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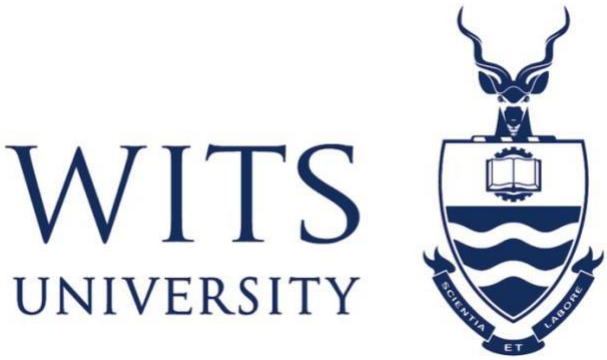

Wealth accumulation and inequality: The drivers of intra-racial wealth inequality in South Africa

A Research Report submitted in partial fulfilment of the Degree

Master of Commerce (Applied Development Economics)

in the School of Economics and Finance,

University of the Witwatersrand

By

Mbalenhle Rachel Mthimkhulu

1503770

Supervised by Dr.Gilad Isaacs

25-03-2022

DECLARATION

I Mbalenhle Rachel Mthimkhulu declare that this Research Report is my own, unaided work. It is being submitted for the Degree of Master of Commerce at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

Signed by candidate

_____

(Signature of candidate)

25th day of March 2022 in Pretoria

Abstract

South Africa is the most unequal country in the world according to the World Bank. Though *between* race inequality has been decreasing, albeit still high, *within* race inequality has been increasing. This paper investigates the determinants of individual *within* group wealth inequality in South Africa using National Dynamic Household Data (NIDS) Wave 5. The individual wealth variable is transformed using the inverse hyperbolic sine (IHS) to deal with skewness and its other unique characteristics. The impact of chosen variables-education, marital status, gender, age and inheritance- on wealth inequality is investigated using Ordinary Least Square (OLS) and Quantile Regression as methods of estimation. The study finds that factors such as gender and education have a significant effect on within race wealth inequality in South Africa.

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Chapter One

Introduction to Research

1.1 Overview

One of the South African government's main aims is to achieve sustainable and inclusive economic growth, however, the challenge it faces is deciding whether it reflects the true welfare of its society. This is often not the case due to the extreme economic inequality in society because of the high wealthconcentration in the hands of a limited number of individuals. The main concern for policymakers and other stakeholders is not that wealth in South Africa is concentrated in the hands of only a few, but rather that the poor remain mired in abject poverty. Poverty not only entails near-term material deprivation, but often deprives poor people of the chance to realise their intellectual and economic potential.

Economic inequality is often defined by expenditure, income and wealth distribution, generally among households[1]. The commonly used measures of inequality are percentile distribution of populations across specific income classes or Gini coefficients (Sen, 1973; 1992). Mare (2011) suggests that inequality has deep roots in previous generations, which might be the case in the South African contextdue to the country's political and economic history. The demographic and social dislocation of the apartheid era most likely increased the magnitude and severity of inequality in South African society, which is highly pronounced even after the advent of democracy.

Economic inequality often perpetuates social injustices and social dysfunction, which most countries, including South Africa, aim to eliminate or reduce. The consequences of rising inequality are the prevalence of crime, corruption, poverty, family breakdown and disruption of social cohesion. The relationship between inequality and crime is highlighted by Anser, Yousaf, Nassani, Alotaibi, Kabbani and Zaman (2018), who studied the relationship between growth, inequality and

[1] Rousseau (1938:174-176) distinguished between natural or physical inequalities and social or political inequalities; the former arise from the unequal distribution of physical and mental abilities among individuals and the latter arise from the inequalities of authority, esteem and economic advantages associated with social position, irrespective of the aptitude of the individuals who occupy those positions

crime using panel datafrom 16 countries. They found that inequality leads to an increase in violent crimes, while poverty andslow economic growth lead to an increase in property crime. Fajnzylber, Lederman and Loayza (2002)reached the same conclusion that countries with high levels of inequality are more prone to experience violent crimes. In societies in which resources are equitably distributed, people expect to be treated fairly and view corruption as wrong. In less equitable societies, people do not expect to be treated equally and although they view corruption as morally wrong, it becomes a norm (Ariely & Uslaner, 2017). This implies that inequality in a society may lead to increased corruption in that society. These issues are prevalent in South Africa, as the country is one of the most unequal countries in the world. Chatterjee (2019) and May and Govender (1998) posit that approximately 21% of households in SouthAfrica live on $1 per day. South Africa is also ranked as one of the deadliest countries in the world dueto the prevalence of violent crime (Super, 2016).

A substantial body of literature exists in South Africa on income inequality but little has been written about wealth inequality and the sources thereof. The lack of sufficient, reliable data on wealth has oftenbeen attributed to the limited research undertaken in this area[2]. The main aim of this research paper is to contribute in this regard. Literature that investigated data on wealth distribution from the 1700s in the United States of America (USA) and Britain concluded that inequality in wealth emerged with the advent of industrialisation (Williamson & Lindert, 1980; Lindert, 2000a & 2000b), although there wasa gradual growth in wealth inequality in Sweden pre-industrialisation that was attributed to changes experienced in the agricultural sector. A sharp increase in wealth inequality was experienced in the early 1900s that was attributable to industrialisation (Bengtsson, Missiaia, Olsson & Svensson, 2018). Development theory argues that growth and distribution do not always improve together, as the trickle-down effects of economic yields do not often occur and there is a price to pay for neglecting either (Adams, 2003).

An extensive amount of literature exists on wealth inequality *between* races,

[2] The limitation of data availability on wealth inequality is well documented and can be accessed via this link: https://poverty.umich.edu/research-projects/policy-briefs/rising-wealth-inequality-causes-consequences-and- potential-responses/

reflecting that wealth inequalities have continued to rise globally. In the South African context, between race groups economic inequality has been declining, albeit still high, while within race groups economic inequalityhas been increasing, which has left the country's Gini coefficient unchanged at 0.65. Orthofer (2017), Deaton (2013) and May and Govender (1998) assert that within-race inequality, especially among the black population, accounts for 29% to 49% of the overall South African Gini coefficient. Income inequality has remained highly concentrated, even post-apartheid, primarily driven by the black population (Leibbrandt, Woolard, McEwen & Koep, 2010; Leibbrandt, Finn & Woolard, 2012). In a study undertaken by the World Bank in 2018, South Africa ranked as a country with one of the highestrates of inequality in the world as measured by the Gini coefficient (World Bank Report, 2018; Orthofer,2017; Deaton, 2013). Due to income inequality remaining high as measured by the Gini coefficient, it can be expected that this will feed into wealth inequality, as these two variables are perceived to have high positive correlation. Therefore, it is not surprising that wealth inequality is worse in South Africacompared to other countries, as it stands at between 0.9 and 0.95 (Orthofer, 2017).

Although wealth inequality has not received the same level of attention in the literature as other types of inequality, it has started to receive more attention amongst economists and policymakers including South Africa (Orthofer, 2017; Chatterjee, 2019). This shift of focus from income inequality to wealth inequality was necessary. Chang (2010) postulates that wealth is much more meaningful as a measure of economic wellbeing than income, as it provides an individual with a financial cushion during times of uncertainty and can be used as leverage to enhance productivity. During periods of loss of income, it allows people to pay their living expenses without falling below the poverty line.

The wealth inequality trends highlighted in the relevant literature indicate that it has been rising for a range of reasons. Piketty and Saez (2014) argue that in the 21st century population growth has stabilised while inequality has increased, causing more reliance on inheritance wealth. Maroto (2016) posits that factors related to demographics, human capital, financial attitudes and access to the credit market contribute to wealth inequality. In South Africa, this argument could not

be more correct; for example,the expectation that transition from real capital to human capital as a basis for increased earnings and, therefore, for a rise in greater equality in the 20th century is not supported by observed trends in SouthAfrica. Despite improved access to education and human capital both between and within groups, neither income nor wealth inequality have reduced (Orthofer, 2017). Stringham (2017) indicates that improving work skills, working more, working in jobs in higher demand and saving and investing all increase inequality within groups for those who can and those who cannot access those jobs. In South Africa, where unemployment is generally high, the impact of being able to secure a job and raise capitalis likely to cause more wealth inequality within groups over time. The difference between those who have access to jobs and those without will be highly pronounced.

1.2 The Research Objective

This study sought to establish the extent of wealth inequality within various demographic groups in South Africa using the National Income Dynamic Survey (NIDS) dataset. The specific objectives are:

- To investigates the sources of individual rather than household wealth inequality within race.
- To test arguments such as that of Piketty et al. (2014) that an increase in factors such as humancapital can reduce inequality between and within groups in South African society.
- To also investigate other factors that could be drivers of inequality within groups in SouthAfrica, such as age, gender, marital status and inheritance.The above-mentioned factors could explain wealth inequality within groups in South Africa rather thanthe conventional factors such as institutional structures. Determining if such factors have any influenceover within-group inequality in South Africa will depend on the availability of relevant data.

The study did not seek to identify whether or not wealth inequality was higher pre- or post-apartheid, but rather sought to identify the drivers of within-race

wealth inequality in South Africa by initially drawing from the available body of literature to identify the determinants of wealth accumulation, andto substantiate the initial claim that within-race wealth inequality in South Africa is higher than income inequality. This would assist in ascertaining the success or failure of new government policies implemented to ensure the equitable distribution of wealth. This paper focused on gender, education, inheritance, marital status and age as drivers of within-group wealth inequality. The selection of these variables was to discern the magnitude of wealth inequality within race groups. These variables are explored in detail under the literature review by synthesising the reasons for their inclusion in the analysis.

1.3 Motivation for this Research and Contribution

There are numerous reasons for the need to understand wealth inequality and within-group wealth inequality in South Africa:

- There is rising wealth inequality in South Africa that may be attributed to the past social injustice that has affected the country's social fabric.
- Wealth inequality indicates a lack of upward mobility and limited economic opportunities in society perpetuated by, among other things, social injustice which changed people's economicendowments.
- Wealth inequality tends to exacerbate the intra- and intergenerational wealth gap, i.e. inequality in one generation implies inequality of opportunity for the next generation (Pfeffer, 2007).
- There is a growing sense of discontent among individuals both globally and locally due to highlevels of wealth inequality.
- Inequality can manifest both between and within the various sub-groups of society due to a number of reasons such as economic and social policies. In South Africa, *within*-group wealthinequality has become one of the driving forces behind South Africa's stubbornly high Gini coefficient, which stand at 63% as of this writing. This implies that as inequality rises so does the importance of understanding inequality within groups.
- Even though determinants of wealth are normally done at household level rather than individual level, the way that NIDS is collected makes it

possible to investigate intra-racial wealth inequality at individual level. Furthermore, there may be a problem with a household analys approach. Wilkinson and Pickett (2009) highlight the problem of mapping the relationship found in aggregate-level data to individuals, i.e. transposing the patterns we see when comparing groups into the head of every individual. The existing literature pertaining to inequality may suffer from ecological fallacy (the assumption that an association at the aggregate level is reproduced within each individual) or the Yule–Simpson effect (that the statistical relationship at one level of aggregation can be absent or even reversed at a different level of aggregation). This implies that simply because household assets are shared within the members of the household, it does not necessarily mean that the ownership of those assets shared is equal or even shared at all.

- Lastly, understanding intra-racial wealth inequality is of interest to both social theory and socialpolicy[3]

There is a lack of intentional policies designed to understand the redistribution of resources in South African society. The prevailing view is that the problem of inequality can be addressed by increasing economic growth, however, this notion is baseless, as it is not true that a rising tide can lift all boats without taking into consideration that poor people need to be in those boats in the first place for such tides to benefit them.

In order to design effective policies that can deal with wealth inequality, it is necessary not only to understand the trend but to also understand the drivers of this trend. Therefore, a better understanding of the drivers of wealth inequality is important for policy formation, if the state is to be successful in addressing the rising social discontent resulting from rising wealth inequality. A society that does not offer sufficient equality of opportunities for everyone to advance is not sustained. This paper seeks to determine the sources of within-race wealth inequality in South Africa, which, to the researcher's knowledge, no study has

[3] In their book, Richard Wilkinson and Kate Pickett (2009) suggest that more equal societies tend todo better than those that are unequal

investigated before. This will in turn inform the policymakers on how to effectively deal with inequality in South Africa.

1.4 Research Question

This paper examines whether variables such as gender, age, marital status, education and inheritance have had any causal effect on intra-racial wealth inequality in South Africa. The research was designedas described hereunder.

Section 2 of this paper explores wealth accumulation variables in terms of between race groups and within race groups generally and in the South African context specifically. It draws from a vast amount of literature that explored different variables that contribute to the accumulation of individual wealth and wealth inequality with regard to education, age, gender, inheritance and marital status. Due to a lack of sufficient observation pertaining to inheritance that could substantiate the inclusion of this variable in the analysis, this study included this variable as a wild card. The findings revealed by the literature review were applied in the South African context only, but utilised information regarding various forms of inequality as a foundation for this research. Section 3 presents a discussion of the design of the study, appropriate definitions and the transformation made. Section 4 presents a discussion of the methodological design for the research. All the models chosen for the analysis are discussed thoroughly. Section 5 provides an empirical analysis of the data and empirical findings and Section 6 provides a summary of the research, discusses the policy implications of the findings and suggests possible ways to expand the research.

Chapter Two

Literature Review

2.1 Concept of Various Proposed Drivers of Wealth Inequality in Literature

There are different ways in which inequality and wealth inequality can manifest in society. There is a substantial amount of literature that addressed the source, dynamics and consequences of inequality globally. For example, Kranzinger (2016) makes use of concepts such as indirect network effects to explain how two compatible systems of wealth accumulation produce self-reinforcing advantages thatincrease wealth. Liebowitz and Margolis (1994) posit that the formation of social institutions often enhances individuals' ability to accumulate economic capital and lays the foundations for social equality. One can argue that such social institutions should not be formed as they tend to promote socialinequality; such social institutions should be inclusive. The availability of such institutions tends to promote a non-zero-sum game, where participants benefit jointly and quash the possibility of extreme wealth inequality. A society in which the citizens partake in wealth creation and sharing tends to be more democratic and wealthy than a society in which the wealth is concentrated in the hands of the few.This emphasises the need for the research of within-group wealth inequality.

Merton (1968) provides an example of how within-group inequality is perpetuated among authors by showing that eminent authors received disproportionate credit for their contributions compared to lesser-known authors for comparable contributions in their publications. He concludes that success notonly depends on current performance but also past performance. The paper argues that groups who receive any form of initial benefit will also experience growth in wealth, which will result in intra-social inequality. The same can be said in terms of wealth distribution within groups. Wealth begets wealth and inequality begets more inequality.

Rössel and Bromberger (2009) mention that the distribution of cultural and social capital causes a rigidclass structure within a society. Considering the zoning laws enforced by the apartheid regime, social capital formation in South Africa was

destroyed with only pockets thereof remaining, which tend to manifest in rising inequality within groups. Zoning laws impair the ability to accumulate wealth between groups and even within groups if some people happen to benefit from the law.

Another possible cause of wealth inequality could be that the distribution of wealth does not change over time and is not determined by pure chance, but rather depends on the distribution of human beings' physiological and psychological characteristics (Pareto, 1975). Kranzinger (2016) posits that the unequal distribution of power in a society can exacerbate wealth inequality; he uses the example of shadow banking to highlight the potential Matthew effect[4] occurring within groups. The majority of low-income, undereducated communities in South Africa rely on shadow banking to finance their operations and often get caught up in prolonged debt traps that limit their ability to accumulate wealthgoing forward.

All the above-mentioned pieces of literature support this study's expectation that increasing income levels tend to promote inequality, with income level variations often cited as the main cause of inequality. Although income may be the driving force behind wealth inequality, Orthofer (2017) positsthat inequality is still rising in South African households despite the stagnation registered in both income and savings. Furthermore, high income does not necessarily lead to wealth accumulation, as one might have a high income but not accumulate wealth or vice versa (Chang, 2010). This seems to indicate that there could be drivers of inequality besides those that are commonly blamed, such as income, necessitating further investigation of wealth inequality.

It is often argued that inequality highlights individual efforts. Those who do not earn a high income andwealth can attribute this to their inferior efforts, perhaps due to their lack of education, which hinders their prospects of gaining the necessary skills to secure well-paid employment. This argument ignores the fact that not everyone has equal access to basic services, for example, quality

[4] The Matthew effect refers to a scenario in which positive feedback keeps the winners ahead, whether legal ornot (Matthew 13:12). Shadow banking operations tend to proliferate wealth inequality within groups

education. Brunori, Ferreira and Peragine (2013) posit that inequality in opportunity is more to blame for income inequality and a lack of wealth accumulation than individual efforts and responsibility. The root of this inequality is more likely associated with gender, race, geographic location and family background. In post- apartheid South Africa, the life chances of an average child are determined by their birth place and theirparents' wealth, not by their hard work and determination. These variables are so deterministic that one can accurately predict by the child's seventh birthday if he or she will live a life of extreme poverty andunemployment (Spaull, 2019).

*2.*2 Inequality and Wealth Inequality in South Africa

Globally, there is a rising trend of wealth inequality studies. Recent literature includes studies such as those of Keister (2000), Keister and Moller (2000), Zucman (2019), Cagetti and De Nardi (2006), Killewald and Pfeffer (2017), Schachner (2017), Piketty and Saez (2014) and Piketty (2007). In SouthAfrica, studies on wealth have been conducted by Daniels, Finn and Musundwa (2012), Ngwenya and Paas (2012) and, most recently, studies by Augustine (2015), Orthofer (2016), Daniels and Augustine (2016), Terreblanche (2018), Chatterjee (2019) and Chatterjee, Czajka and Gethin (2020). However, there has been limited focus on drivers of wealth inequality in the South African context, despite SouthAfrica being ranked as one of the most unequal countries in the world as measured by the Gini coefficient.

Using the Wave 2 NIDS data set, Orthofer (2017) studied the trends of wealth inequality in South Africaand compared these to the rest of the world to provide a general trend of wealth in South Africa. This author's data indicates that inter-race wealth inequality is pronounced in South Africa, however, sources of such disparities were not investigated. Ngwenya et al. (2012) explored wealth inequality in South Africa by assessing the ownership of financial products per household among four ethnic groups and found that education performs a significant role in a household holding financial assets. The authors also found that the Life Cycle Hypothesis (LCH) does not hold in South Africa. Daniels et

al. (2016) focused on investigating the quality of the NIDS data set. Daniels et al. (2012) investigated the construction of the NIDS data set. Chatterjee et al. (2020) studied the distribution of household wealth using NIDS, tax data and macroeconomic balance sheet statistics. They found that 10% of the population owns 86% percent of the aggregate wealth. They also found that inequality has remained stable and also slightly increased within the top wealth group in post-apartheid South Africa. The Southern Centre for Inequality Studies working paper written by Terreblanche (2018) discusses the benefits enjoyed by the business sector which led to inequality and the role wealth tax can play in addressing inequality in South Africa. Almost all of the above-mentioned papers focused mainly on thetrends of wealth inequality in South Africa but did not focus on the sources that drive this disparity between or within racial groups.

Augustine (2015) is the only study that investigated the determinants of wealth inequality in South Africa but at householdlevel. The author uses the NIDS Wave 2 data set utilising quantile regression to account for wealth accumulation behaviour at different wealth distribution levels of the household. The author's main focus was to evaluate the role of the LCH on the distribution of wealth in South Africa as well asaccumulation of wealth behaviour in the tribal authority areas. The author's finding was that wealth inequality cannot be explained by LCH in South Africa. However, the author did not investigate within race wealth inequality sources in South Africa.

It is imperative to not only highlight the existence of wealth inequality in South African society, but also to understand the sources in order to ever mitigatethe trend. It is also important to understand these sources at individual level rather than household level due to the difference in individual asset ownership which may occur within the same household. Therefore, the main aim of this research paper is to contribute in this regard.

The obvious determinant of wealth inequality around the world seems to be income. Piketty (2007) posits that wealth inequality is being driven by financial assets in the USA and UK. However, South African dynamics differ from those of the aforementioned countries in the sense that both financial assets (Orthofer,

2017) and labour income (Orthofer, 2016) have had an impact on wealth accumulation.There are several ways this can be explained. The labour market structure was based on racial discrimination that dictated employment opportunities and remuneration of the labour force. Skilled jobs with higher remuneration were reserved for the white population while menial job opportunities were reserved for the remainder of the population. The Indian and Coloured population took intermediate jobs. Black South Africans experienced the highest level of unemployment and those whowere employed were paid less than were white people (van der Berg, 2011). South Africa is still experiencing high levels of unemployment due to slow economic growth and structural unemploymentthat affects the majority of the black population (Leibbrandt et al., 2010).

Orthofer (2016) describes the distribution of wealth structure in South Africa as the wealthiest 10% ofthe population earning 55% to 65% of the available income but owning 90% to 95% of the total wealth.The middle class earns 30% to 35% of total income but owns only 5% to 10% of the wealth. The poorest50% earns 10% of the total income and has no wealth. The study also found that there is a high, positive correlation between labour income and wealth in the top tier of the distribution. However, this only holds for the white population, implying that the white population has been able to translate its labour income into wealth while other race groups have not. There are a number of reasons why this might bethe case, for example, spending patterns, investment vehicles and black tax[5], but these require further exploration to gain a deeper understanding thereof.

Orthofer also indicates that the South African middle class has been unable to create wealth from income. There may be a number of reasons why this is the case; for example, Visagie (2013) posits thatthe majority of the South African middle class do not earn much in monetary terms. The literal middleclass earns between R1 520 and R4 560 per month. This does not leave much room for investing and accumulating wealth. The affluent middle class earns between R5 600 and R40

[5]Black tax is when the majority of black income earners spend a large portion of their income on supportingtheir relatives instead of investing or accumulating wealth

000 per month. This group makes up 31% of the population. The elite middle class earns more than R40 000 per month andmakes up 4% of the population. Orthofer does not explain what constitutes the middle class in her paper,however, if this paper was to use Visagie's (2013)[6] concept of the middle class, it is not surprising that this middle class has not been able to convert its income into wealth accumulation.

Nattrass and Seekings (2001) and Seekings and Nattrass (2008) state that inequality in South Africa is driven by income inequality between the upper middle class and everyone else. Orthofer's (2016) findings indicate that a high correlation between labour income and wealth in the top tier of the income distribution does not hold for all races in South Africa. Lupton and Smith (1999) explain this correlationby positing that even if earnings are the same there can still be a significant variation in wealth accumulation as a result of the variation in savings due to spending patterns and the type of investment vehicles that households choose, which may have different returns depending on economic conditions in the market.

The lowest tier of income distribution consists of uneducated and unskilled labourers, often employed in the industrial sector and having no wealth at all. The fact that the industrial sector, for example, the manufacturing industry, has been experiencing a decline poses a challenge with regard to the absorption of low-skilled workers. The country has to rely on the high technology sector, which is capital intensiveand requires a highly skilled labour force.

The labour market as highlighted above has had a huge role in driving wealth inequality in South Africabetween and within races. One of the post-apartheid government's objectives was to level the playing fields in the labour market and the business sector by adopting policies such as Affirmative Action[7] andBlack

[6] Visagie (2013) distinguishes the middle class using three categories: 1) literal middle class, ii) affluent middleclass and iii) elite middle class

[7] Affirmative Action is a policy that takes into account a person's demographics such as race and gender when employment and educational opportunities are extended. This policy is aimed at increasing opportunities for previously disadvantaged and underprivileged groups.

Economic Empowerment (BEE)[8]. It is widely known that policies such as BEE have created a few black elites who are often politically connected and who clinch ownership deals worth billions of rand by means of these policies, thereby accumulating immense personal wealth (Emkes, 2012). This may have played a role in widening the gap between the poor and the rich within the black population.

The literature show that income is one of the major contributors of inequality in South Africa due to the country's labour market dynamics. It was therefore important to include this variable in the literature analysis. However, this paper did not include it in its estimation of determinants of wealth due to the high correlation between income and wealth. Moreover, the paper does not focus on identifying the trend of wealth inequality in South Africa as this has been highlighted by authors such as Orthofer.

2.3 Review of Literature: Determinants of Wealth Variables

There is ample literature that shows that wealth accumulation is much more skewed compared to income. There are a number of reasons why this is the case. Apart from income, the most obvious reasonis the variation in individual education levels, where individuals with higher levels of education are more likely to have high levels of wealth due to the importance of education in the labour market. Other drivers of wealth inequality are age, marital status and gender. Although there is a correlation betweenthese factors and wealth accumulation, such correlation does not necessarily mean causation. This

section provides evidence from literature highlighting how these factors are sources of individual wealthinequality.

2.3.1 Education

Education performs a significant role in wealth accumulation by enhancing a

[8] BEE is a policy that was adopted by the post-apartheid government for the equitable distribution of economic opportunities, which included transferring wealth to previously disadvantaged members of the population. This is achieved through companies – a company is rated according to its economic inclusion of black people, such as ownership of shares. This becomes a prerequisite for any company that seeks to do business with the state.

person's ability to be productive in different fields. There is a direct and positive correlation between education and productivity (Becker, 1962; Lau, Jamison & Louat, 1991). This may be because education cultivates positive traits such as improving one's decision-making and one's ability to process new and complicated information that may bring about innovation in the production process (Lau et al., 1991). These traits have an important role in the labour market, as they enhance individuals' productivity, which may raise earnings and wealth accumulation. Some scholars such as Psacharopoulos (1979) argue that education does not necessarily enhance an individual's productivity, but merely serves as an indicator of one's ability in the labour market, especially for industries in which it is difficult to measureproductivity.

Other positive traits are financial literacy and the improvement of networking opportunities, both of which can be essential for one's wealth accumulation ability. Ge (2011) highlights how attending college can enhance one's chances of marrying, as college increase networking opportunities. Some may argue that education and experience are better indicators of one's ability, which is translated into high income in the labour market. As the labour market constantly requires higher skills due to technology advancement, those who attain such skills through education put themselves in line to earn"education premium" wages (Autor, 2014; Acemoglu, 2012; Autor, Katz & Kearney, 2008; Blundell, Dearden, Goodman & Reed, 2000). This positive correlation between education and the labour market performs a significant role in wealth accumulation (Spaull & Jansen, 2019).

The attainment of educationcan be viewed as an investment in human capital that can yield financial returns. The returns in this case are in the form of wealth accumulation ability. Although the association is not direct, through education one is able to earn a higher income, which allows one to invest in other wealth accumulatingassets. This makes investment in human capital just as important as investing in financial assets. As labour income is one of the major contributors to income and performs a role in wealth accumulation, any hindrances that reduce one's employability and mobility in the labour market have an impact on wealth inequality.

According to Restuccia and Urrutia (2004), households that have attained a certain level and type of education tend to accumulate more wealth than those who have not attained the same. An inability to finance education is one of the reasons for some individuals remaining trapped in poverty, thus perpetuating the problem of wealth inequality. This implies that education has the power to either dividesociety or perform the role of an equaliser. Education's association with wealth accumulation has been examined in numerous studies.

Kaplan and Rauh (2013) explored the characteristics of the richest individuals as presented by Forbes magazine over three decades. They concluded that in recent years the trait that has set them apart from others is the attainment of high levels of education. They acquiredquality education and then utilised their education in industries such as finance, technology and mass retail. These results are similar to those found in the South African context, as South Africans who havemanaged to accumulate wealth often hold Science, Technology, Engineering and Mathematics (STEM)degrees and work in the technology and finance industries (SA Wealth Report, 2020). The SA Wealth Report (2020) employed data pertaining to wealth from their in-house, stock market, property and income statistics in each market and GDP per capita statistics in each market, which is information thatis not readily available in NIDS.

Restuccia et al. (2004) examined the role of early and college educationon income disparities and concluded that both factors perform a role in income disparity, which, as explained, performs a role in wealth disparity. When classifying the wealthy according to demographics, the results are the same.

Terrel (1971) and Shapiro, Maschede and Osoro (2013) conducted studies in which they explored the difference between blacks' and whites' wealth accumulation in the USA. Terrel (1971) utilised the 1967Survey of Economic Opportunity (SOE) and Shapiro et al. (2013) utilised the Panel Study Income Dynamics (PSID) from 1984 to 2009. They found that wealth accumulation was highly correlated with education. Terrel (1971) breaks down the wealth accumulation of black and white households in termsof size, composition and concentration. The study found that the size of the wealth accumulated by black

households is generally less than that of white households and that black households tend to holdfewer financial assets, preferring to hold non-financial assets such as housing and vehicles whereas white households who have financial and non-financial assets prefer real estate equity and business equity. Another finding was that although black households save more than white households they accumulate less wealth than do white households. This refutes the misconception that poor people merely have to save to accumulate wealth.

The above observation implies that saving alone would not lead to the accumulation of wealth, but is rather an investment vehicle that has a significant role in wealth accumulation (Lupton et al., 1999). The studyalso found that there is a higher degree of intra-racial wealth inequality in black households than in white households, with black and white households having Gini coefficients of 0.82 and 0.69, respectively. One of the reasons for wealth accumulation between and within race groups was the levelof education attained by the head of the household. Maschede et al. (2013) reached a similar conclusion,namely that the wealth gap between the two races was due to education disparities.

Recent studies reached similar conclusions with regard to the role of education in wealth accumulation,even though the demographic analyses were not the same. One of these was a cross-country study conducted by Bauer, Cobb-Clark, Hildebrand and Sinning (2011), which included countries such as the USA, Germany and Australia in which the wealth gap between natives and immigrants was explored. Their study concluded that although the USA and Australia both accept more highly skilled migrants than does Germany, the results relevant to Germany and the USA were the same; both countries' wealth gap between immigrants and natives was explained by education attainment by the head of the household and not income. For Australia income does not explain wealth accumulation, but educationdoes and it is found to affect wealth accumulation of the migrant on a positive way due to the fact arriving migrants tend to be more educated than natives. Having education in this case tends to reducethe wealth gap rather than widening it. The study indicated that education does perform a role in wealthaccumulation, as it reduces wealth accumulation disparities between immigrants and natives.

Similarly, Behrman, Mitchell, Soo and Bravo (2012) examined the Chilean Social Protection Survey and reached the same conclusion as Bauer et al. (2007), i.e. that education attainment is highly associated with wealth accumulation. This implies that if we examine households, individuals or migrants, there is always a positive correlation between education and wealth accumulation. Althoughthese different studies have been able to show that education is important for wealth accumulation, thereseems to be a limit to this impact.

Using Brabant's panel survey of Dutch individuals, Hartog and Oosterbeek (1998) found that individuals with higher general education (secondary schooling) accumulate more wealth than those with lower and tertiary education. This implies that the highest levelof education does not translate into the highest level of wealth accumulation. The results are surprising,as an individual with the highest level of education, such as a Master's or Ph.D., is expected to accumulate more wealth than an individual who has attained less education due to opportunities that such an education is expected to bring. However, such opportunities are dependent on labour market conditions.

In developed countries, highly educated individuals tend to struggle to find employment at a commensurate level. In developing countries, the advantage of such a level of education is still high, associety has not yet equalised. This is highlighted in the study conducted by Veenhoven (1996). This equaliser is obtained by wide access to education (Golding & Katz, 1999). This also implies that the relationship between education and income depends on the current economic trajectory that dictates thedemand for a particular education/skill. For example, in the early 20th century income concentration between white and blue-collar workers in the USA decreased due to the demand for blue-colour workersin the economy (Golding et al., 1999). Furthermore, an increase in graduates who entered the labour market decreased wage premiums, which decreased inequality (Telegdy, 2018). Thus, access to education and creating sectors that can absorb low- and semi-skilled workers can increase their opportunities to accumulate wealth, thereby decreasing the wealth inequality gap. Although this phenomenon may indeed hold, highly skilled individuals who hold qualifications that are in demand inthe labour market can still see their wage rise, which makes the type of

education attained an importantfactor in determining returns. Bingley, Zhu and Walker (2005) found that returns, in terms of employability and income are still rising for individuals who have attained education related to mathematics and engineering. Individuals with these types of qualifications can usually be found in the techno-industries and the finance sector. It is therefore no accident that individuals with STEM qualifications appear on Forbes' list of the world's wealthiest and most successful people. Literature indicates that education can enable one to take advantage of opportunities in the labour market that could increase one's ability to accumulate wealth. Therefore, those who have less education within each racial group is likely to accumulate less wealth.

2.3.2 Gender

Gender performs a role in society in terms of positions and opportunities that are afforded according togender (Lorber, 2001), which may lead to wealth inequality. Gender has always been used in society toenforce social norms that define what behaviour for males and females is acceptable and normal, for example, how men and women should act, talk, dress, etc. These social norms also define the positions and opportunities that are afforded to each gender. These positions and opportunities pave the way forwealth creation and accumulation. Historically, society has viewed men as superior to women, for example, boys are viewed as stronger and better able to accomplish complicated and technical tasks and are therefore afforded better opportunities in terms of, for example, education, which has been discussed as having a positive correlation with wealth accumulation. Men generally have moreeducation than women, which implies a higher income for men in the labour market and that men are likely to accumulate more wealth through income. If race discrimination is included in this dynamic, black women will likely bear the brunt of the results of these social norms, which implies higher intra- racial wealth accumulation disparity between black males and black females.

Another aspect worth mentioning is that gender inequality can be perpetuated through differential access to and control over material resources, which tends to restrict access to education or ownership of the means of production to a specific

gender group, thus exacerbating wealth inequality within that group. Ettinger, Conroy and Barr (2019) argue that gender has always played a role in accessing education. Traditionally, boys have had much more access to education than girls, who in some societiesare banned from becoming educated. Those who do manage to attend school generally drop out in secondary school (Mapfumo, Chireshe & Munhuweyi, 2002). In this case, education divides wealth accumulation in society in terms of gender, as access to education, according to one's gender, will resultin employment opportunities in the labour market where labour income is earned, which enhances financial literacy that aids investment decision-making and provides the entrepreneurial skills requiredfor wealth accumulation.

Gender inequality in education creates wealth inequality by limiting access to other wealth accumulation variables. By limiting women from acquiring education, it also limits their representationin wealth-creating industries such as the technology and finance sectors, which is where wealthy individuals apply the skills they attained from education. This creates segregation by race in the labourmarket. In some countries where there is gender parity, women are still underrepresented in the aforementioned industries. Balakrishnan and Low (2016) posit that in Japan, for example, female engineers make up only 1% of the engineering population. Although there is gender equality throughout the schooling years, only a limited number of females opt for an engineering path in tertiaryeducation, and those who do choose to take the path do not pursue a career in engineering while those who pursue a career in engineering leave the profession prematurely due to socio-cultural influences that portray women as homemakers. Women are encouraged to enter less challenging fields while malesare encouraged to participate in science-, technology- and mathematics-related fields.

South Africa has made great strides in ensuring equal access to education and 90% of the children of school-going age attend school irrespective of their gender (Branson, Hofmeyer & Lam, 2014). Although high, the drop-out rate is the same for both genders (40%) (Branson et al., 2013). This researcher utilised Wave 2 NIDS data to study school drop-out rates in South African schools. This is important information, as dropping out of secondary school may limit an individual's ability to create and accumulate wealth, as explained in the foregoing

section. Women are equally represented in tertiaryeducation institutions (South Africa's Department of Women, 2015). Taking these two points into consideration, one can expect to see no gender bias with regard to wealth accumulation in South Africa.However, this does not seem to be the case, as South African women are generally poorer than South African men (Stats SA, 2018). Although these poor women are mostly black (Stats SA, 2018), the factthat all women are poorer than men across the racial spectrum might mean that wealth accumulation isgender biased. The same can be said of the USA, where females are underrepresented in both undergraduate and postgraduate Science and Technology programmes (Hughes, 2012).

Only a small fraction of women makes it onto the list of South African wealthy individuals. This may be a true representation of society at large; that men have accumulated more wealth than women due totheir educational attainment and their income. According to Toolo (2018) and South Africa's Department of Women (2015), women are underrepresented in STEM programmes at higher learning institutions in South Africa. UNICEF and South Africa's Department of Women (2015) posit that only28.5% of women graduate with STEM degrees in South Africa, which could be the reason that they areunderrepresented among individuals who have accumulated wealth. This is attested to by a number of human resource managers working for technology, finance and mining companies, as many of these companies acknowledge that there is a gender wage gap in their companies and attribute this to so fewwomen holding STEM degrees in South Africa and fewer women than men in management positions (Donnelly, 2019). Apart from socio-cultural issues that discourage women from participating in STEM programmes, Toolo (2018) indicates that girls do not do well in mathematics and science, which are secondary school subjects required at the tertiary level if one wishes to pursue a STEM qualification.

Other issues that result in gender wage gap are not skill related but are based on the fact that women's skills are undervalued (Bosch, 2015). Conley and Ryvicker (2004) argues that it may not necessarily be the lack of education and experience but rather performance biases held about men competence compareto women. This is then reflected in the few women occupying managerial positions.

The gender wage gap in South Africa decreased post-apartheid from 40% in 1993 to 16% in 2014. Thisis attributed to the wage gap decline at the 10th percentile due to the introduction of a minimum wage. Between 1993 and 2005 the wage gap at the 90th percentile decreased, but thereafter increased due to women not being likely to hold senior positions (United Nations University, 2019). Blau and Kahn (2017) utilised a PSID (1955–2014) survey to study the gender wage gap in the USA. They concludedthat although there was a reduction in the wage gap between 1980 and 2010, the gap persists. They indicated that the reduction was due to improvement in education and females' experience; more females were completing their secondary and post-secondary education and were choosing to immediately enter the workforce after having children, which allowed them to gain more work experience over time.

According to Oostendorp (2004), the persistence of the wage gap was due to occupation and industries; few women occupied managerial positions in lower-paying industries. The author reached this conclusion by conducting a cross-country study on occupation gender wage using the International Labour Organization's October Inquiry. This implies that if there are more females in STEM industries, they might be able to earn an income comparable to that of males, which may reducewealth inequality.

If the gender wage gap persists in the favour of men, it is not surprising that studies that investigated the gender wealth gap in various countries such as the USA, Australia and Germany reached the same conclusion that the gender wealth gap is highly male concentrated. It will also not be surprising that this will be carried over into within-race wealth inequality, although the determinant of this wealth gapis different for each study. Schmidt and Sevak (2006) utilised PSID 2001 in the USA, Neelakantan andChang (2010) utilised a Health and Retirement Study (HRS) in the USA, Austen, Jefferson and Ong (2014) utilised the Household, Income, Labour Dynamic (HILDA) survey in Australia and Sierminska,Frick and Grabka (2010) utilised the Socio-Economic Panel (SOEP) in Germany. Neelakantan et al. (2010) posit that although women in the USA earn 78% of what men earn, they hold 36% of the wealth.This wealth gap is due to men having more wealth escalators and single parenting generally being undertaken by women.

Approximately 37.7% of South African households are headed by females (Kamer, 2020) and these households are more likely to be poor than are households headed by a male. Women are also more likely to be unemployed (Nwosu & Ndinda, 2018). This leaves limited room for such households to accumulate wealth, thus perpetuating the intra-racial wealth accumulation disparity.

Sierminska (2018) found that the gender wealth gap is explained by characteristics that have already been discussed, namely income and labour market experience. Austen et al. (2014) found that the wagegap is explained by the portfolio of assets held by each gender. This emphasises the point previously discussed, namely the importance of investment vehicles for wealth accumulation. An interesting observation was made by Schmidt et al. (2006), in that after controlling for income and education, the wealth gap between males and females decreases but is not eliminated. As they do not explain the determinant of this gap, it can be assumed that the gap is based purely on gender discrimination, whicheconomists refer to as the raw gender wage gap. They also found that this does not hold for young households, because after controlling for income and education the gender wealth gap disappears. Theirstudy implies that education and a reduction of the gender wage gap can eliminate the gender wealth gap.

Neelakantan et al. (2010) posit that the gender wealth gap persists even during retirement, which is not surprising, because if there has been a hindrance to education, income and gender discrimination throughout the female lifecycle, then females are bound to have accumulated less wealth than males fortheir retirement. Neelakantan et al. (2010) posit that the reason for this gender wealth gap is that womenare more risk-averse than males, but concede that this does not entirely explain this wealth wage gap. Although there is literature that supports the assertion that women are much more risk averse than men (Jianakoplos & Bernasek, 1998; Sunden & Surette, 1998; Eckel & Grossman, 2008; Hartell, 2007; Holt& Laury, 2002), Schubert, Brown, Gyler and Brachinger (1999) dispute that women are more risk averse than men when it comes to investment or financial decision-making except with regard to gambling. They reached this conclusion after running an experiment and control study in which they presented risky

choices for both financial and insurance decisions to both men and women. Shapiro, Hass, Maxfield and Gupta (2015) examined risk behaviour in a range of managerial positions and foundthat risk-taking is gender neutral, meaning that women take as much risk as men. Sundheim (2014) posits that the difference between men and women is not that one gender is more risk averse than the other, but that men only take into account the strategic objectives of the risk while women also think about the impact the risk will have on the people around them. This makes sense, as more households are headed by women, making it difficult for them to make financial decisions that risk their families' livelihood.

It is not only labour market distortions that create unequal opportunities for the genders to accumulate wealth. Other factors can drive intra-racial wealth accumulation in South Africa such as inheritance allocation across different communities and asset-holding rights within races. This is observed mostly in the black and Asian communities, in which it is a norm for family wealth to be passed down to a male heir. Males are also groomed from an early age to manage, for example, a family business. In numerous countries it is still taboo for a female to own land and other assets.

The literature indicates that gender is an important determinant of wealth accumulation due to social norms that influence education and income and which are highly correlated with the wealth that is derived from gender-based remuneration. Moreover, that gender discrimination may have a significantrole in influencing gender inequality and therefore intra-racial wealth accumulation. In summary, gender inequality tends to manifest in three strands. The first strand is inequality of capability – wherethere is variation in terms of core functions such as education, health and nutrition. The perception of the presence of such variations in capability limits women's access to jobs, credit and property ownership rights. The second strand is agency – where women lack a voice in making decisions regarding matters that affect them, for example, resource allocation in the household, workplace and governing bodies. This often results in unequal investment in women's education, as previously discussed. Inequality in capability and agency results in the third strand of inequality, namely inequality in livelihood between males and females in society. To achieve gender equality,

policymakers should focus on policies that reduce or completely eradicate the entrenched notions of the superiority of men over women in the three aforementioned strands. The reality in South Africa is that most households are headed by single parents who are mostly women (Statistics South Africa, 2019). Although some men and women marry, the inclusion of gender in the analysis was important, as the gender wealth gapis a reality for most households. Furthermore, some of these women are divorced, widowed or have never married. This aspect of the family structure is discussed in the ensuing section.

2.3.3 Marital Status

No literature could be found that focuses on the dynamic between marital status and wealth inequality in South Africa. However, Shisana, Risher, Celentano, Zungu, Rehle, Ngcaweni and Evans (2016) cameclose to establishing a link in their paper that discusses the link between marital status and HIV in SouthAfrica. They found that the odds of being HIV positive were lowered among married individuals who lived with their spouses compared to those who are divorced or seperated. This does not necessarily mean that being HIV positive explain wealth inequality, but it highlights the consequences of marital dynamics with regard to social issues that can be linked to wealth accumulation.

There are other pieces of literature outside South African studies that indicate that marital status plays a significant role in wealth accumulation (Ge, 2011). For example, several benefits accrue to those who are married who contribute to economic security (Lupton et al., 1999). These benefits include marriage wage premium, resource pooling and economies of scale, savings and specialisation of labour[9] between partners (Heimdal, 2008; Wilmoth & Koso, 2002; Hao, 1996; Ghallagher & Waite, 2000; Cohen, 2000; Kenney, 2008; Grinstein-Weiss, Yeo, Zhan & Charles, 2008; Waite & Bachrach, 2000). All these benefits foster wealth

[9] Specialisation of labour is achieved by one labourer focusing on what they are good at or only one task. This leads to a reduction of costs and savings for further production of goods and services. In this case, whoever earns less can be a homemaker if the opportunity costs are low. This hypothesis has the backing of Backer's theory of the family (1991), which states that specialisation of labour in the household achieves efficiency. Thismay lower household expenses and release funds for saving and investing for wealth accumulation.

accumulation.

Wealth accumulation differs from one individual to another due to individual traits such as education, income and gender that increase one's ability or inability to create wealth. When individuals with similar traits such as high education and income marry, wealth accumulation opportunities increase. Using the National Survey of Family Growth in the USA, Blackwell and Litcher (2004) found that highly educated individuals tend to marry other highly educated individuals. They also found that individuals tend to marry within the same race. This implies that a married couple is more likely to havesimilar traits, i.e. similar income, which is essential for wealth accumulation.

Under the legal protection of marriage, these individuals are able to pool their economic resources (Barlow, 2004; Baatrup & Waaldijk, 2005) for collective wealth accumulation, which is relatively less likely to occur in cohabitation partnerships (Barlow, 2004; Baatrup & Waaldijk, 2005; Brines & Joyner,1999; Blackwell et al., 2004). Hamplova, Le Bourdais and Lapierre-Adamcyk (2014) found that married couples are indeed more likely to pool resources than are cohabiting couples. They reached thisconclusion after using the General Social Survey to understand money pooling practices between married and cohabiting couples in Canada. This may be attributed to different reasons such as no legal obligation that requires cohabiting partners to maintain each other and to share property when separating(Barlow, 2004). Furthermore, the risk of separation in cohabiting couples is higher than that of marriedcouples (Blackwell & Lichter, 2004). With a high risk of separating and no legal protection, it is not surprising that cohabiting partners remain individualistic in terms of how they manage their economic resources, which may minimise their ability to accumulate wealth. Cohabitation is linked to a high accumulation of debt (Addo, 2014; Schneider, 2011).

Married couples are able to achieve specialisation of labour and economies of scale[10], which can release funds for saving and investment for wealth creation.

[10] By lowering costs and achieving more production of goods and services, economies of scale are

However, Butikofer and Gerfin (2009) indicate that it is not only married couples who can achieve economies of scale but any couples living together. By utilising the Swiss Household Panel Data to study economies of scale and how they are shared among partners, they concluded that couples are able to achieve substantial economies of scale by living together. An interesting finding was that women benefit more than do males in this setup as they take almost half of the household's resources. This may imply that since women are generally poorwhen they are not in a 'couple' setup, it is financially in their favour to be in a partnership, as they are able to accumulate more economic resources from the economies of scale achieved in the partnership setup that enable them to accumulate more wealth. It should be noted that because Butikofer et al. (2009) did not classify couples in their study as cohabiting or married, one could assume that it is married couples and married women who are more likely to reap higher rewards from economies of scale. This is due to the previously cited literature, which asserted that married couples are more likelyto pool resources than cohabiting couples.

Married men earn more income than unmarried men (Hill, 1978). This may be due to the specialisationof labour, which, based on social norms, allows men to focus on labour market productivity, i.e., takingmore work responsibilities and other human capital improvement opportunities that increase their labour income, which was highlighted in the foregoing section as a critical component of wealth accumulation. This implies that marriage increases men's productivity, thus allowing them to earn marriage wage premiums. This theory is supported by authors such as Chun and Lee (2001), who identified time available for both homemaking and labour market productivity as factors. Men spend less time in home productivity, which enables them to dedicate more efforts to labour market productivity, thus raising their labour income. Hersch and Stratton (1997; 2000) posit that Chun and colleague's (2001) theory is one of the theories identified in the literature whereby either marriage increases men's productivity or productive men marry. There is no consensus on which one of these theories is an absolute

achieved, which implies that by lowering household living expenses through spreading these costs across the household occupants, economies of scales are achieved.

reason why men earn marriage premium wage.

Authors such as Nakosteen and Zimmer (1987; 1997) disagree with Chun et al. (2001), as they posit that men who earn a premium wage are more likely to be selected by women as suitable partners. For example, Fafchamps and Quisumbig (2005) found that assortative matching at marriage is based on wealth, which comes in the form of land, livestock, jewellery, education and work experience in rural Ethiopia[11]. This also applies in Asian countries such as India (Borker, Eeckhout, Luke, Minz, Munshi & Swaminathan, 2017). If this is the case, then labour productivity associated with the specialisation oflabour does not explain marriage premium. This is attested to by Hersch et al. (2000), who found that specialisation of labour does not lead to marriage premium wage when they used panel data. This is because married men and single men spend the same amount of time in homemaking production. Thismay be true, as there is no difference between married men and single men in terms of time dedicated to homemaking. This may be due to social norms, which dictate that men are not expected to dedicate their time doing household chores. Single men may not be married, but they may have a partner who helps with household chores or rely on their relatives and other domestic help, which makes them spendthe same amount of time on household production as those men who are married.

Another approach is to associate married women's wealth accumulation increases with the pooling of resources and sharing in the household. Addo and Lichter (2013) assessed the variation of wealth inequality between black and white women due to their marital status and marital history and found thatthese two factors did impact wealth inequality among women. They used cohort data, which indicated that women who married and remained married accumulated more wealth than those who experienceddisrupted marriages. These results were found to be more prevalent in the middle and bottom quantile of the wealth distribution. Chang (2010) asserts that although the income gap between never-married women and

[11] See the latest report on the mechanism of assertive mating; https://www.pewresearch.org/fact-tank/2014/01/29/new-academic-study-links-rising-income-inequality-to-assortive-mating/

men who work full time is only 5%, the wealth gap is significantly high at 80%. This gap is smaller for their male counterparts.

From the foregoing discussion one could be inclined to conclude that firstly, there is more likely to be high intra-racial wealth inequality within the portion of the population that does not marry, as the population will have fewer couples who can perform resource pooling. Secondly, the racial group thatdoes not possess wealth accumulating attributes such as education and high income will have a smaller number of married couples who will accumulate wealth, which may perpetuate intra-racial wealth inequality within that population. It would have been interesting to ascertain the effects of religious affiliation or arranged marriages versus chosen marriages on wealth inequality. This was not possible in this study as the dataset did not include such data in the survey. It would also have been beneficial tohave a sufficiently large sample to allow for a reliable analysis thereof. The quality of the available datainforms the quality of the investigation and the findings.

2.3.4 Age and Inheritance

Age: Wealth accumulation varies with age. An individual becomes wealthier as s/he ages. Many studiesattest to this, for example, Lydall (1955), which uses an Oxford Institute of Statistics Survey to show that there is a linear relationship between wealth and age. Other studies include that of Atkinson (1971)for the UK and Brittain (1978) for the US, which use estate tax data. However, other studies show thatalthough there is a relationship between wealth and age, the relationship is not linear and instead follows a hump pattern. This means wealth tends to increase, however, it also reaches a peak where it starts to decrease. Modigliani (1986) explains this phenomenon in length by using the life cycle hypothesis (LCH) of savings, where savings from income are seen to play a major role in wealth accumulation. The basis of the LHC hypothesis was used in understanding the relationship between wealth accumulation and age; for example, an individual may start with negative wealth during the early yearsof their working life, due to, for example, student and mortgage loans, but as they get into the middle years of their working life where their income is seeing rapid growth due to their education

and experience, they are able to pay off these debts and also save. Properties bought via mortgage loans andsavings for investment become sources of wealth accumulation. This implies that individual wealth increases during the individual's working life due to their ability to save from their earning, and then starts to fall during their retirement years when their savings are zero, which leads to a reduction in assets.

Wealth accumulation in an individual's lifecycle reaches its peak between the ages of 60 and 65; thereafter it declines due to dissaving (Shorrocks, 1975; King & Dicks-Mireaux, 1981; Hurd, 1986). King et al. (1981) used a survey of 12 734 families to study the wealth age gap and found that wealth declines after the retirement age, which is consistent with the LCH.

It should be noted though that savings alone does not lead to accumulation of wealth. This is attested by Wolff (1999), who used the Survey of Financial Characteristics of Consumers (SFCC) to investigate sources of wealth by age. Wolff (1999) firstly focused on savings and capital gains on existing wealth as sources of wealth accumulation from 1962 to 1992 in US households on aggregate level. The resultsindicated that capital gains contributed more to accumulation of wealth by household compared to conventional savings, as capital gains contributed three-fourths while savings contributed the remainingone-fourth on aggregate level. Secondly, he investigated whether any relationship exists between savings from income, capital gains, inheritance and inter vivos transfers on household wealth accumulation. Results were that savings which includes life-cycle savings contributes one-fourth to household wealth compared to three-fourths from capital gains. He also found that capital gains are the largest component of initial endowment on wealth accumulation.

The above studies show that wealth difference can be accounted for by the difference in age, where the richest individuals are found in the middle and towards the end of their working lifecycle, and the poorest being those who are just starting out their working lives.

Inheritance: Although lifecycle accumulation is widely seen as a source of wealth inequality, inheritance is also a major source of wealth inequality, especially

within the top wealth decile (Davies& Shorrocks, 2000). This was found to be true by Kotlikoff and Summers (1981), who used two approaches in determining the share of inheritance on wealth accumulation. In the first method they estimated the flow of inheritance which they found to make up half of private wealth. In the second method, which they deemed to be more accurate, they subtracted their estimated lifecycle wealth froman estimated private wealth in a given year, which yielded a much higher estimate of 80%. However, the LCH suggests that inheritance does not contribute much to wealth accumulation compared to savings (Modigliani, 1986). Wolf (1999) investigated whether there is any relationship between savingsfrom income, capital gains, inheritance and inter vivos transfers on household wealth accumulation. He found that inter vivos transfers play a far bigger role in wealth accumulation than inheritance for younger families.

Tomes (1981) highlighted the different inheritances that can be transferred from one generation to the next. He stated that inheritance does not necessarily come in the form of intergenerational transfer of materialistic wealth, as it also comes in the form of parents transferring resources such as investment inhuman capital to their children which may be used for wealth accumulation. It can therefore be implied that any difference in wealth in the form of either human capital or financial capital in nature can createdisparities in individual wealth accumulation.

In summary, the discussed literature on education, gender, marital status, age and inheritance highlightthe role that these variables may have on individual wealth accumulation and inequality in South Africa.These variables can easily show within race wealth inequality in South Africa due to the country's economic, political and social structure. An individual with high levels of education within each racial group has a high probability of finding high-paying employment, which is highly correlated with increasing one's probability of accumulating wealth. If one investigates the social structure of the South African education system, it is evident that only the affluent, upper middle class and elite within each racial group have the means to afford and attain quality education, which may increase the individual'spotential in the labour market, therefore increasing that individual's probability of wealth accumulation.Those who cannot afford such education are then left behind, which may then create within-race wealth

inequality. Furthermore, literature shows that individuals marry individuals with the same characteristics, i.e. educated females are likely to marry males with the same level of education. Literature also shows that individuals with high-paying jobs have a higher probability to marry. Wealth accumulation then manifests within marriage due to advantages that come with marriage, making marital status another important variable for intra-racial wealth accumulation and inequality. This mayresult in a snowball effect which may create intergenerational wealth inequality within each race group.

Chapter Three

Data

3.1 National Income dynamics Study (NIDS)

This paper utilised secondary individual cross-sectional data collected from the NIDS, which is the onlyhousehold panel study in South Africa. This survey was also the first study to include individuals' and households' financial information such as asset ownership and debt, which are factors used to identify wealth accumulation. The data collection began with Wave 1 in 2008. NIDS was commissioned by the South African government and was undertaken by the Southern African Labour and Development Unit(SALDRU)[12] , which is based at the University of Cape Town. The South African government's objective was to alleviate poverty, inequality and unemployment by achieving sustainable and inclusiveeconomic growth. For this objective to be achieved, the socio-economic environment in South Africa had to be studied and understood.

The initial purpose of the NIDS dataset was to provide an understanding of the socio-economic dynamicthat South Africa is facing. The first NIDS dataset that was collected is referred to as Wave 1. There have since been several waves, namely Waves 2 to 5, which are still used for the initial purpose. However, this is no longer the sole purpose of the NIDS dataset. To achieve its objective, the government adopted a National Development Plan in 2012. The NIDS datasets purpose now includes assisting the government to evaluate the impact of the policies that are adopted (DPME, 2016). Apart from this, the data can also assist in studying how individuals and households have fared during socio-economic shocks. Panel data has been used by various countries to study the economic wellbeing of their citizens, as they are effective in answering the "what", "why"

[12] SALDRU was founded in 1975. It is a highly reputable research body that conducts policy-relevant researchthat has contributed to the formulation of poverty-reduction policies in South Africa. Its focus includes socio-economic issues related to the labour market, inequality and human capital. It is also home to J-PAL Africa, which is at the forefront of sub-Saharan Africa J-PAL's work in conducting randomised evaluations for policy making that is informed by evidence. SALDRU has also published a number of working papers.

and "how" questions (Woolard & Leibbrant, 2006).

A NIDS sample was taken from households such as private households, monasteries and convents. The sample was drawn by statisticians working for Statistics South Africa (Stats SA). A total of 400 Primary Sampling Units (PSUs)[13] were drawn from the master sample of 3 000 PSUs. Within the 400 PSUs, 10 to 12 non-overlapping clusters of residences were randomly selected. Two of these clusters from each PSU were not used and were allocated to NIDS. The others were used as samples for other surveys. Overall, NIDS ended up with a random sample of 9 600 residences (SALDRU, 2012).

The data was collected during face-to-face interviews and/or questionnaires written in the participants' language. The questionnaire was a combination of household and individual level with individual and household questionnaires recorded separately. Individual interview records were created for all resident household members with each individual allocated an identifier. Variables derived from responses to questions pertaining to income and expenditure of the individual include that of income and expenditure. An individual 15 years old or over in the household completed an adult questionnaire. A proxy questionnaire was also completed by an available adult on behalf of adult not currently in the household during the time of the interview. The proxy questionnaire took less time than the adult questionnaire. The questionnaire includes a broad range of questions about income, sources of income and expenditure, levels of education, employment status, gender, marital status as well as assets and debt. The same participants who reside in these households are revisited every two years (SALDRU, 2012).

NIDS defines individual net worth as individual assets less individual debts. Net worth in NIDS is derived from net financial wealth, net business equity, net real estate equity, value of vehicle/s and total value of pensions/retirement annuities. Net financial assets wealth is made up of the total value of interest-bearing assets held in banks and other institutions, stocks and mutual funds, life insurance funds,

[13] PSUs are geographic locations made up of one or more Enumeration Areas (EUs) for census data collection. EUs are neighbouring blocks, in this instance, made up of 74 households

trust funds and collectibles minus the total value of unsecure debts, which also include car loans.Net business equity is the net value of all business shares owned by the individual. Net real estate equityis the net value of all properties owned by the individual including the principal home, holiday and other properties. Where property ownership is shared, a percentage of ownership of assets and debts is assigned to the individual. Value of vehicles is the total value of all vehicles owned by the individual including all transport and recreational (boats/caravans) vehicles. Pension/retirement annuities is the amount of pension and/or retirement capital owned by the individual. The pension annuities should beheld in accounts that grow without any tax implications such as company pension plan for the benefit of the employee (Daniel et al., 2016).

To obtain the wealth variable information, individuals are asked questions such as whether they will bein debt, break even or have something left over if all assets and investments were turned into cash and all debts were paid. The value amount of how much money or debts would be left is requested. Wherean individual is unable to provide a value amount of the asset or debt, this amount is then imputed. Livestock is not included in computing individual wealth due to not knowing who owns the livestock, however, it does form part of household wealth. Life insurance policies are not included in Wave 5 dueto individuals not knowing the value of the policy and also confusing the insurance policy value with the pay-out value. Bank overdrafts are included as well as part of financial debts, albeit not included inWave 1–3.

This paper utilised data from Wave 5, which was undertaken in 2017. The initial sample comprised over 28 000 representatives in 7 300 households. Although there are a number of differences between Wave 5 and the previous waves, the main difference is that Wave 5 includes a top-up of 2 775 participants. However, it should be noted that out of this additional sample of 2 775 only 2 016 completed interviews successfully. This top-up made Wave 5 a more appropriate selection due to the increased sample size to mitigate the erosion of white, Asian and high-income respondents who were underrepresented in previous waves.

There are a number of positives that can be drawn when assessing the NIDS

dataset such as the sample size, which was deemed large enough, and the randomness of the sample collected. There are also checks and balances put in place in the system that assist with data validity and reliability, for example,the system rejects questionnaires with no valid outcomes (where no answer was provided). Another example is that educational progression inconsistencies are checked and corrected. Questions identifiedas important during previous waves are added to the following waves (Woolard et al., 2010). In addition,SALDRU (2018) investigated outliers in Wave 5 using the blocked adaptive computationally efficient outlier nominations (BACON) algorithm and once those outliers are identified contact was made with identified respondents to clarify if indeed the values were correct. However, data from participants whocould not be reached was not removed from the data set.

There are several drawbacks identified in the NIDS data set which might negatively impact the analysisoutput and the paper's conclusion. The main issue is non-response, where either the participant was not willing to provide information or did not know the answer to the question. The second issue is that oneof the participants in one of the households completed a questionnaire on behalf of a participant who was not available to complete their own questionnaire. This could lead to inaccurate data being collected. The third issue is that of the underrepresentation of high-earning and wealthy participants inthe dataset, as such individuals tend to be highly inaccessible. These are expected issues however whenone employs a survey such as NIDS.

Furthermore, the NIDS dataset does not include all questions that may have assisted in answering this paper's research question, such as how participants accumulated their wealth. It would have been helpful to understand, for example, if successful business owners had used BEE. This paper hypothesised that such initiatives have had a role to play in driving wealth inequality, especially within black society, and relevant information could have been uncovered by conducting a qualitative study using NIDS. The drawbacks that have been highlighted are likely to limit this research's results, as the variables chosen for the analysis may not fully explain wealth determinants in South Africa. Due to the underrepresentation of wealthy participants in the sample, the results may be

biased in estimation but not in direction.

Chapter Four

Methodology

The most notable study of wealth inequality was that conducted by Cagetti and De Nardi (2006), whichassessed various models that are employed to estimate wealth inequality in the USA. Similar approachwas followed in this paper. As highlighted in the data section, modelling wealth inequality is a challenge due to the unavailability of relevant data to obtain a sufficiently representative sample to answer the questions of interest.

A variety of approaches have been followed to discuss wealth inequality, for example, Gini coefficients,descriptive statistics, ordinary least square and quantile regression methods. The same approach was adopted in this study to analyse intra-racial wealth inequality in the South African context. The choiceof this approach was motivated by the presence of heterogeneity in individuals' wealth accumulating ability contributed by various factors such as education, gender and marital status.

To improve data quality for the analysis, the chosen variables were cleaned accordingly and categorical variables were created. This is discussed in the ensuing section. Thereafter, descriptive statistics and regression analysis were performed using Stata software and the interpretation of the results is providedin the empirical analysis in Section 5.

4.1 Variable Construction

The following variables were selected for analysis: education, marital status, gender, inheritance andage. The choice of variables was based on two reasons, namely the supporting literature and the availability of data.

Table 4.1 hereunder shows all the variables that were utilised in the analysis, the way they wereconstructed and the expected sign.

Table 4.1: Variables utilised to study intra-racial inequality in South Africa

Variable name	Source	Variable design	Expected Sign
Edu_1	NIDS	Edu_1 is a regressor variable which is a categorical variable that includes an individual who has attained no schooling, Grade 0, 1, 2, 3, 4, 5, 6 and 7.	Negative
Edu_2	NIDS	Edu_2 is a regressor variable which is a categorical variable that includes an individual who has attainedgrade 8, 9, 10, 11 or 12.	Positive
Edu_3	NIDS	Edu_3 is a regressor variable which is a categorical variable that includes an individual who has an N1 (NATED/NTC1), N2 (NATED/NTC2), N3 (NATED/NTC 3), National Certificate Vocational 2,National Certificate Vocational 3, National Certificate Vocational 4, NTC 2/NCV 3, NTC 3/NCV 4, Certificate not requiring grade 12 and Diploma not requiring grade 12.	Positive
Edu_4	NIDS	Edu_4 is a regressor variable which is a categorical variable that includes an individual with a Diploma,Bachelor's Degree, Honours degree or higher degree (Master's Degree or a Doctorate).	Positive
Gender	NIDS	Gender is a regressor variable which assumes a valueof 1 for males and 2 for females, with males being the omitted variable in the regression.	Negative for rFemale Positive for Male
Age	NIDS	The individual age is a regressor variable which ranges from zero to 110 years old. Three cohorts of age are created as follows: cohort 1 (individuals aged15 to 34 years); cohort 2 (individuals aged 35 to 48 years); and cohort 3 (individuals aged 49 to 110 years).	Positive for cohort 1 and 2 andnegative for cohort3.

Race	NIDS	The race variable is a distinguisher variable. It assumes a value of 1 for black, 2 for Coloured, 3 for	Positive/negative
		Asian/Indian and 4 for white; those who responded"do not know" were omitted.	
Marital Status	NIDS	Marital status is a regressor variable which assumesa value of 0 for married, 1 for living with a partner, 2 for widow/widower, 3 for divorced or separated and 4 for never married. Married, which assumed a value of 0 in our data, was the omitted variable in theregression.	Positive for Married andnegative for the other categories.
Inheritance		Inheritance is a regressor variable.	Positive
Individual Wealth	NIDS	As computed in the NIDS: The individual net worth variable is a regressand variable. = Total Assets - Total debts Total Assets = Real Estate + Business Equity + Value of Vehicles + Financial Assets (includes bankaccounts and stock) + Superannuation (Pensions/Retirement Annuity) + Possessions Total Debts = Real Estate Debts + Business Debt + Vehicle Finance Debt + Financial (loans)	

The Stata software [14] was used to clean the data and analyse the within-group wealth inequality relationship in South Africa. Each variable was cleaned by dropping those questions which the respondent did not provide an answer or gave a misleading or non-related resp onse to that specific question. Furthermore, the survey data was weighted to address the problem of attrition due to high non-response among high-income earners or the wealthy. This was to ensure that the sample represented the entire population before estimation (Himelein, 2014). Wealth data normally suffers from outliers which tend to skew the distribution. Outliers in a sample can represent two things: the error in data collection, or a true

[14] The Stata software is a powerful analytical tool that caters for survey data analysis. See https://www.stata.com/

reflection of the population. Daniel et al. (2016) posit that due to high attrition in the NIDS as a result of high non-responses, the data has lost its accuracy over time. Any panel analysis of outliers in a single-time period may cause further attrition, making it less accurate in representing the South African population. Due to this, Daniel et al. (2016) chose not to eliminate any data which may have been deemed as an outlier in their analysis.

Although there was a top-up in Wave 5, to deal with attrition observed by Daniel et al. (2016) in previous waves, it appears to be minor. This point is raised by Branson (2018), taking into considerationthat the sample size selected was 8 202 households but only 1 008 were successfully interviewed, with72% of the sample refusing to participate. Even if the household agreed to participate, only 73% of residents agreed to participate at individual level (see SALDRU, 2018). This may imply that Wave 5 may still suffer from the same attrition as observed in the previous waves. However, Daniel and Khan (2019) state that the top-up sample did improve the quality of WAVE 5.

Therefore, this paper takes all the observations about the data mentioned above into account. Initially the paper runs its first estimation without removing the outliers to avoid any further possible attrition to the data. The second estimation does correct for possible outliers, as SALDRU (2018) mentions that possible outliers were not removed from the data set. The BACON algorithm is used to detect the outliers following the 2018 NIDS team methodology. The researcher then uses the winsorized method to limit the effect of outliers. The results for both estimations are analysed for comparison. Methods of estimation are discussed in Section 5.

The individual net-worth variable is transformed using the inverse hyperbolic sine transformation (IHST), which allows all values (including zero) of the individual wealth to be transformed in order that the distribution of the individual net worth better approximates a normal distribution. Note that thenegative value could mean that the individual has more debt than assets, making his/her net worth negative (for more about IHST see Friedline, Masa and Chowa, 2015).

4.1 Descriptive Statistics

Descriptive statistics were performed to determine the wealth characteristics of racial group. The correlation matrix is also presented to establish the relationship between the dependent and independentvariables for each racial group. Graphs that highlight wealth distribution are presented. Another way inwhich wealth distribution within each sub-group is presented is by means of percentiles: the 90th – 100th percentile represents those who are wealthy, the 50th – 90th percentile represents the middle class, and the 0 – 40th percentile represents those who are impoverished.

The paper used quantile regression in its estimation, which will be discussed in section 5. The caveat here is that quantile regression, despite the fact that it satisfies the population independence, normalisation and scale invariance properties, it does not meet the transfer principle, i.e. because quantiles do not satisfy the sub-group consistency property. The paper also used the Gini coefficient tomeasure within-race inequality, which is discussed in detail in the ensuing section. However, althoughit is a good measure in certain instances, it is extremely sensitive to the middle (5–9) changes relative to the extreme end of the distribution where most inequality changes occur. It is also less sensitive at high levels of inequality (Cobham, Schlögl & Sumner, 2015). Accordingly, the researcher chose to include the Palma ratio[15], as recommended by Doyle and Stigliz (2014) and Cobham et al. (2015) to make the analysis of intra-racial wealth inequality more robust.

Cobham et al. (2015) posit that the Palma ratio brings to light hidden or partially hidden inequality in the part of the distribution that is likely most relevant, which is the richest and the poorest. Palma (2006,2011, 2014a & 2014b) posits that the part of the distribution that is most important is the top 10% and the bottom 40% since the population in between is more stable, with inequality determined by the top 10% and the bottom 40% of the distribution, irrespective of country and time.

[15] The Palma ratio is named after Jose Gabriel Palma. It is defined as the ratio of national income shares of thetop 10% to the bottom 40% of households (see Palmer, 2006, 2011, 2014a and 2014).

There are a number of critiques directed to the Palma ratio as a tool to study inequality which the paper will not discuss (for example, see Krozer, 2015). Piketty also cautions against concentrating on the topend of the distribution due to under-representation of the wealthy in sample surveys. However, due to the fact that Daniels et al. (2019) found NIDS Wave 5 to be much more of a representative survey of the population due to the white, Indian and high-earners top-up sample, this paper will instead explorethe ends of the distribution using the Palma ratio.

4.2 Gini Coefficient and Lorenz Curve

The Gini coefficient is a conventional method used to compare income and wealth inequality within and between groups. There is ample literature expounding the use of the Gini coefficient as a tool to analyse income and wealth inequality (Aronson et al., 1993; Decoster et al., 2005; Murthy et al., 2010).Lambert and& Aronson (1993) separate the Gini coefficient of income inequality into between-group and within-group contributions. The Gini coefficient is constructed as follows:

$$G = G_B + \sum a_k G_k + R$$

Where G is the Gini coefficient and the population sub-groups are indexed by k=1, 2,…., n and G_B is the between-group's Gini coefficient, defined as the one that would be obtained if all the wealth in every sub-group were to be replaced by the relevant sub-group's mean, i.e. a_k is the product of population share and the wealth share sub-group k, G_k is the Gini coefficient for wealth within sub-group k and R is a residual that is zero if the sub-groups' wealth ranges do not overlap. Let the wealth be represented by $x_1, x_2, \ldots\ldots, x_N$ in the population, call φ, the average of which is μ, be partitioned into n sub-groups φ_k of sizes N_K with mean μ_k. Assume that in a hypothetical prior state there was no wealth inequality, then wealth $\mu N = \sum N_k \mu_k$ was equally distributed throughout φ so that everybody received μ.

The bottom 100p% of the wealth units in the wealth parade would have 100p% of total wealth under this regime. When inequality is introduced, the wealth share of these people falls to L(p); say that L(p)is the Lorenz curve. The transformation:→ $L(p)$, is a downward shift, measured in area terms by the Gini coefficient:

$$G = \int_0^1 [p - L(p)]dp$$

The equation presented above is the Gini coefficient for the sample of interest. This paper's analysis does not merely identify the presence of within-group wealth inequality but also establishes the driversof such wealth inequality. Two estimation regression models are used to determine the drivers of within- group wealth inequality: the ordinary linear regression (OLS) and quantile regression (QR). Due to thepossibility that the OLS may suffer from misspecification, error quantile regression was also used for inference comparison.

4.3 Methods of Estimation

4.3.1 The OLS Regression Model

The OLS regression model used to estimate the determinant of intra-wealth inequality in South Africanhouseholds takes the following form.

$$Y_i = \beta_0 + \beta_i X_i + \varepsilon_i$$

Where Y_i is the individual wealth and X_i is the vector of factors deemed to be determinants of intra- wealth inequality, which include education, inheritance, gender, marital status and age, and ε_i is the disturbance term that encompasses all other uncontrolled factors in the model. This regression will be estimated for each group (African, Coloured, Indian and white) separately using race as a distinguisherof the group. The researcher then analyses how those variables that correlate with wealth affect inequality within each group. All the assumptions of classical linear regression are assumed for the undertaking of the estimation. Using the classical normal distribution assumption about the error terms, i.e. that they are individuallyand identically normally distributed with a zero mean and a constant variance, the same attribute is given to the beta

parameters obtained, as they are the results of the minimisation of error terms that are normally distributed. Provided the assumptions of classical regression are satisfied, the paper can make inferences about intra-group wealth inequality in South Africa. As most of the data points were qualitative responses such as gender, marital status and education, the paper adopted the ANCOVA, which is an admixture of quantitative and qualitative variables that allow one to control for the effects of quantitative regressors (covariates) in a model that includes both quantitative and qualitative data (Gujarati & Porter, 2009).

The estimate model for the regression takes the following form:

$$Y_i = \beta_1 + \beta_2 D_{2i} + \beta_3 D_{3i} + \beta_n D_{ni} + \beta_4 X_i + u_i$$

Where Y_i is individual wealth and D_{2i} is a dummy variable that will take a value of 1 if the gender is female and zero otherwise. Similarly, D_{3i} is a dummy variable[16] that captures different qualitative aspects of the data such as education, which is put into four categories as explained in the data section, and X_i is a vector of other non-qualitative control variables such as age. The dummy variable trap is avoided by excluding one category and utilising it as a benchmark in the analysis. The inclusion of numerous regressors is likely to proliferate many degrees of freedom and to adversely affect the precision of the estimators, and appropriate modifications were made to control such limitations.

4.3.2 Quantile Regression

OLS estimates often rely on assumptions that are not admissible with real data, especially with regard to the residual distributions. OLS would only be sufficient in the context that the dependent variable and independent variables follow a bivariate normal distribution. The quantile regression is preferred, as it makes no such assumption about the distribution of the residuals. If the individual wealth variable is bimodal or multimodal, then quantile regression is appropriate for the analysis. Quantile regression involves constructing a set of regression curves for the various quantiles of the conditional distribution of the dependent variable

[16] See the data transformation section in the data section to see how the dummy variables are constructed for each variable used in this study.

(Koenker & Portnoy, 1999). Quantile regression estimates provide a more detailed analysis of the entire relationship between the regressands and regressors than a standard regression model (Koenker, 2005). As the individual wealth and income variables were highly skewed,the study was interested in what predicts the median individual wealth rather than the average individual wealth. Koenker and Hallock (2001) minimised a sum of asymmetrically weighted absolute residuals, by differing weights to the negative and positive residuals as follow:

$$Min_{\xi \varepsilon R} \sum \rho_\tau \left(Y_i - \xi\right) = Min_{\beta \varepsilon R} \rho \sum \rho_\tau \left(Y_i - \xi(\chi, \beta)\right)$$

Where ρ_τ is the absolute value which gives the τth sample quantile as its solution. The assumption is that $\rho_\tau = 0.5$. The estimate found here will be asymptotically normally distributed, more robust and free form outliers and non-normal error than OLS, hence the preference of quantile for this study's analysis. The quantile regression is again estimated for each group (African, Coloured, Indian and white) using race as an identifier of the group, followed by an analyses of how variables such as age, gender, marital status and inheritance, which are correlated with individual wealth, affect inequality within each of these groups. The ensuing section provides an empirical analysis of the regression results, beginning with the descriptive statistics, the correlation and the regression analysis.

Chapter Five

Empirical Results and Analysis

5.1 Descriptive Statistics Analysis

Table 5.1 hereunder depicts the descriptive statistics obtained after cleaning the dataset obtained from NIDS. It was observed that after transforming the individual wealth variable, 24 522 observations wereobtained with a mean of 20.367 units with the lowest individual wealth being -R16.966 units. The inheritance variable has an average of R119 628.34, with a maximum of R180 000. The notable observation is that the inheritance variable has 38 observations only in this dataset, as explained in Table 1. Age variable, which is another variable in the analysis, ranges from a value of 0 up to 110, with the average age being 27.95 years. The means have given the wealth and inheritance levels (OECD,2013). However, since means are quite sensitive to outliers, not much can be drawn from these two means.

Table 5.1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Wealth	24522	9.635	4.345	-16.966	20.367
Male	41831	.453	.498	0	1
Female	41831	.547	.498	0	1
Married	41831	.166	.372	0	1
With Partner	41831	.044	.204	0	1
Widow(er)	41831	.056	.23	0	1
Divorced	41831	.015	.123	0	1
Never married	41831	.363	.481	0	1
Edu 1	41831	.471	.499	0	1
Edu 2	41831	.791	.978	0	2
Edu 3	41831	.107	.555	0	3
Edu 4	41831	.105	.64	0	4

Inheritance	38	119628.34	328986.79	500	1800000
Cohort 1 (age 15-34)	28237	32.847	23.909	1	110
Cohort 2(age 35-48)	28237	29.884	22.594	2	110
Cohort 3 (age 49-110)	28237	21.718	14.068	3	48

Note: All the definitions for variables are as in Table 1 in the data section. Source: Self-computed using NIDS (Wave-5).

5.2 Pairwise Correlation

Table 5.2 hereunder depicts the correlation matrix. It shows that with regard to marital status individual wealth is positively correlated with being married, being a widow or widower and being divorced, with the highest degree of association being between married followed by those who are a widow/widower, while individuals who live with partners or never married have a negative association with individual wealth. The degree of correlation of individual wealth and marital status categorical variables is in line with the researcher's expectation and literature, except for divorced where its correlation with individual wealth is positive. According to literature, ever-divorced individuals hold less wealth than those who have continuously been married. It should be noted though that literature makes comparison between continuously married and ever-married individuals. The results show that it may still be betterto have been married than being single for the rest of a person's life. In terms of gender, being male orfemale has no significant association with individual wealth. In terms of education, individuals with education categorised as edu_1, edu_3 and edu_4 are positive and significantly associated with individual wealth. In terms of age cohort, individuals aged between 15 and 34 years and between 35 and 48 years are positive and significantly associated with individual wealth. Old age (49–110) has negative and significant association with individual wealth. Inheritance in our sample has no associationwith individual wealth – which could be explained by the fact that there are only 38 observations for inheritance in the data sample.

Table 5.2: Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) wealth	1.000															
(2) male	-0.005	1.000														
(3) female	0.005	-1.000	1.000													
(4) Married	0.210*	0.002	-0.002	1.000												
(5)WithPartner	-0.025*	0.015*	-0.015*	-0.095*	1.000											
(6) Widow(er)	0.117*	-0.161*	0.161*	-0.109*	-0.052*	1.000										
(7) Divorced	0.043*	0.022*	0.022*	-0.056*	-0.027*	-0.031*	1.000									
(8) Nevermarried	-0.256*	0.013*	-0.013*	-0.337*	-0.161*	-0.184*	-0.095*	1.000								
(9) edu_1	0.033*	0.017*	0.017*	0.171*	0.092*	0.085*	-0.063*	-0.488*	1.000							
(10) edu_2	0.119*	0.012*	0.012*	0.030*	0.081*	-0.066*	0.015*	0.470*	-0.763*	1.000						
(11) edu_3	0.017*	0.024*	0.024*	0.070*	0.037*	-0.006	0.029*	0.040*	-0.181*	-0.155*	1.000					
(12) edu_4	0.124*	0.001	-0.001	0.156*	0.012*	-0.008	0.051*	-0.042*	-0.155*	-0.133*	-0.032*	1.000				
(13)inheritance	0.250	0.307	-0.307	0.309	-0.058	-0.047		-0.193	-0.145	-0.040	-0.065	0.348*	1.000			
(14) Cohort 1	0.281*	-0.093*	0.093*	0.385*	0.012*	0.406*	0.108*	-0.628*	0.396*	-0.410*	0.032*	0.085*	0.331*	1.000		
(15) Cohort 2	0.183*	-0.068*	0.068*	0.170*	-0.069*	0.415*	0.039*	-0.357*	0.376*	-0.276*	-0.032*	0.020*	0.349*	0.621*	1.000	
(16) Cohort 3	-0.112*	0.037*	-0.037*	-0.075*	0.114*	-0.308*	-0.019*	0.172*	-0.316*	0.148*	0.079*	0.015*	-0.271	-0.290*	-0.847*	1.000

****p<0.01, **p<0.05, *p<0.1 Source: Self Computed using NIDS (Wave- 5)*

5.3 Gini Coefficient for Intra-Wealth Inequality in South Africa

Table 5.3 hereunder indicates the overall wealth Gini coefficients categorized by race in South Africa.Wealth inequality is extreme among Colored followed by blacks, whites and lastly, Asians/Indians. The population wealth inequality in South Africa is 0.91, which is significantly high, confirming the popular view that South Africa is one of the most unequal societies in the world. These results are in line with Orthofer's findings. However, these results do not provide sufficient statistic to base a conclusion about wealth distribution within each sub-group. This is due to the limitations posed by theGini coefficient as discussed in section 4.2. The Gini coefficient may not capture considerable changesthat may be taking place within each sub-group distribution (Daniel et al., 2014).

Table 5.3: Wealth Gini Coefficient categorised by race

Group	Estimate	STE	LB	UB
African	0.900	0.022	0.858	0.943
Coloured	0.947	0.029	0.890	1.004
Asian/Indian	0.814	0.027	0.760	0.868
White	0.834	0.034	0.767	0.901
Population	0.916	0.013	0.891	0.940

Index: Gini Index, Sampling weight: w5_pweight, Group variable: race. Source: Self-computed using NIDS (Wave-5)

5.4 The Percentile Share of Wealth Distribution

Table 5.4 in the appendix gives the percentile share of individual wealth distribution in South Africa. Itgenerally shows that the richest 10% of the population receive 86.6% of total individual wealth, while the 10% of poorest individuals were in debt (-0.6%). If individual wealth was distributed evenly, then all decile groups will receive 10%.

From Table 5.5 (5.5.1 to 5.5.4) in the appendix, which also shows the results of percentile distributionof wealth per race group, it can be observed that the top 10% acquires 84.05% of all individual wealth for African individuals, while the bottom 40% only acquires

0.0013% of all individual wealth in the African sample. The top 10% acquires 89.6% of all individual wealth in the Coloured population group, while the bottom 40% only acquires -0.01% of all individual wealth. The top 10% acquires 69.9% of all individual wealth in the Indian population group, while the bottom 40% only acquires 0.003% of all individual wealth. The top 10% acquires 73.5% of all individual wealth in the white population group,while the bottom 40% only acquires 0.006% of all individual wealth in this group. These results confirmthat inequality is more prevalent among the black and Coloured populations than the white and Asian/Indian individuals, as shown by the overall Gini coefficients in Table 5.3 above.

Furthermore, Table 5.5 (5.5.1 to 5.5.4) in the appendix included the Palma ratio categorisation of the individual wealth for different race group. The Palma ratio shows that for Africans, individual wealth of the top 10% was 637.34 times higher than that of the bottom 40%. For Coloured individuals, the top10% wealth was 135 less than that of the bottom 40%. In case of Indian individuals, the ratio shows that the wealth of the top 10% was 2225.39 times higher compared to that of the bottom 40% in the sample. Lastly, for white individuals' wealth, the top 10% wealth of white individuals was 116.87 times that of the bottom 40% in the sample.

Figure 5.4 in the appendix shows that if using the Lorenz curve to depict the individual wealth inequalityin South Africa, Coloured individuals are more unequal followed by African and Indian individuals, with the least unequal of the individual group being white individuals.

The most interesting observation that emerged from the Gini coefficient results and the percentile distribution was the high wealth concentration within the Coloured population compared to the black population. According to various literature sources on inequality, the black population has the highest level of income concentration, which one intuitively expects will translate to wealth concentration. From the Gini and percentile distribution, a conclusion can be reached that the Coloured population hasbeen unable to translate their income into wealth. This will be in line with literature that posit that highlevels of income do not automatically translate into wealth accumulation. The Palma ratio presents a hidden picture however about the Coloured population that could not be observed from the Gini coefficient. Although the Coloured population seems to have the highest inequality

compared to other sub-groups, the Palma ratio shows that the wealth held by the top 10% is no different than the bottom40% in terms of net worth, i.e. an individual with extremely high values of wealth is often very similarto an individual with extremely low levels of wealth due to their use of debt, as the wealthy individualneeds to be able to use her/his assets as collateral for the large liabilities that take her/him into negativenet worth, due to the value of the repayments exceeding the value of the assets.

5.5 Regression Analysis

Table 5.5, 5.6, 5.7 and 5.8 in this section presents the results obtained by regressing the standardised variables using ordinary least squares without inheritance, which has fewer observations (there are only38 observations for inheritance in the entire individual NIDS data Wave 5). For the first estimation, anypossible outliers were initially not removed from the data set. For the second analysis, before estimating,the BACON command was used to identify the presence of outliers, after which the extreme cases we removed. From the top quantile, 10% of outliers are identified and dropped. Since descriptive statisticsanalysis is based on data with outliers, to remain consistent the analysis below will be based on the same data set. The estimated results where outliers were controlled for are estimated and reported in the appendix. These results are contrasted with those estimated before controlling for outliers for both the OLS and quantile regression.

The results reported here are those before controlling for outliers, as they are deemed to reflect the truenature of the individual wealth in South African context. Using the survey regression where each regression is weighted accordingly to estimate for African individuals using ordinary least square, which gives a mean average of the variable contribution in explaining wealth and quantile regression, which gives the median of the variable contribution, the following results are obtained:

5.5.1 OLS and Quantile Regression Estimation Analysis for African Individuals

5.5.1.1 OLS Regression Analysis

Under OLS, education categorised as edu_1, edu_2 and edu_3, is significant and has negative impact on individual wealth accumulation for Africans. Only edu_4 is significant and has a positive effect in explaining individual wealth for Africans. Per average, every

additional year of education under the edu_4 category increases individual wealth by 0.03 standard deviation, while an increase in one year ofeducation under the edu_1, edu_2 and edu_3 categories will result in individual wealth for African individuals decreasing by 0.05, 0.03 and 0.01 standard deviation, respectively.

African female individuals hold less wealth than their male counterpart. Being a black female will leadto a 0.02 standard deviation less wealth compared to their African male counterpart. In terms of maritalstatus, using married as a benchmark, it can be seen that African individuals living with partners have a 0.061 standard deviation less wealth compared to those who are married. Other marital status categories are not significant under ordinary least square analysis.

In terms of age, age was categorised into three categories: cohort 1 individuals aged between 15 and 34, cohort 2 individuals aged 35 to 48, and cohort 3 individuals aged 49 to 110, which is the maximumage in our sample. All cohorts are significant. Cohort 1 has a positive effect in explaining individual wealth for African individuals, while cohort 2 and cohort 3 have a negative effect in explaining individual wealth. African individuals between the age of 15 and 34 have 0.0012 standard deviation more individual wealth, while those aged between 35 and 48 and 49 and 100 years have 0.0012 and 0.002 standard deviation less wealth, respectively.

5.5.1.2 Quantile Regression Analysis

Using survey quantile regression to analyse the sample for African individuals at 0.1, 0.25, 0.5, 0.75 and 0.9 quantiles, it can be seen that the effect of edu_1 on individual wealth differs, having a negativeeffect and stronger magnitude effect on individual wealth for Africans in lower quantiles than higher quantiles. Under this category, the 0.9 quantile estimate is approximately the same as the ordinary leastsquare point estimate. Similarly, under the other categories of education, namely edu_2 and edu_3, similar patterns can be observed, as a negative effect and the magnitude of impact edu_2 and edu_3 have on wealth accumulation decreases when moving from the 0.1 quantile to those in the 0.9 quantile. There is no clear close relation between the estimate of OLS and quantile estimates in this case. Edu_4has a positive effect on wealth accumulation, while its magnitude of impact increases when moving from the 0.1 quantile to 0.9 quantile. The

results align with literature on education, in that individuals with low education have a lower chance of accumulating wealth, while those who are educated have a greater chance of accumulating wealth. Put another way, those who are wealthy are likely to be highly educated. It is surprising however that edu_4 is not statistically significant in the 0.1 quantile.

In terms of gender, the point estimate is close to the quantile estimation obtained at 0.9 percentile. A negative effect on wealth can be observed by merely being female. The magnitude of impact that beingfemale has on wealth decreases when moving from the 0.1 quantile to those in the 0.9 quantile. The effect is opposite for males, as they are the benchmark. This is also in line with literature on gender wealth gap, which states that due to the gender wage gap, where males tend to earn more than women,males thus have an advantage of accumulating more wealth.

In terms of marital status, mixed results were also found. Living with a partner, the point estimate of the OLS is almost equal to that of the 0.9 quantile estimate. The sign and significance remain consistentas with those obtained for the point estimate. Living with a partner adversely affected individual wealth, with the magnitude effect being highly pronounced in quantile 0.1 to 0.5, and less pronounced in quantile 0.75 to 0.9. Being a widow/widower is only negative and significant at the 0.25, 0.5 and 0.75 quantile. The magnitude effect if higher at the 0.5 quantile, compared to those at quantile 0.5 and 075. Being divorced or separated is negative and significant in explaining individual wealth at the 0.1, 0.25and 0.5 percentile, with the magnitude effect is higher at the 0.1 quantile and weaker at the median. African individuals who never married attain less individual wealth at all quantile levels compared to those who are married. Again, the magnitude effect is stronger in the 0.1 to 0.5 quantiles and lower in the 0.75 and 0.9 quantiles. Overall, the estimates for both OLS and quantile regression on marital statusfollow the literature, as due to resource pooling married individuals have more wealth compared to those who are living with a partner, widow/widower, divorced or separated and never married. Most of the resource pooling which aids in accumulating wealth appears to happen in the top quantiles.

Lastly, age cohort 1, 2 and 3 maintain the signs observed at point estimate with individuals in cohort 1having a positive effect on individual wealth, while age in cohort 2 and 3 has

an adverse effect on individual wealth for African individuals. The magnitude effect observed in the 0.1 to 0.5 quantile, is expected as the lowest quantile has less wealth to begin with. For cohort 3 the effect is as expected, since as one gets older his/her individual wealth declines as a result of dissaving. However, cohort 2 isexperiencing dissaving which is not expected. This is due to the fact that this cohort is still supposed tobe active in the labour market, which according to LHC, should allow this cohort to save therefore accumulate wealth. This means LHC does not hold in this sub-group which is in line with Ngwenya etal. (2014) that the LHC does not hold in South Africa, especially within the previously disadvantaged racial group. These findings are also in line with Augustine (2016). Dropping the extreme outlier (see table 6 in the appendix), the sign and significance of the results do not change, but the size of the coefficients vary from variable to variable. The goodness of fit and Pseudo R-squared improved substantially after controlling for outliers, with some increasing in value and others decreasing in value.

However, it should be noted that all our OLS results are invalid as some of the OLS assumption areviolated, such as the linearity assumption; there is a curvilinear function between age and wealth.

Table 5.5: Models of individual's wealth for African via OLS and QR

	OLS	Q (0.10)	Q (0.25)	Q (0.50)	Q (0.75)	Q (0.90)
edu_1	-0.0520***	-0.00024***	-0.00107***	-0.00360***	-0.0161***	-0.0639***
edu_2	-0.0344***	-0.00016***	-0.00067***	-0.00266***	-0.0137***	-0.0575***
edu_3	-0.0131***	-0.0000440	-0.00017***	-0.00065***	-0.00418***	-0.0195***
edu_4	0.0313***	0.0000731	0.00113**	0.0136***	0.0463***	0.0861***
Female	-0.0155**	-0.000026	-0.00029***	-0.00070***	-0.00178***	-0.00539***
Living with partner	-0.0607***	-0.00103***	-0.00276***	-0.00840***	-0.0280***	-0.0801***
Widow/widower	-0.0164	0.000439	-0.000980**	-0.00256**	-0.0102***	-0.0250
Divorced or separated	0.0120	-0.000656*	-0.00195***	-0.00458***	-0.00360	-0.00983
Never Married	-0.0617***	-0.00111***	-0.00297***	-0.00945***	-0.0306***	-0.0870***
Cohort 1	0.00119***	0.000016***	0.000051***	0.000107***	0.000293***	0.000799***

Cohort 2	-0.00118***	-0.0000011	-0.000012**	-0.00003***	-0.00012***	-0.00037***
Cohort 3.	-0.00180***	-0.00003***	-0.00005***	-0.00009***	-0.00028***	-0.00082***
R-Square	0.11	0.005	0.02	0.05	0.11	0.20
N	13020	19367	19367	19367	19367	19367

t statistics in parentheses, Self computed using NIDS Wave 5
** p < 0.05, ** p < 0.01, *** p < 0.001*

5.5.2 OLS and Quantile Regression Estimation Analysis for Coloured Individuals

*5.5.*2.1 OLS regression analysis

Estimating results for Coloured individuals using ordinary OLS, it can be observed that education categorised as edu_1 is the only variable that is significant in explaining individual wealth negatively for Coloured individuals. For every additional year of education under the category edu_1, a person's wealth declines by 0.11 standard deviation for Coloured individuals. Education under the categories edu_2 and edu_4 has a positive sign but is not significant in explaining individual wealth for Coloured individuals. Similarly, all other covariates under the OLS maintain the same sign as those of African individuals, but are not significant in explaining individual wealth for Coloured individuals. This meansthat OLS is not the best estimator for the Coloured population.

5.5.2.2 Quantile regression analysis

Using survey quantile regression to analyse the sample for Coloured individuals at 0.1, 0.25, 0.5, 0.75 and 0.9 quantile terms of education, edu_1 is negative and significant under the 0.25, 0.50, 0.75 and 0.9quantile with a magnitude effect stronger in the 0.25 and 0.5 quantile and weaker in the 0.75 and 0.9 quantile. The top quantile (0.9) estimation is smaller than those obtained by OLS point estimates. Similarly, although at different levels of significance, edu_2 and edu_3 show the same patterns as edu_1, with the negative and magnitude effect of edu_2 and edu_3 found to be strong for individuals in the 0.25 and 0.5 quantile and weaker for individuals in the 0.75 and 0.9 quantile. However, edu_3 is insignificant at the 0.075 quantile. Edu_4 has a positive and significant effect in explaining individual wealth for individuals in the 0.5 and 0.75 percentile although at different levels of significance, with the magnitude effect higher in the 0.75 quantile. Although the picture

of education does not follow thesame precise picture as that of the African population, overall the same conclusion – that individuals with high levels of education may lead to high levels of wealth – can be reached.

In terms of marital status, where married is the benchmark, it can be observed that those living with partners hold less wealth in each quantile compared to their married counterparts. The magnitude effectdecreases when moving from the 0.1 to 0.9 quantile. For individuals who are either a widow or widower,their wealth is negative and significant under the 0.25 and 0.5 quantile, with the magnitude effect stronger in the 0.25 quantile than 0.25 quantile. For divorced or separated individuals, the estimate is only negative and significant under the 0.25 quantile, where Coloured individuals held less wealth compared to the benchmark. Living with a partner and never married seem to matter more in the Coloured population, as covariance is statistically significant in all quantiles. An individual who is married holds more wealth than those who are living with partners and never married, which is in line with literature discussed under marital status, which state that resource pooling that aids in wealth accumulation occurs within the institute of marriage.

Lastly, age cohort 1 is positive and significant in explaining individual wealth. The magnitude effect isstronger in the top quantile compared to the lower quantiles. Under cohort 2, it can be observed that only the estimates in the median quantile are negative and significant in explaining individual wealth for Coloured individuals. Similarly, individuals whose age falls in cohort 3 hold less wealth in all quantiles, with the effect being stronger in the lower quantiles and weaker in the higher quantiles. Peoplewho are older in the lower quantiles hold less wealth compared to those who are older in higher quantiles. Again, since there is dissaving in cohort 2, the LHC does not hold. For Coloured individuals,when controlling for outliers (see table 7 in the appendix), the point estimate for never married and cohort 1 become significant, contrary to the initial results obtained before controlling for outliers. The quantile regression maintains the same sign and significance. The goodness of fit and Pseudo R-squared improved substantially after controlling for outliers.

Table 5.6: Models of individual's wealth for Coloured via OLS and QR

	OLS	Q (0.10)	Q (0.25)	Q (0.50)	Q (0.75)	Q (0.90)
du_1	-0.106*	0.0000858	-0.00182***	-0.00681***	-0.0437***	-0.133***
du_2	0.00631	0.0000972	-0.00132**	-0.00581**	-0.0412***	-0.125***
du_3	-0.0114	0.0000408	-0.000431*	-0.00155*	-0.0112	-0.0255*
du_4	0.0208	0.00109	0.00631	0.0283**	0.0550***	0.0535
Female	-0.145	-0.0000135	-0.00047***	-0.00068***	-0.000999*	-0.00347
Living with partner	-0.161	-0.00085***	-0.00269***	-0.00895***	-0.0280***	-0.0841***
Widow(ers)	-0.183	0.000721	-0.00159**	-0.00610**	-0.00740	-0.0125
Divorced or separated	-0.190	0.0000885	-0.00211*	-0.000279	-0.00126	0.0688
Never married	-0.197	-0.00086***	-0.00276***	-0.00974***	-0.0288***	-0.0869***
Cohort 1 (age 15-34)	0.00421	0.0000084**	0.000062***	0.000101***	0.000204***	0.000555***
Cohort 2 (age 35-48)	-0.00645	0.00000373	-0.0000158	-0.0000327*	0.00000089	-0.000168
Cohort 3 (age 49-110)	-0.0145	-0.0000105	-0.00006***	-0.000076**	-0.000161*	-0.000593*
R-square	0.02	0.003	0.02	0.05	0.11	0.19
N	2339	3271	3271	3271	3271	3271

t statistics in parentheses, Self Computed using NIDS Wave 5
** p < 0.05, ** p < 0.01, *** p < 0.001*

5.5.3 OLS and Quantile Regression Estimation for Indian Individuals

5.5.3.1 OLS regression analysis

Estimating results for Indian individuals using ordinary OLS, it can be observed that edu_1, edu_2 andedu_3 are negative and significant while edu_4 is insignificant. For every one year of education attainedunder the first three education categories, individual wealth for Indian individuals declined by 0.6, 0.5and 0.2 standard deviation, respectively. Under marital status, where being married is the benchmark, only never married is significant in explaining individual wealth. Not being married results in individual wealth of 0.3 standard deviation less compared to being married. Gender is statistically insignificant inexplaining individual wealth.

5.5.3.2 Quantile regression analysis

When results are estimated using survey quantile regression under the 0.1, 0.25, 0.5, 0.75 and 0.9 percentile for Indian individuals, it can be observed that under the education category, only edu_1 andedu_4 are found to be significant, but not for all quantiles. Edu_1 is negative and significant in the 0.25, 0.5 and 0.75 quantiles. The magnitude effect of edu_1 in explaining individual wealth is higher in the

0.25 and 0.5 quantile compared to the 0.75 quantile. The point estimate of the OLS and quantiles regression results are substantially different. Edu_2 and edu_3 are insignificant at all quantile levels. Edu_4 is positive and significant at the 0.5 and 0.75 percentile in explaining individual wealth for Indianindividuals, with the magnitude effect highest in the 0.75 quantile.

Gender, where male is the benchmark, is insignificant. For marital status where being married is the benchmark, living with partner held less wealth compared to those who are married; the magnitude effect is only significant at the 0.75 percentile, where living with a partner has 0.09 less wealth compared to the benchmark. A widow/widower held more wealth in the 0.1 and 0.5 quantile comparedto those who are married, with the magnitude effect significant and higher in the 0.5 quantile. This alsoimplies that a widow/widower in the 0.1 quantile held less wealth compared to those in the 0.5 quantile.Those who are never married or separated held less wealth compared to those who are married at the 0.25, 0.5 and 0.75 quantile, with the magnitude effect higher in the 0.25 quantile compared to the 0.5 and 0.75 quantile.

With regard to age, where age is categorised into three cohorts, the results show that cohort 1 is positiveand significant in explaining wealth in the 0.25, 0.75 and 0.9 quantile, with the magnitude effect increasing when moving from the 0.25 to 0.9 quantile. Cohort 2 is only statistically significant in the 0.1 and 0.25 quantile in explaining wealth, with the magnitude effect higher in the 0.25 quantile compared to the 0.1 quantile. Cohort 3 is only statistically significant in the 0.25 quantile. In this sub- group LCH does not hold. The goodness of fit and Pseudo R-squared improved substantially after controlling for outliers (see table 8 in the appendix). When the extreme outliers are omitted, for Indianindividuals the results are mixed. Initially, the point estimate for the highest education was not

significant; however, when controlling for outliers it becomes significant, but all other education categories become insignificant. Therefore, the Indian sample suffers small variations, and any inference deduced therefrom thus needs to be treated with caution.

Table 5.7: Models of individual's wealth for Indian via OLS and QR

	OLS	Q (0.10)	Q (0.25)	Q (0.50)	Q (0.75)	Q (0.90)
edu_1	-0.569*	-0.00502	-0.0133*	-0.0277*	-0.116**	-0.235
edu_2	-0.457*	-0.00241	-0.00374	-0.00759	-0.0603	-0.133
edu_3	-0.176*	-0.00131	-0.00244	-0.00353	-0.0237	-0.0575
edu_4	-0.0974	0.000120	0.00322	0.0377*	0.0749*	0.119
Female	-0.0268	-0.0000175	-0.00251	-0.0101	-0.0212	-0.0343
Living with partner	-0.247	-0.00146	-0.00498	-0.0288	-0.0917*	-0.226
Widow/widower	-0.00809	0.00501***	0.00450	0.0621*	0.0479	-0.128
Divorced or separated	-0.550	0.000598	-0.00430	-0.0304	0.503	0.375
Never married	-0.289*	-0.00240	-0.00834**	-0.0345**	-0.0892*	-0.250
Cohort 1	0.00269	0.000145	0.000404*	0.00118	0.0026*	0.0063*
Cohort 2	-0.00372	-0.000163*	-0.000371*	-0.00111	-0.00177	-0.00656
Cohort 3	-0.00681	-0.000213	-0.000614*	-0.00120	-0.00172	-0.00853
R-square	0.002	0.006	0.02	0.07	0.12	0.14
N	166	438	438	438	438	438

t statistics in parentheses Self computed using NIDS Wave 5
** p < 0.05, ** p < 0.01, *** p < 0.001*

5.5.4 OLS and Quantile Regression Estimation Analysis for White Individuals

5.5.4.1 OLS regression analysis

Estimating results for white individuals using ordinary OLS, it can be observed that only higher education categorised as edu_4 and cohort 3 are significant in explaining individual wealth. For every one-year increase in higher education attainment for white individuals, their individual wealth increasesby 0.2 standard deviation. Cohort 3 has a negative effect in explaining individual wealth. Individuals incohort 3 will have 0.02 standard deviation less wealth compared to other cohorts.

5.5.4.2 Quantile regression analysis

When the results are estimated using quantile regression, it can be observed that edu_1, edu_2 and edu_3 follow the same pattern. Edu_1 is negative and significant in explaining individual wealth at the0.1, 0.75 and 0.9 percentile, with the magnitude effect decreasing when moving from the 0.1 to 0.9 quantile. The adverse effect of edu_2 is seen in all quantiles, with the magnitude effect higher in the 0.1, 0.25 and 0.5 quantile compared to the 0.75 and 0.9 quantile. The adverse effect of edu_3 is seen inthe 0.25 to 0.9 quantiles, with the magnitude effect decreasing when moving from the 0.25 to the 0.9 quantile. Edu_4 is the only category that is positively significant, with the magnitude effect increasingwhen moving from the 0.25 quantile to the 0.9 quantile. White individuals who have education categorised as edu_4 held higher wealth compared to other education categories. This is in line with literature, whereby high levels of education are highly correlated with high levels of wealth.

In terms of gender, it can be observed that being a white female is negative and statistically significantin the quantiles 0.25 to 0.75. This means that white female held less wealth than their male counterpartsin these quantiles, with the magnitude effect decreasing when moving from the 0.25 to 0.75 quantile. For marital status, where being married is a benchmark, living with a partner is only negative and significant in the 0.9 quantile, meaning that living with a partner adversely affects white individuals, asthey will hold less wealth than married individuals in this quantile. Widow/widower is negative and significant in the 0.25 quantile, meaning that a widow/widower holds less wealth in 0.25 percentile compared to their married counterparts. Divorced is negative and significant in the 0.25 quantile, meaning that divorced individuals hold less wealth compared to their married counterparts. Never married is negative and significant in the 0.75 and 0.9 quantiles, meaning that never married individuals hold less wealth in these quantiles compared to their married counterparts.

Lastly, in terms of age, cohort 1 is positive and significant in all quantiles, with the magnitude effect increasing when moving from the 0.1 to 0.9 quantile. Cohort 2 is negative and significant in the 0.25 and 0.5 quantiles, with the magnitude effect the same in both quantiles. Cohort 3 is negative and significant in the 0.25 to 0.75 quantiles, with the magnitude effect increasing when moving from the 0.25 to 0.75 quantile. The LCH

does not hold for this sub-group.

Controlling for outliers in the white individual's sample, the results again are mixed at best for the OLS. For quantile regression the result remained relatively the same as when outliers were not controlled for(See Table 9 in the appendix). This finding emphasises the need to run the results without controlling for outliers due to attrition in this sub-group. Though the goodness of fit and Pseudo R-squared improved after controlling for outliers.

Table 5.8: Models of individual's wealth for White via OLS and QR

	OLS	Q (0.10)	Q (0.25)	Q (0.50)	Q (0.75)	Q (0.90)
edu_1	0.0177	-0.0164***	-0.0328	-0.0720	-0.151***	-0.526**
edu_2	-0.050	-0.00851**	-0.0219***	-0.0703***	-0.140***	-0.487**
edu_3	-0.011	-0.00328	-0.0116**	-0.0276***	-0.0334*	-0.175**
edu_4	0.205*	0.00345	0.0176***	0.0409***	0.121***	0.311***
Female	-0.111	-0.0105	-0.0389**	-0.0421**	-0.0563*	-0.138
Living with partner	0.135	-0.0107	-0.00614	-0.0186	-0.0812	-0.306*
Widow/widower	-0.111	-0.000823	-0.0518**	-0.0297	-0.0945	-0.0990
Divorced or separated	1.261	-0.00737	-0.0415*	-0.0368	0.00641	0.212
Never married	-0.091	0.0113	-0.0279	-0.0265	-0.107*	-0.329*
Cohort 1	0.0086	0.000669*	0.00193***	0.00365***	0.00535***	0.00731*
Cohort 2	-0.015	-0.000411	-0.00167***	-0.00165*	-0.00117	-0.00183
Cohort 3	-0.022*	-0.000913	-0.00335***	-0.00554***	-0.00671**	-0.00855
R-Square	0.16	0.01	0.04	0.08	0.11	0.15
N	365	1388	1388	1388	1388	1388

t statistics in parentheses Self computed using NIDS Wave 5
** p < 0.05, ** p < 0.01, *** p < 0.001*

Chapter Six

Conclusion

6.1 Conclusion to the Research

This paper's objective was to identify the drivers of within-group wealth inequality in South Africa, asexisting literature highlights that within-race inequality is the driving force behind the high level of inequality in South Africa. The variables that were utilised were selected based on an analysis of relevant literature. Using descriptive statistics and statistical analyses, the paper found that age, education, gender and marital status determine individual wealth accumulation within races in South Africa due to their statistical significance, although some of these variables did not have a significant effect on some of the sub-groups. However, the results consistently show that education and gender, play a huge role in one's ability to accumulate wealth for all sub-groups. Individuals with lower levelsof education hold less wealth than those who have tertiary education. There exists gender wealth gap in all sub-groups as females hold less wealth than their male counter. The results also show that it is not only that individuals tend to have unequal access to wealth-enhancing characteristics or resources, butthat individual wealth tends to vary greatly between race groups.

The biggest wealth inequality is observed within the African and Coloured race. These are the racial groups that were adversely affected the most by the apartheid policies. These are also the racial groupsthat BEE and Affirmative Action policies have been targeting the most in order to level of the playing field with the other sub-groups. However, inequality does not seem to be narrowing. This substantiatesthe notion that the individual wealth gap can be attributed to both historical injustices and ongoing policy choices in South Africa. These results reflect a lack of economic inclusivity in South African society, which implies that the majority of the citizens do not have a reasonable opportunity to obtain the resources they need to live a dignified life. The government must therefore strive to increase economic inclusivity if it is to create a stable society.

To address the rising wealth gap in the country, the government needs to establish policies that promoteopportunities to grow one's wealth and formulate policies which address the pervasive inequality in South African society. This can be achieved by formulating

policies that will contribute to diminishing the wealth gap over time, for example, homeownership, quality education in line with market demands,and investing equally in the provision of the necessary infrastructure that enhances upward mobility across the country and not only in cities. The government can also devise a mechanism such as a racialwealth audit that will inform the distributional impact of such policies in the country.

Future research can explore the impact of other variables such as inheritance in understanding wealth inequality within race groups. The research can also be expanded by increasing the sample size and quality of the data. The sample employed for this study was small and incomplete for some of the casevariables.

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Data Source

Southern Africa Labour and Development Research Unit. National Income Dynamics Study 2017, Wave 5 [dataset]. Version 1.0.0 Cape Town: Southern Africa Labour and Development Research Unit [producer], 2018. Cape Town: DataFirst [distributor], 2018.

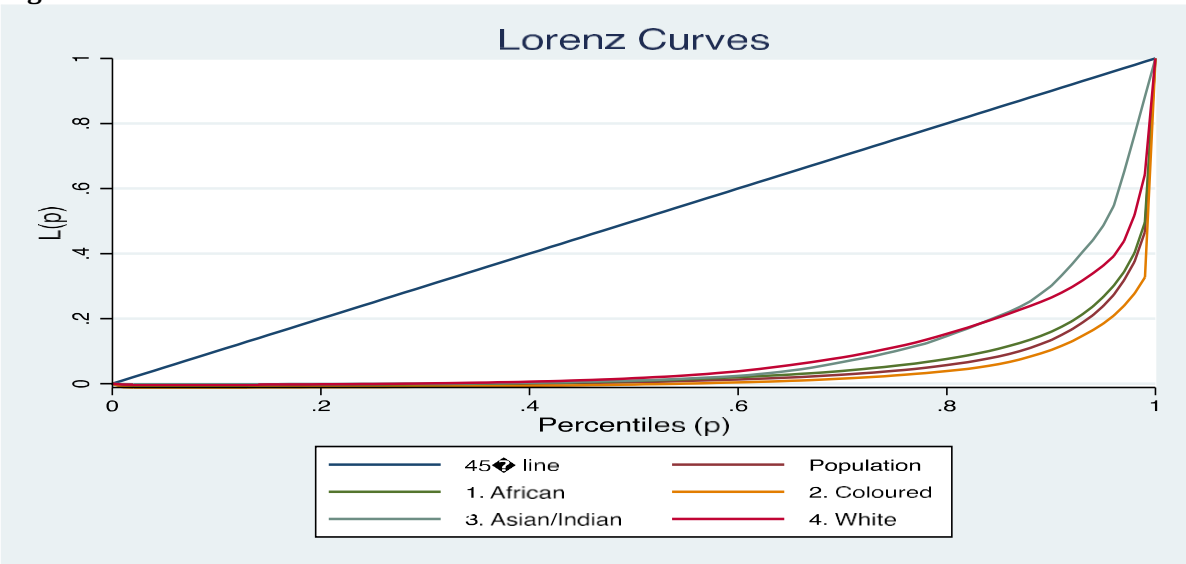
Appendix

Table 5.4: Percentile Share (percent) of Wealth in South Africa generally.

Wealth	Coefficient	Std. err	[95% Conf. Interval]
0-10	-.579369	.1457167	-.8649903 .2937476
10-20	.0856284	.0138163	-.8649903 -.2937476
20-30	.1821764	.0286675	.125985 .2383679
30-40	.3037946	.0478181	.2100657 .3975234
40-50	.4861762	.0762453	.3367267 .6356256
50-60	.8339262	.1303722	.5783819 1.089471
60-70	1.484158	.2321058	1.029204 1.939111
70-80	2.912556	.4527319	2.02515 3.799962
80-90	7.711056	1.190268	5.377996 10.04412
90-100	86.5799	2.065213	82.53185 90.62795

Source: Self computed using NIDS (Wave 5)

Figure 5.4: Lorenz curve for wealth distribution based on race.



Source: Self-computed using NIDS (Wave-5)

Table 5.5: Results of percentile distribution of wealth per race group.

Table 5.5.1 Results of percentile distribution of wealth for Black individuals.

Wealth	Coefficient	Std.err	[95% Cont. Interval]
0-40	.0013188	.0019809	-.002564 .0052016
40-90	.1581676	.0019809	.0912788 .2250564
90-100	.8405136	.0344592	.7729685 .9080587
Number of obs	13,037		
Palma	637.3357	962.7833	-1249.685 2524.356

Source: Self-computed using NIDS (Wave-5)

Table 5.5.2 Results of percentile distribution of wealth for Coloured individuals.

Wealth	Coefficient	Std.err	[95% Cont. Interval
0-40	-.0066253	.0055957	-.0175984 .0043478
40-90	.1105058	.0635451	-.0141049 .2351164
90-100	.8961195	.0599437	.7785712 1.013668
Number of obs	2,341		
Palma	135.258	120.0271	-370.5068 99.99076

Source: Self-computed using NIDS (Wave-5)

Table 5.5.3 Results of percentile distribution of wealth for Indian individuals.

Wealth	Coefficient	Std.err	[95% Cont. Interval
0-40	.0031023	.0022156	-.0012723 .0074769
40-90	.2976855	.0590293	.1811354 .4142356
90-100	.6992122	.0598881	.5809665 .8174579
Number of obs	166		
Palma	225.3865	169.6757	-107.1718 557.9448

Source: Self-computed using NIDS (Wave-5)

Table 5.5.4 Results of percentile distribution of wealth for White individuals

Wealth	Coefficient	Std.err	[95% Cont. Interval]
0-40	.0062937	.0028339	.0007209 .0118665
40-90	.2581611	.0624952	.135264 .3810581
90-100	.7355453	.0642046	.6092867 .8618038
Number of obs	365		
Palma	116.8707	59.46461	.3221993 233.4192

Source: Self-computed using NIDS (Wave-5)

Results After modifying outliers and re-estimating the results: Table 6: OLS and QR Regression results for African Individuals

	OLS	Q (0.10)	Q (0.25)	Q (0.50)	Q (0.75)	Q (0.90)
zedu_1	-0.0101***	-0.000201***	-0.000747***	-0.00244***	-0.00846***	-0.0200***
zedu_2	-0.00542***	-0.000131***	-0.000452***	-0.00169***	-0.00674***	-0.0158***
zedu_3	-0.00170***	-0.0000288	-0.0000986***	-0.000328**	-0.00174***	-0.00431***
zedu_4	0.00242**	-0.0000429	0.000227*	0.00162*	0.00644***	0.00728***
Female	-0.00250***	-0.000000442	-0.000203***	-0.000534***	-0.00131***	-0.00340***
Living with partner	-0.0117***	-0.000766***	-0.00229***	-0.00652***	-0.0181***	-0.0318***
Widow/widower	0.000317	0.000652**	-0.000682***	-0.00219*	-0.00385**	-0.00334
Divorced or separated	0.000682	-0.000517	-0.00189***	-0.00490***	-0.00473	-0.00189
Never married	-0.0132***	-0.000856***	-0.00243***	-0.00734***	-0.0199***	-0.0368***
cohort1	0.000384***	0.0000138***	0.0000445***	0.0000920***	0.000245***	0.000641***
cohort2	-0.00021***	-0.00000096	-0.00000261	-0.0000189***	-0.000078***	-0.00033***
cohort3	-0.00034***	-0.000021***	-0.000037***	-0.000057***	-0.000161***	-0.00044***
R-square	0.18	0.012	0.04	0.09	0.17	0.24
N	12528	18528	18528	18528	18528	18528

t statistics in parentheses, Source: Self-computed using NIDS (Wave-5)
** p < 0.05, ** p < 0.01, *** p < 0.001*

Table 7: OLS and QR Regression results for Coloured Individuals

	OLS	Q (0.10)	Q (0.25)	Q (0.50)	Q (0.75)	Q (0.90)
zedu_1	-0.0101	0.0000903	-0.00131***	-0.00397***	-0.0132***	-0.0253***
zedu_2	-0.00830	0.0000884	-0.000957**	-0.00320***	-0.0117***	-0.0208***
zedu_3	-0.00322	0.0000268	-0.000356**	-0.00103**	-0.00248	-0.00697***
zedu_4	0.00154	0.000218	0.00106	0.00543	0.00873**	0.00566**
Female	-0.00295	-3.10e-17	-0.000326*	-0.000460**	-0.000570	-0.000600
Living with partner	-0.00718	-0.000824***	-0.00224***	-0.00741***	-0.0200***	-0.0443***
Widow - widower	-0.00568	0.000493	-0.00134*	-0.00553***	-0.0116*	-0.0243
Divorced or separated	-0.00942	-0.000102	-0.00188**	-0.00315	-0.00344	-0.00272
Never married	-0.0153***	-0.000824***	-0.00234***	-0.00805***	-0.0208***	-0.0477***
Cohort 1	0.000245**	0.00000580*	0.0000563***	0.0000895**	0.000184**	0.000425***
Cohort 2	-0.0000206	0.00000593	-0.0000118	-0.0000212*	0.0000300	0.000106
Cohort 3	0.0000308	-0.00000593	-0.000046***	-0.000056***	-0.0000959	-0.000242
R-square	0.14	0.01	0.04	0.10	0.19	0.29
N	2219	3084	3084	3084	3084	3084

t statistics in parentheses, Source: Self-computed using NIDS (Wave-5)
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 8: OLS and QR Regression results for Indian Individuals

	OLS	Q (0.10)	Q (0.25)	Q (0.50)	Q (0.75)	Q (0.90)
zedu_1	-0.00984	-0.00254	-0.00730	-0.00956	-0.00661	-0.0122
zedu_2	-0.00477	-0.00225	-0.00256	-0.00136	-0.000758	-0.00545
zedu_3	-0.00107	-0.00122	-0.000758	0.00363	0.00144	-0.00332
zedu_4	0.0137***	-0.00320	-0.000490	0.00344	0.00924*	0.00684
Female	-0.0173	0.000430	-0.00111	-0.00382	-0.00933	-0.0135
Living with partner	-0.0472***	-0.000353	-0.00229	-0.00998	-0.0384	-0.0410*
Widow/widower	0.0697***	0.00475**	0.000946	0.0519	0.0538*	0.0248
Divorced orseparated	-0.0126	-0.00170	-0.00347	-0.0149	-0.0162	-0.0498
Never Married	-0.0202	-0.00101	-0.00429*	-0.0137**	-0.0400	-0.0418*
cohort1	0.000551	0.0000633	0.000182*	0.000486*	0.000911	0.00190***
cohort2	-0.000254	-0.0000883	-0.000131	-0.000451	-0.000612	-0.00139*
cohort3	-0.0000294	-0.0000671	-0.000302	-0.000537	-0.000343	-0.00121
R-square	0.41	0.02	0.05	0.12	0.28	0.30
N	131	331	331	331	331	331

t statistics in parentheses, *Source*: *Self-computed using NIDS (Wave-5)*
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 9: OLS and QR Regression results for White Individuals

	OLS	Q (0.10)	Q (0.25)	Q (0.50)	Q (0.75)	Q (0.90)
zedu_1	-0.0151	-0.000119	-0.00527	-0.0106	-0.00357	-0.0169**
zedu_2	-0.000269	0.00105	-0.00131	-0.00439	-0.00247	-0.00489
zedu_3	-0.00212	-0.00191*	-0.000962	-0.00273*	-0.00694*	-0.00462
zedu_4	0.00401	-0.00200	0.00105	0.00455**	0.00542*	0.00231
Female	-0.00606	-0.000011	-0.000161	-0.00141	-0.00542	-0.00191
Living with partner	0.0138	-0.00253	-0.00349	-0.0102	-0.00201	0.00738
Widow/widower	0.00113	-0.00297	0.000619	-0.00944	-0.0443**	-0.0663***
Divorced or separated	0.00213	0.00405	0.00107	0.00465	-0.0312*	-0.0380*
Never Married	0.00847	0.00371	0.00235	-0.00861	-0.0111	-0.00321
Cohort 1	0.00089*	0.000011	0.000125*	0.000236	0.0013**	0.00235***
Cohort 2	-0.0005	0.000169	0.000144	0.000193	0.00011	-0.000492
Cohort 3	-0.000084	0.000068	0.000107	0.000102	0.0006	0.000341
R-square	0.13	0.03	0.04	0.10	0.15	0.2
N	208	602	602	602	602	602

t statistics in parentheses, Source: Self-computed using NIDS (Wave-5)
** $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$*