usually lack the appropriate experience required for a particular job. The studies found that individuals in the middle lifecycle of their careers (typically aged 35-49) have a substantially higher probability of being employed when compared to younger graduates who are 21 to 34 years old, despite possessing a similar level of education. However,

employment returns reduce as individuals approach retirement age. These studies stressed the importance of analysing employment outcomes across age cohorts, as age and experience play a significant role in influencing employment outcomes

International and domestic literature consistently finds that employment outcomes of tertiary education differ for men and women (Cukrowska-Torzewska, 2016; Zizzamia and Ranchhod, 2019). The studies further found that marriage and the presence of children in the household have a profound effect on labour force participation and employment outcomes.

The study achieved four critical objectives: firstly, by providing an overview of tertiary education and employment status for South African men and women, given that women may experience lower employment outcomes compared to men, despite possessing similar education levels (Fredericks and Yu, 2018; Posel and Casale, 2019); subsequently, assessing the value of using a disaggregated tertiary education indicator to estimate the relationship between education and employment status, given that higher levels of education improve an individual's employment outcomes and most studies have treated tertiary education as a single variable (Branson and Leibbrandt, 2013; Baldry, 2016; Zizzamia and Ranchhod, 2019).

Thirdly, determining whether the relationship between tertiary education and employment status differs by age-cohort or gender, provided how age and experience is influential in improving employment outcomes even when education levels are similar (Van der Berg and Van Broekhuizen 2012; Baldry, 2016; Graham, Williams, and Chisoro, 2019), or how demographic and socioeconomic factors influence employment outcomes to tertiary education separately for men and women (Posel and Casale, 2019; Zizzamia, and Ranchhod, 2019; Posel et al 2024); and fourthly, investigating the relationship between tertiary education and employment status for the African subsample in South Africa, provided that they were the most disadvantaged group during apartheid and the group that benefits the most from post-apartheid policies (Van der Berg and Van Broekhuizen, 2012; Branson and Leibbrandt, 2013).

Chapter 3 provided an overview of relevant South African household surveys and the key variables used in this dissertation. Ultimately, the 2022 GHS dataset was used to investigate how each level of tertiary education influences employment outcomes in South Africa. The significance of the 2022 GHS for this research is that it disaggregates tertiary education according to NQF level and collects data on a wide range of socioeconomic factors, such as education, health, gender, race, geographical location and household composition. This chapter

further presented and discussed the descriptive statistics for the chosen sample and variables of interest to illustrate the nature of the data used in this dissertation.

The chapter showed that at a descriptive level, the employment status of individuals (whole sample) and African individuals at each level of education varied considerably across age cohorts. The descriptive analysis further showed that it also varied for men and women when separated.

The results showed that for the whole sample and amongst African individuals only, in each age cohort, employment rates are highest for people with masters or doctoral degrees, followed by those with an honours degree and those with bachelor's degrees. Therefore, this indicates that the higher the level of education an individual has, the more likely they are to be employed. This finding was consistent for men and women. The descriptive analysis showed that there is a higher percentage of men with no schooling who are employed compared to the percentage of women with no schooling who are employed. The gap between men and women closes as the education level increases (diploma and above). This analysis contributed significantly to achieving the first objective of this dissertation, which was to provide an overview of tertiary education and employment status for South African men and women.

Subsequently, Chapter 4 of this study provided an econometric investigation into the research objectives. The study used binary logistic models to estimate the relationship between tertiary education and employment in South Africa, following the work of Yahong and Khan (2021) on the cross-sectional analysis of employment returns to education and health status in China.

To achieve the second objective of this dissertation, the study implemented logit estimation for basic and expanded model specifications to investigate the relationship between tertiary education and employment. The first estimation illustrated that in the most basic sense, where tertiary education is grouped as a single variable, as is standard in literature (Bhorat and Kimani, 2015; Zizzamia and Ranchhod, 2019), having tertiary education is associated with a 24 percentage point increase in the probability of being employed than having primary or no schooling. The magnitude of this marginal effect declines to 20.5 percentage points when additional variables are included.

When tertiary education is disaggregated, each subsequent level of tertiary education (or each subsequent NQF level) has a larger magnitude of marginal effect. This indicates that higher levels of education are associated with improved employment outcomes. The findings stress the importance of disaggregating tertiary education to its respective levels, highlighting how

each NQF level experiences distinct employment outcomes, showing the value of the human capital theory and signalling theory (Mincer, 1962; Becker, 1964; Spence, 1978).

Further nuances were uncovered by disaggregating the estimates across different demographic subsamples, which helped to achieve the third research objective of this study. The findings illustrated that higher levels of tertiary education are significant for the youngest cohort (21-29) but have smaller marginal effects than for the whole population, implying that the benefit of those qualifications is lowest in this age group. Individuals in the age cohorts of 30-39 and 40-49 appeared to benefit the most from their tertiary education, as they typically have a greater marginal effect than for the full sample. The results showed the value of accumulated work experience in boosting employment outcomes. The results further illustrated that for the oldest cohort (50-59), the marginal effect is the smallest of all age cohorts, suggesting that education has a weak association with employment for this group.

These findings are consistent with and reflect patterns established in existing literature on how individuals' age and experience are instrumental in influencing employment outcomes, even when individuals may possess the same level of education (Kingdon and Knight, 2004; Van der Berg and Van Broekhuizen, 2012; Graham, Williams and Chisoro, 2019).

Subsequently, the analysis narrowed its focus to the African group. Distinctions were discovered by disaggregating the estimates across different demographic subsamples. This aligned with the fourth objective of this dissertation, investigating the relationship between tertiary education and employment status for the African subsample in South Africa. The estimated results for Africans were similar to those of the whole population, with the exception of some control variables.

The analysis then estimated employment probabilities separately for men and women, which helped as a final step of achieving the third objective of this dissertation, determining whether the relationship between tertiary education and employment status differs by age-cohort or gender. The findings suggested that tertiary education positively influences employability for both genders when compared to those who possess no schooling or primary education. The results reflected that women have a stronger association between tertiary education and employment than men. An indication that tertiary education may assist women to overcome labour market disadvantages or to access certain types of jobs (Fredericks and Yu, 2018; Casale, Posel, and Mosomi, 2021).

The findings presented in this dissertation contribute significantly to the understanding of how different levels of education are associated with distinct employment outcomes in South Africa. Whilst existing literature has demonstrated that higher levels of education improve an individual's employment outcomes (Branson and Leibbrandt, 2013; Bhorat and Kimani, 2015; Zizzamia and Ranchhod, 2019), this dissertation explored how returns to different levels of education differ across age groups, African subsample, men and women.

Whilst the study did provide a detailed investigation into how different levels of tertiary education influence employment outcomes, there were limitations to the analysis. One critical limitation of the study was its inability to account for selection into labour force participation. The other limitations of the analysis are the potential presence of endogeneity, due to omitted variables of unobserved characteristics such as ability and motivation, and of measurement error.

5.1 Recommendations

This dissertation has provided substantial evidence of the impact of each level of tertiary education on employment outcomes and how this relationship varies across age cohorts, race, and gender. As empirical evidence in Chapter 4 has established that each level of tertiary education is positively associated with employment, this justifies the rationale for sustained public investment in higher education. However, increasing levels of graduate unemployment and skills mismatch prompt concerns about the efficiency of such an investment and the inherent risk of diminishing returns. This indicates the necessity for a more cohesive policy that not only facilitates access to higher education but also enhances transitions into employment, because aside from formal education, interventions that foster work experience and broaden professional networks are crucial for young individuals trying to obtain employment.

Whilst a substantial step has been taken to fill the gap in literature, there is still some space for future research. There is a need for research that goes deeper within the topic and interrogates the specific skills and competencies that are acquired through the different levels of tertiary education and their alignment with labour market demands. This could serve as a critical tool for observing the potential skills gap and recognising where tertiary education institutions can effectively improve in preparing graduates for the labour market.

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Appendices

Table A3. 1: Mean of key variables for the economically active population (whole sample)

VARIABLES	Employed	Searching Unemployed	Non-searching Unemployed
Demographic Indicators:			
Male	0.565	0.460***	0.370***
	(0.004)	(0.006)	(0.012)
Female	0.435	0.540***	0.630***
	(0.004)	(0.006)	(0.012)
Age (in years)	38.749	33.612***	34.827***
	(0.092)	(0.111)	(0.237)
African	0.758	0.919***	0.882***
	(0.006)	(0.005)	(0.010)
Coloured	0.094	0.059***	0.084***
	(0.004)	(0.004)	(0.009)
Asian/Indian	0.040	0.008***	0.019***
	(0.004)	(0.002)	(0.004)
White	0.109	0.014***	0.015***
	(0.005)	(0.002)	(0.002)
Married	0.516	0.274***	0.312***
	(0.006)	(0.006)	(0.012)
Divorced/Widowed	0.048	0.027***	0.040*
	(0.002)	(0.002)	(0.004)
Never Married	0.435	0.699***	0.648***
	(0.006)	(0.007)	(0.012)
Education Categories:			
No Schooling	0.009	0.007*	0.022***
	(0.001)	(0.001)	(0.003)
Primary	0.064	0.075**	0.126***
	(0.002)	(0.003)	(0.009)
Incomplete secondary	0.300	0.430***	0.491***
	(0.005)	(0.007)	(0.012)
Matric	0.376	0.397	0.305***
	(0.005)	(0.007)	(0.012)
Higher Certificate	0.037	0.031**	0.017***
	(0.002)	(0.002)	(0.003)
Diploma	0.079	0.032***	0.023***
	(0.003)	(0.002)	(0.004)
Bachelors Degree	0.094	0.024***	0.013***
	(0.003)	(0.002)	(0.003)
Honours Degree	0.024	0.004***	0.001***
	(0.002)	(0.001)	(0.001)
Masters/Doctorate	0.018	0.002***	0.001***

	(0.002)	(0.001)	(0.001)
Health Indicators:			
Poor Health	0.005	0.007	0.019***
	(0.001)	(0.001)	(0.003)
Fair Health	0.034	0.032	0.068***
	(0.002)	(0.002)	(0.007)
Good Health	0.358	0.356	0.427***
	(0.008)	(0.010)	(0.016)
Very good Health	0.300	0.330***	0.227***
	(0.007)	(0.010)	(0.013)
Excellent Health	0.303	0.275***	0.258***
	(0.008)	(0.010)	(0.016)
Household Composition:			
Number of Children in Household	1.086	1.577***	1.917***
	(0.019)	(0.036)	(0.072)
Number of Working Age Adults in Household	1.782	2.374***	2.488***
	(0.026)	(0.043)	(0.084)
Number of Pension Age Adults in Household	0.195	0.334***	0.340***
	(0.006)	(0.011)	(0.017)
Location and Province:			
Urban	0.767	0.635***	0.515***
	(0.005)	(0.009)	(0.014)
Rural	0.233	0.365***	0.485***
	(0.005)	(0.009)	(0.014)
Western Cape	0.153	0.076***	0.093***
	(0.005)	(0.005)	(0.009)
Eastern Cape	0.078	0.096***	0.151***
	(0.003)	(0.005)	(0.008)
Northern Cape	0.021	0.019	0.022
	(0.001)	(0.002)	(0.002)
Free State	0.044	0.047**	0.064***
	(0.002)	(0.003)	(0.006)
KwaZulu-Natal	0.169	0.219***	0.231***
	(0.005)	(0.009)	(0.012)
North West	0.058	0.062	0.113***
	(0.003)	(0.004)	(0.010)
Gauteng	0.322	0.307	0.128***
	(0.006)	(0.009)	(0.008)
Mpumalanga	0.074	0.100***	0.091*
	(0.003)	(0.005)	(0.008)
Limpopo	0.081	0.073***	0.106**
	(0.003)	(0.005)	(0.009)
Sample	15506	8366	2435
Population	16177755	8159173	2238079

Source: Own calculations, GHS 2022.

Notes: Data have been weighted to represent population-level estimates. Estimates are given as percentages for individuals aged 21 - 59 years. Standard errors are in parentheses. ***, **, and * indicate that estimates for employed individuals differs from those that are unemployed at 0.01, 0.05 and 0.1 significance levels.

Table A3. 2: Frequency and percentage of people who work with remuneration

	Working Without Remuneration	Working With Remuneration
Total:	450 802 (1.4)	31 892 799 (98.6)

Source: Own calculations, GHS 2022.

Notes: Data have been weighted to represent population-level estimates. Estimates are given in frequencies and percentages in parentheses for individuals aged 21 - 59 years.

Table A3. 3: Mean of key variables for the whole sample

VARIABLES	Age 21-29	Age 30-39	Age 40-49	Age 50-59
Demographic Indicators:				
Male	0.496	0.499***	0.505***	0.464***
	(0.006)	(0.005)	(0.006)	(0.006)
Female	0.504	0.501***	0.495***	0.536***
	(0.006)	(0.005)	(0.006)	(0.006)
Age (in years)	25.108	34.344***	44.133***	54.232***
	(0.031)	(0.033)	(0.039)	(0.048)
African	0.846	0.847	0.798***	0.713***
	(0.006)	(0.006)	(0.008)	(0.009)
Coloured	0.085	0.075*	0.085	0.114***
	(0.004)	(0.004)	(0.005)	(0.006)
Asian/Indian	0.022	0.026	0.034***	0.039***
	(0.003)	(0.003)	(0.004)	(0.005)
White	0.047	0.052***	0.084***	0.134***
	(0.004)	(0.004)	(0.005)	(0.008)
Married	0.180	0.420***	0.567***	0.595***
	(0.006)	(0.007)	(0.008)	(0.009)
Divorced/Widowed	0.004	0.014***	0.066***	0.168***
	(0.001)	(0.001)	(0.003)	(0.006)
Never Married	0.817	0.566***	0.367***	0.238***
	(0.006)	(0.007)	(0.008)	(0.007)
Employment Status:				
Employed	0.340	0.552***	0.626***	0.559***
	(0.007)	(0.006)	(0.007)	(0.008)
Unemployed	0.363	0.264***	0.199***	0.129***
	(0.007)	(0.006)	(0.006)	(0.005)
Not economically active	0.297	0.184***	0.175***	0.312***
	(0.006)	(0.005)	(0.005)	(0.008)

Education Categories:				
No Schooling	0.006	0.008	0.015***	0.045***
	(0.001)	(0.001)	(0.001)	(0.003)
Primary	0.044	0.061***	0.087***	0.201***
	(0.003)	(0.003)	(0.004)	(0.006)
Incomplete secondary	0.352	0.390***	0.370**	0.323***
	(0.006)	(0.006)	(0.007)	(0.008)
Matric	0.456	0.367***	0.337***	0.254***
	(0.007)	(0.006)	(0.007)	(0.007)
Higher Certificate	0.035	0.036	0.030***	0.017***
	(0.002)	(0.002)	(0.002)	(0.002)
Diploma	0.038	0.061***	0.064***	0.059***
	(0.002)	(0.003)	(0.004)	(0.004)
Bachelors Degree	0.054	0.057	0.065**	0.064***
	(0.003)	(0.003)	(0.004)	(0.004)
Honours Degree	0.011	0.012	0.017***	0.020***
	(0.002)	(0.002)	(0.002)	(0.003)
Masters/Doctorate	0.004	0.008***	0.015***	0.016***
	(0.001)	(0.001)	(0.002)	(0.003)
Health Indicators:				
Poor Health	0.005	0.009***	0.014***	0.032***
	(0.001)	(0.001)	(0.002)	(0.003)
Fair Health	0.018	0.029***	0.055***	0.123***
	(0.002)	(0.002)	(0.003)	(0.005)
Good Health	0.351	0.357	0.383***	0.418***
	(0.009)	(0.009)	(0.009)	(0.009)
Very good Health	0.303	0.299	0.292***	0.252***
	(0.009)	(0.008)	(0.008)	(0.008)
Excellent Health	0.323	0.306***	0.256***	0.174***
	(0.009)	(0.009)	(0.009)	(0.007)
Household Composition:				
Number of Children in Household	1.438	1.502***	1.225***	1.039***
	(0.032)	(0.029)	(0.023)	(0.026)
Number of Working Age Adults in Household	2.430	1.863***	1.905***	2.169***
	(0.038)	(0.031)	(0.031)	(0.037)
Number of Pension Age Adults in Household	0.303	0.284**	0.222***	0.209***
	(0.009)	(0.009)	(0.008)	(0.008)
Location and Province:				
Urban	0.661	0.692***	0.705***	0.702
	(0.008)	(0.007)	(0.007)	(0.008)
Rural	0.339	0.308***	0.295***	0.298
	(0.008)	(0.007)	(0.007)	(0.008)
Western Cape	0.116	0.115*	0.131***	0.151***
	(0.006)	(0.005)	(0.006)	(0.007)

Eastern Cape	0.095	0.095	0.090	0.103***
	(0.004)	(0.004)	(0.004)	(0.005)
Northern Cape	0.021	0.018	0.022	0.025
	(0.001)	(0.001)	(0.002)	(0.002)
Free State	0.046	0.049	0.051	0.046
	(0.002)	(0.003)	(0.003)	(0.003)
KwaZulu-Natal	0.203	0.187**	0.174***	0.176***
	(0.007)	(0.006)	(0.007)	(0.007)
North West	0.062	0.062	0.072*	0.069
	(0.004)	(0.003)	(0.004)	(0.004)
Gauteng	0.284	0.303***	0.296	0.268***
	(0.007)	(0.007)	(0.008)	(0.009)
Mpumalanga	0.082	0.077***	0.073***	0.082*
	(0.004)	(0.004)	(0.004)	(0.004)
Limpopo	0.092	0.093	0.090	0.081
	(0.004)	(0.004)	(0.004)	(0.004)
Sample	9045	9491	7591	5773
Population	8970244	10783254	7255554	4705454

Source: Own calculations, GHS 2022.

Notes: Data have been weighted to represent population-level estimates. Estimates are given as percentages for individuals aged 21 - 59 years. Standard errors are in parentheses. ***, **, and * indicate that estimates for individuals aged 30-39, 40-49 and 50-59 differs from those aged 21-29 at 0.01, 0.05 and 0.1 significance levels.

Table A3. 4: Mean of key variables for economically active

VARIABLES	Age 21-29	Age 30-39	Age 40-49	Age 50-59
Demographic Indicators:				
Male	0.525	0.526***	0.537***	0.536**
	(0.007)	(0.006)	(0.006)	(0.008)
Female	0.475	0.474***	0.463***	0.464**
	(0.007)	(0.006)	(0.006)	(0.008)
Age (in years)	25.417	34.360***	44.079***	53.874***
	(0.037)	(0.036)	(0.043)	(0.057)
African	0.834	0.846	0.796***	0.704***
	(0.007)	(0.006)	(0.008)	(0.011)
Coloured	0.088	0.071***	0.079**	0.107*
	(0.005)	(0.004)	(0.005)	(0.007)
Asian/Indian	0.023	0.027	0.035***	0.037***
	(0.004)	(0.004)	(0.005)	(0.005)
White	0.055	0.056***	0.089***	0.153***
	(0.005)	(0.004)	(0.006)	(0.010)
Married	0.194	0.435***	0.585***	0.629***
	(0.007)	(0.008)	(0.008)	(0.010)
Divorced/Widowed	0.004	0.014***	0.066***	0.143***
	(0.001)	(0.001)	(0.003)	(0.006)

Never Married	0.803	0.551***	0.349***	0.228***
	(0.007)	(0.008)	(0.008)	(0.008)
Employment Status:				
Employed	0.484	0.676***	0.759***	0.812***
	(0.008)	(0.007)	(0.007)	(0.008)
Unemployed	0.516	0.324***	0.241***	0.188***
	(0.008)	(0.007)	(0.007)	(0.008)
Education Categories:				
No Schooling	0.002	0.003	0.011***	0.029***
	(0.001)	(0.001)	(0.001)	(0.003)
Primary	0.037	0.052***	0.072***	0.163***
	(0.003)	(0.003)	(0.004)	(0.007)
Incomplete secondary	0.320	0.368***	0.350***	0.308
	(0.007)	(0.007)	(0.008)	(0.009)
Matric	0.469	0.384***	0.350***	0.272***
	(0.008)	(0.007)	(0.008)	(0.009)
Higher Certificate	0.038	0.039	0.034	0.020***
	(0.003)	(0.003)	(0.003)	(0.003)
Diploma	0.047	0.066***	0.071***	0.072***
	(0.003)	(0.003)	(0.004)	(0.005)
Bachelors Degree	0.066	0.064	0.076*	0.085***
	(0.004)	(0.004)	(0.005)	(0.006)
Honours Degree	0.014	0.014	0.020**	0.027***
	(0.002)	(0.002)	(0.003)	(0.004)
Masters/Doctorate	0.006	0.010*	0.018***	0.023***
	(0.001)	(0.002)	(0.003)	(0.004)
Health Indicators:				
Poor Health	0.002	0.003*	0.007***	0.016***
	(0.001)	(0.001)	(0.001)	(0.002)
Fair Health	0.012	0.021***	0.040***	0.095***
	(0.002)	(0.002)	(0.003)	(0.006)
Good Health	0.329	0.345	0.374***	0.416***
	(0.010)	(0.009)	(0.010)	(0.011)
Very good Health	0.323	0.315	0.308**	0.276***
	(0.010)	(0.009)	(0.009)	(0.010)
Excellent Health	0.334	0.316**	0.271***	0.198***
	(0.010)	(0.009)	(0.009)	(0.009)
Household Composition:				
Number of Children in Household	1.305	1.404***	1.161***	0.896***
	(0.032)	(0.029)	(0.024)	(0.029)
Number of Working Age Adults in Household	2.331	1.807***	1.815***	2.078***
	(0.040)	(0.033)	(0.031)	(0.037)
Number of Pension Age Adults in Household	0.287	0.259***	0.200***	0.183***
	(0.010)	(0.009)	(0.008)	(0.010)

Location and Province:				
Urban	0.699	0.725	0.735**	0.739
	(0.009)	(0.007)	(0.008)	(0.009)
Rural	0.301	0.275	0.265**	0.261
	(0.009)	(0.007)	(0.008)	(0.009)
Western Cape	0.122	0.117	0.135**	0.150***
	(0.007)	(0.005)	(0.006)	(0.008)
Eastern Cape	0.085	0.084	0.080	0.088***
	(0.005)	(0.005)	(0.004)	(0.005)
Northern Cape	0.021	0.018	0.021	0.025
	(0.002)	(0.001)	(0.002)	(0.003)
Free State	0.042	0.048	0.047	0.040
	(0.003)	(0.003)	(0.003)	(0.004)
KwaZulu-Natal	0.202	0.187*	0.174***	0.173***
	(0.008)	(0.006)	(0.007)	(0.008)
North West	0.055	0.055	0.068**	0.064
	(0.004)	(0.003)	(0.005)	(0.005)
Gauteng	0.312	0.329**	0.316	0.296***
	(0.009)	(0.008)	(0.009)	(0.011)
Mpumalanga	0.090	0.081***	0.073***	0.094
	(0.004)	(0.004)	(0.004)	(0.006)
Limpopo	0.071	0.082**	0.086***	0.072**
	(0.004)	(0.004)	(0.004)	(0.004)
Sample	6277	7615	6119	3861
Population	6310337	8803886	5986726	3235979

Source: Own calculations, GHS 2022.

Notes: Data have been weighted to represent population-level estimates. Estimates are given as percentages for individuals aged 21 - 59 years. Standard errors are in parentheses. ***, **, and * indicate that estimates for individuals aged 30-39, 40-49 and 50-59 differs from those aged 21-29 at 0.01, 0.05 and 0.1 significance levels.

Table A3. 5: Mean of key variables, by gender

VARIABLES	Males	Female
Demographic Indicators:		
Age (in years)	37.090	36.955***
	(0.096)	(0.096)
African	0.808	0.816**
	(0.006)	(0.005)
Coloured	0.081	0.084
	(0.003)	(0.004)
Asian/Indian	0.034	0.024***
	(0.003)	(0.003)
White	0.078	0.076**
	(0.004)	(0.004)
Married	0.445	0.424***

	(0.006)	(0.006)
Divorced/Widowed	0.023	0.061***
	(0.001)	(0.002)
Never Married	0.532	0.514
	(0.006)	(0.006)
Employment Status:		
Employed	0.709	0.615***
	(0.006)	(0.006)
Unemployed	0.291	0.385***
	(0.006)	(0.006)
Education Categories:		
No Schooling	0.008	0.008
	(0.001)	(0.001)
Primary	0.081	0.053***
	(0.003)	(0.002)
Incomplete secondary	0.358	0.327***
	(0.005)	(0.005)
Matric	0.379	0.387*
	(0.006)	(0.006)
Higher Certificate	0.032	0.038**
	(0.002)	(0.002)
Diploma	0.052	0.075***
	(0.003)	(0.003)
Bachelors Degree	0.063	0.078***
	(0.003)	(0.003)
Honours Degree	0.014	0.021***
	(0.001)	(0.002)
Masters/Doctorate	0.012	0.012
	(0.002)	(0.002)
Health Indicator:		
Poor Health	0.005	0.007***
	(0.001)	(0.001)
Fair Health	0.028	0.038***
	(0.002)	(0.002)
Good Health	0.352	0.364**
	(0.008)	(0.008)
Very good Health	0.312	0.307
	(0.008)	(0.008)
Excellent Health	0.303	0.284***
	(0.008)	(0.008)
Household Composition:		
Number of Children in Household	0.998	1.536***
	(0.020)	(0.028)
Number of Working Age Adults in Household	1.866	2.110***
	(0.030)	(0.032)
Number of Pension Age Adults in Household	0.230	0.254***

	(0.008)	(0.007)
Location and Province:		
Urban	0.730	0.714***
	(0.006)	(0.007)
Rural	0.270	0.286***
	(0.006)	(0.007)
Western Cape	0.125	0.130
	(0.004)	(0.004)
Eastern Cape	0.080	0.088**
	(0.003)	(0.003)
Northern Cape	0.022	0.019
	(0.001)	(0.001)
Free State	0.045	0.045
	(0.002)	(0.002)
KwaZulu-Natal	0.176	0.196***
	(0.005)	(0.006)
North West	0.063	0.055***
	(0.003)	(0.003)
Gauteng	0.330	0.303***
	(0.006)	(0.006)
Mpumalanga	0.081	0.085
	(0.003)	(0.004)
Limpopo	0.078	0.079
	(0.003)	(0.003)
Sample	12228	11644
Population	12896179	11440749

Source: Own calculations, GHS 2022.

Notes: Data have been weighted to represent population-level estimates. Estimates are given as percentages for individuals aged 21 - 59 years. Standard errors are in parentheses. ***, **, and * indicate that estimates for women differ from men at 0.01, 0.05 and 0.1 significance levels.

Table A4. 1 Logit estimation of employment for men, by age cohort

VARIABLES	Full Sample	Age 21-29	Age 30-39	Age 40-49	Age 50-59
Education Categories:					
Incomplete Secondary	-0.165*	0.022	-0.185	-0.238	-0.228
	(0.089)	(0.192)	(0.162)	(0.158)	(0.171)
Matric	0.142	0.088	0.092	0.370**	0.502**
	(0.094)	(0.189)	(0.172)	(0.168)	(0.213)
Higher Certificate	0.436**	0.555*	0.430	0.636*	-0.405
	(0.181)	(0.298)	(0.308)	(0.340)	(0.496)
Diploma	0.606***	0.273	0.445	1.253***	1.301**
	(0.152)	(0.278)	(0.275)	(0.327)	(0.523)
Bachelors Degree	1.002***	0.414	1.254***	2.113***	1.364**
	(0.180)	(0.326)	(0.337)	(0.460)	(0.546)

Honours Degree	1.159***	0.924	0.809	2.548**	1.493
	(0.359)	(0.624)	(0.576)	(1.054)	(1.077)
Masters and Doctorates	1.875**			0.973	
	(0.878)			(0.805)	
Demographic Indicators:					
Age (in years)	0.167***	0.392	-0.035	0.356	-2.190**
	(0.019)	(0.372)	(0.393)	(0.647)	(1.058)
Age Square (/1000)	-0.002***	-0.006	0.001	-0.004	0.020**
	(0.000)	(0.007)	(0.006)	(0.007)	(0.010)
White	1.665***	1.711***	1.726***	1.813***	1.754***
	(0.222)	(0.405)	(0.405)	(0.448)	(0.473)
Coloured	0.193	0.308	-0.009	0.428*	0.091
	(0.136)	(0.199)	(0.243)	(0.255)	(0.305)
Asian/Indian	1.537***	2.175***	0.941*	1.494***	1.728**
	(0.379)	(0.705)	(0.515)	(0.567)	(0.777)
Married	1.010***	1.157***	1.105***	0.850***	0.729***
	(0.065)	(0.158)	(0.106)	(0.132)	(0.182)
Divorced/Widowed	0.294*	-0.052	-0.353	0.368	0.312
	(0.162)	(0.987)	(0.371)	(0.257)	(0.274)
Health Indicators:					
Fair	0.434	-0.098	1.974**	0.591	-0.211
	(0.354)	(0.958)	(0.912)	(0.716)	(0.547)
Good	0.702**	0.607	2.200**	0.765	0.131
	(0.339)	(0.851)	(0.869)	(0.672)	(0.510)
Very good	0.639*	0.440	2.217**	0.767	-0.099
	(0.341)	(0.852)	(0.866)	(0.672)	(0.517)
Excellent	0.786**	0.582	2.316***	1.009	0.088
	(0.342)	(0.852)	(0.869)	(0.673)	(0.530)
Household Composition:					
Number of Children in Household	-0.031	-0.069*	-0.031	0.056	-0.081
	(0.024)	(0.040)	(0.037)	(0.052)	(0.062)
Number of Working Age Adults in Household	-0.165***	-0.186***	-0.166***	-0.175***	-0.020
	(0.021)	(0.033)	(0.034)	(0.041)	(0.054)
Number of Pension Age Adults in Household	-0.457***	-0.408***	-0.342***	-0.734***	-0.616***
	(0.056)	(0.093)	(0.085)	(0.116)	(0.162)
Location and Province:					
Urban	0.280***	0.356***	0.208*	0.287**	0.185
	(0.072)	(0.117)	(0.121)	(0.138)	(0.175)
Western Cape	0.624***	0.788***	0.688***	0.348	0.445
	(0.140)	(0.213)	(0.251)	(0.245)	(0.328)
Eastern Cape	0.008	-0.019	0.043	-0.045	-0.060
	(0.109)	(0.173)	(0.182)	(0.216)	(0.257)
Northern Cape	0.040	0.207	0.014	-0.111	-0.011

	(0.164)	(0.211)	(0.274)	(0.304)	(0.356)
Free State	-0.122	-0.002	-0.425**	0.029	0.384
	(0.119)	(0.187)	(0.192)	(0.244)	(0.320)
KwaZulu Natal	0.137	-0.025	0.117	0.470**	0.074
	(0.097)	(0.156)	(0.154)	(0.185)	(0.232)
North West	0.129	-0.257	-0.030	0.570**	0.838**
	(0.119)	(0.194)	(0.213)	(0.275)	(0.328)
Mpumalanga	-0.057	-0.013	-0.023	-0.229	-0.085
	(0.108)	(0.176)	(0.179)	(0.207)	(0.270)
Limpopo	0.497***	0.416**	0.350*	0.705***	0.869***
	(0.120)	(0.196)	(0.182)	(0.236)	(0.299)
Masters and Doctorates = o,		-	-		-
Constant	-3.708***	-6.792	-0.978	-8.130	59.121**
	(0.483)	(4.710)	(6.743)	(14.300)	(28.613)
Sample	23872	23872	23872	23872	23872
Population	24336928	24336928	24336928	24336928	24336928

Source: Own calculations, GHS 2022.

Notes: The values displayed are coefficient estimates. Standard errors are in parentheses. Data have been weighted to represent population-level estimates. *** p<0.01, ** p<0.05, * p<0.1. The sample is restricted to individuals aged between aged 21-59. Reference categories for categorical variables; Education: No Schooling or Primary Education; Race: African; Marital Status: Never Married; Health: Poor Health; Location: Rural; Province: Gauteng.

Table A4. 2: Logit estimation of employment for women, by age cohort

VARIABLES	Full Sample	Age 21-29	Age 30-39	Age 40-49	Age 50-59
Education Categories:					
Incomplete Secondary	0.068	-0.233	0.126	0.376**	-0.100
	(0.093)	(0.320)	(0.185)	(0.170)	(0.171)
Matric	0.542***	0.284	0.674***	0.738***	0.291
	(0.097)	(0.313)	(0.186)	(0.178)	(0.196)
Higher Certificate	0.678***	0.124	0.898***	1.257***	0.759
	(0.142)	(0.366)	(0.253)	(0.348)	(0.637)
Diploma	1.460***	1.273***	1.327***	2.135***	1.687***
	(0.136)	(0.357)	(0.236)	(0.291)	(0.442)
Bachelors Degree	1.840***	1.528***	1.987***	1.830***	5.186***
	(0.155)	(0.359)	(0.302)	(0.311)	(1.021)
Honours Degree	2.287***	1.707***	2.964***	2.221**	
	(0.330)	(0.511)	(0.701)	(0.876)	
Masters and Doctorates	2.339***	1.063*	3.454***		2.086*
	(0.396)	(0.637)	(1.036)		(1.092)
Demographic Indicators:					
Age (in years)	0.197***	0.249	0.526	0.317	-0.070
	(0.019)	(0.398)	(0.376)	(0.555)	(1.059)
Age Square (/1000)	-0.002***	-0.002	-0.007	-0.003	0.002

	(0.000)	(0.008)	(0.005)	(0.006)	(0.010)
White	1.562***	1.694***	1.610***	1.621***	1.316**
	(0.171)	(0.300)	(0.366)	(0.325)	(0.545)
Coloured	0.669***	0.969***	0.625***	0.596***	0.372
	(0.114)	(0.198)	(0.199)	(0.207)	(0.322)
Asian/Indian	0.922***	0.808	1.402***	0.710*	1.263
	(0.263)	(0.508)	(0.487)	(0.431)	(0.810)
Married	0.052	0.297**	0.011	-0.140	-0.098
	(0.054)	(0.119)	(0.087)	(0.105)	(0.166)
Divorced/Widowed	0.307***	1.339**	0.002	0.157	0.240
	(0.110)	(0.614)	(0.292)	(0.168)	(0.188)
Health Indicators:					
Fair	0.371	1.085	0.108	0.680	0.149
	(0.292)	(1.308)	(0.559)	(0.479)	(0.578)
Good	0.567**	1.406	0.510	0.752*	0.279
	(0.273)	(1.233)	(0.521)	(0.445)	(0.565)
Very good	0.502*	1.321	0.450	0.858*	-0.073
	(0.273)	(1.229)	(0.520)	(0.443)	(0.570)
Excellent	0.624**	1.413	0.555	0.931**	0.236
	(0.274)	(1.229)	(0.522)	(0.449)	(0.586)
Household Composition:					
Number of Children in Household	-0.072***	-0.053	-0.119***	-0.062*	-0.062
	(0.019)	(0.037)	(0.028)	(0.036)	(0.053)
Number of Working Age Adults in Household	-0.051**	-0.083*	-0.001	-0.046	-0.028
	(0.021)	(0.042)	(0.028)	(0.039)	(0.047)
Number of Pension Age Adults in Household	-0.234***	-0.155*	-0.324***	-0.281***	-0.266*
	(0.049)	(0.092)	(0.077)	(0.103)	(0.139)
Location and Province:					
Urban	0.402***	0.343**	0.388***	0.513***	0.282*
	(0.067)	(0.137)	(0.104)	(0.122)	(0.167)
Western Cape	0.462***	0.418**	0.526***	0.408**	0.576
	(0.113)	(0.198)	(0.191)	(0.192)	(0.368)
Eastern Cape	0.228**	0.009	0.153	0.570***	0.400
	(0.094)	(0.192)	(0.148)	(0.177)	(0.247)
Northern Cape	0.278*	-0.045	0.500*	0.364	0.448
	(0.145)	(0.305)	(0.257)	(0.259)	(0.365)
Free State	0.018	-0.025	0.038	0.139	0.133
	(0.117)	(0.236)	(0.182)	(0.196)	(0.297)
KwaZulu Natal	0.234***	-0.043	0.376***	0.436***	0.050
	(0.083)	(0.169)	(0.126)	(0.149)	(0.232)
North West	0.246*	0.112	0.352*	0.282	0.384
	(0.129)	(0.269)	(0.197)	(0.229)	(0.323)
Mpumalanga	0.258**	0.080	0.249	0.587***	0.219
	(0.103)	(0.178)	(0.158)	(0.221)	(0.268)

Limpopo	0.579***	0.457**	0.671***	0.714***	0.328
	(0.116)	(0.224)	(0.169)	(0.195)	(0.303)
Masters and Doctorates				-	
Honours Degree					-
Constant	-5.669***	-7.359	-11.237*	-9.133	-0.104
	(0.458)	(5.147)	(6.490)	(12.290)	(28.746)
Sample	23872	23872	23872	23872	23872
Population	24336928	24336928	24336928	24336928	24336928

Source: Own calculations, GHS 2022.

Note*s*: The values displayed are coefficient estimates. Standard errors are in parentheses. Data have been weighted to represent population-level estimates. *** p<0.01, ** p<0.05, * p<0.1. The sample is restricted to individuals aged between aged 21-59. Reference categories for categorical variables; Education: No Schooling or Primary Education; Race: African; Marital Status: Never Married; Health: Poor Health; Location: Rural; Province: Gauteng.

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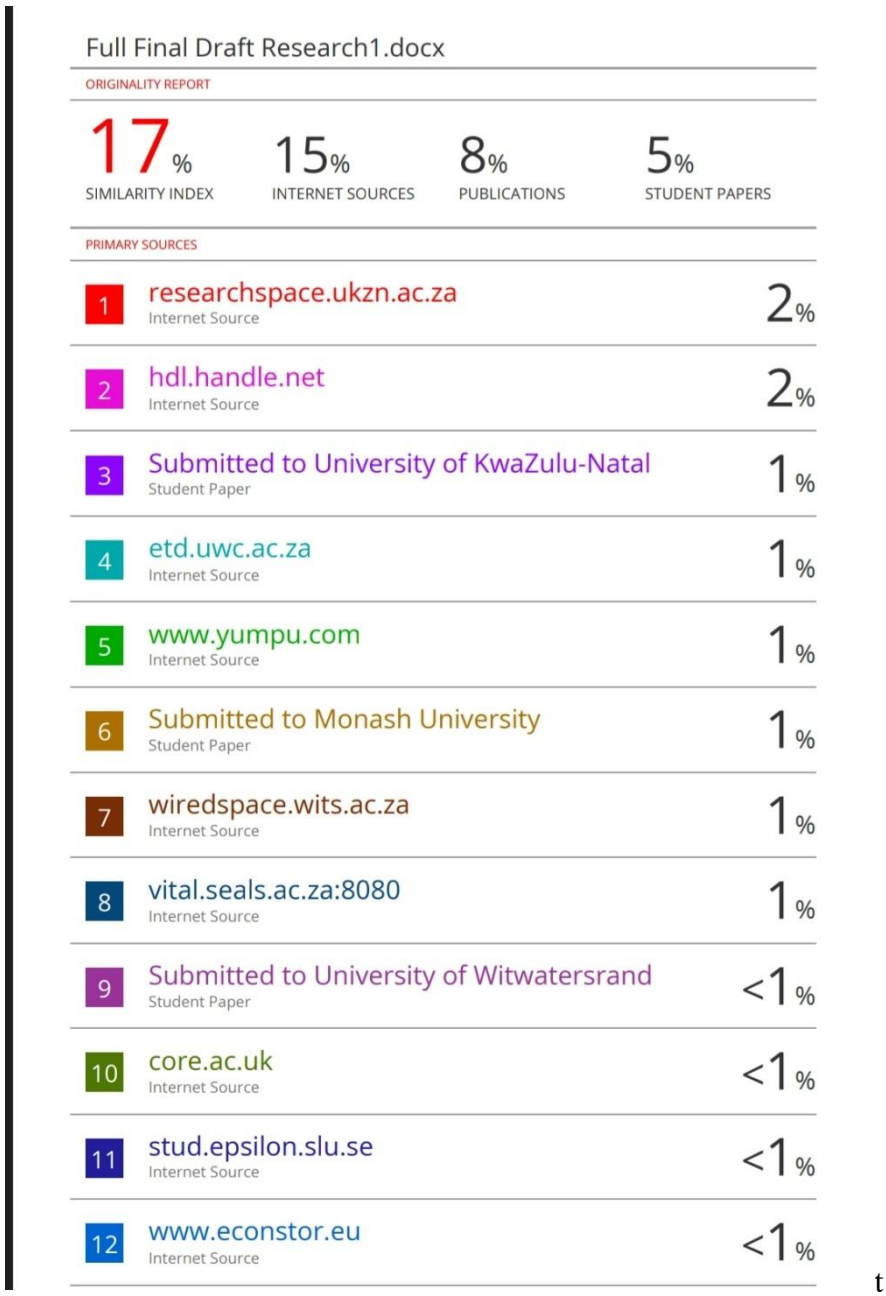

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Ethical clearance

16-09-2024
Mr Sbusiso Blessing Njilo (217052792)
School Of Acc Economics&Fin
Westville

Dear Mr Sbusiso Blessing Njilo,

Original application number: 00027985
Project title: The relationship between tertiary education and employment in South Africa

Exemption from Ethics Review

In response to your application received on 16 September 2024 , your school has indicated that the protocol has been granted **EXEMPTION FROM ETHICS REVIEW.**

Any alteration/s to the exempted research protocol, e.g., Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through an amendment/modification prior to its implementation. The original exemption number must be cited."

For any changes that could result in potential risk, an ethics application including the proposed amendments must be submitted to the relevant UKZN Research Ethics Committee. The original exemption number must be cited.

In case you have further queries, please quote the above reference number.

PLEASE NOTE:
Research data should be securely stored in the discipline/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours sincerely,

[redacted]

Dr Christian Kakese Tipoy
Academic Leader Research
School Of Acc Economics&Fin

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