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2023
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WITS SCHOOL OF GOVERNANCE
UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

INEQUALITY OF OPPORTUNITY IN SOUTH AFRICA

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A dissertation submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, School of Governance

in 50 percent fulfilment of the requirements for the degree Masters of Management in Development and Economics

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Date April 2022

ABSTRACT

Recent studies conducted in South Africa and other developing countries show that measuring the "unfair inequalities" in society (such as with income) that have an effect on one's abilities to achieve certain outcomes, can assist in better understanding total inequality. Statistics South Africa (Stats SA) is the government agency that is responsible for measuring and reporting inequality in the country. The purpose of this research is to contribute in providing an alternative view on how Stats SA can measure and report inequality in South Africa.

The study adopts the ex-ante view when measuring inequality of opportunity. Data used for the study was sourced from the Living Conditions Survey (LCS). The variables used in the study were divided into outcome, circumstance and effort. The outcome or dependent variable used for this research was individual income annualised and adjusted for inflation.

Results from the study show that individual employment status, individual years of schooling, race, parental educational level and employment status, sex of individual at birth and place of residence had the biggest effect on individual income in South Africa.

DECLARATION

I, **Andrid Angelique Booysen**, declare that this dissertation entitled *'Inequality of opportunity in South Africa'* is entirely my unaided work. The sources used have been accordingly acknowledged and referenced using the Publication Manual of the American Psychological Association (APA) 6th edition style. This completed work has not previously been submitted for any academic examination towards any qualification at any other university.

ABooysen

Andrid Angelique Booysen

Date - 30 March 2022

DEDICATION

This research is dedicated to my parents, Desmond and Chesmaine Booysen. Thank you for your continuous support throughout my academic career. You have both instilled the importance of education in me, from a very young age. Today, I can only thank God for blessing me with parents like you. I am so grateful that you are able to witness the fruits of your labour.

ACKNOWLEDGEMENTS

I would like to acknowledge my supervisor Professor Pundy Pillay, for his guidance, advice, friendship and most of all his patience, during this process. His supervision and support were invaluable to the success of this research.

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CHAPTER 1: “ONCE UPON A TIME”: INTRODUCTION AND BACKGROUND

1.1 Introduction

The rising level of inequality in all its forms has become a global problem; around the world, countries are reporting various levels of social and economic inequalities within and between them (Blackburn, 2008). South Africa, like the rest of the world, is not immune to the widening gap between the ‘haves’ and the ‘have-nots’.

Inequality levels as measured by the Gini Coefficient for income, remained persistently high over the last few decades, ranging between 0.68 and 0.66 from 1994 to 2015 (Francis & Webster, 2019). It is therefore not surprising that South Africa’s level of inequality has been ranked as the highest in the world (Francis & Webster, 2019; Mbeki & van der Berg, 2020; McLennan, Noble & Wright, 2016; Statistics South Africa, 2019; World Bank, 2018).

South Africa is a member of the United Nations (UN), and thus one of the countries which participates in achieving the global objectives as stated in the UN’s Sustainable Development Goals (SDGs). With specific reference to SDG 10, “reduce inequality within and among countries”, the South African government has an obligation to ensure that inequality is drastically reduced by 2030. Furthermore, the South African government has also identified reducing inequality along with eliminating poverty, as the two main objectives in the country’s long term development framework, the National Development Plan, Vision for 2030 (NDP), (National Planning Commission, 2011). However, attempting to address issues of poverty, inequality and unemployment is not foreign to the South African government. Since the end of the apartheid era, various programmes and policies such as the Reconstruction and Development Programme (RDP), Growth, Employment and Redistribution (GEAR), the Accelerated and Shared Growth Initiative for South Africa (AsgiSA) and the New Growth

Path, were all developed in an effort to, inter alia, redress social injustices, and reduce inequality (Chibba & Luiz, 2011; Francis & Webster, 2019). Furthermore, the South African government has also developed various poverty-alleviating programmes, such as the indigent register, social grants system, free basic education and healthcare, and school nutrition programmes. While the democratic government has made considerable efforts to reduce the inequalities caused by apartheid, the results of these efforts have not always been accurately reflected when official inequality is reported. This stems from the type of inequality index used when reporting official inequality, namely the Gini coefficient per capita income/expenditure. One could therefore argue that the manner in which South Africa measures and reports official inequality, is inadequate for the type of inequalities the country's citizens are subjected to.

In recent years, studies on equality, stemming from theories of justice, have emerged, particularly relating to "equality of opportunity". Although there are many opposing ideas about this concept, the one idea authors all agree on is that the differences experienced in individual outcomes are either due to factors within or beyond their control; thus, equalising opportunities means providing compensation for the factors that are outside one's control (Maniquet, 2004). These factors are also classified by others as "circumstances" and "efforts". Circumstances are defined as variables that a person has no control over, such as your sex, race and the place you are born, while efforts are those factors that lie within one's control and are as a result of choices or preferences (Ramos *&* Van de Gaer, 2016; Roemer, 2002). According to these authors and others, any inequalities resulting from circumstances are deemed unjust or morally unacceptable, while inequalities resulting from an individual's own efforts or preferences are seen as fair and morally acceptable (Roemer, 2002; Roemer *&* Trannoy, 2013). The opposing views arise in how authors define what an outcome is, and which of the two factors should be equalised: the efforts or the circumstances (Maniquet, 2004).

Given this relatively new field of inequality, the South African government has an opportunity to transform the manner in which policy and decision makers measure inequality, particularly for reporting on progress made towards achieving SDG 10, reducing inequality in all its forms, and the NDP target of reducing inequality by 2030.

By altering the approach used for measuring and reporting inequality in the country, South Africa would be able to significantly improve the measurement of progress towards achieving these global and local goals, as defined in the United Nations Sustainable Development Goals and South Africa's National Development Plan. Even though the probability of eliminating inequality entirely is not possible because individual income, social status and genetics will always differ, using a multidimensional approach when measuring inequality may assist in more efficient monitoring and reporting of inequality.

1.2 Background of the study

Inequality is something every person of colour in South Africa can relate to. While the White minority may not be oblivious to the injustices experienced daily by the previously disadvantaged, the reality of the situation is lived daily by most Black African, Coloured and Indian/Asian South Africans. This is an unfortunate consequence of the country's past.

South Africa is an upper-middle class country that is characterised by high levels of poverty, inequality and unemployment, coupled with low rates of economic growth (May, 1998; Woolard, 2002). According to scholars such as May, (1998); and Finn, Leibbrandt and Woolard, (2012), this is a direct result of the injustices caused by apartheid, which include racial segregation and poor or no access to basic services such as health, education and housing. Another major contributor to South Africa's high levels of poverty and inequality is the unfair labour practices pre-1994, where certain jobs were reserved for whites (May, 1998; Von Fintel, 2018; Wilson, 2011).

Based on South Africa's very unequal history, arising from the circumstances mentioned previously, it is not surprising that South Africa's income distribution is highly skewed.

Statistics South Africa (2019) reported that, based on the Palma ratio for per capita income, South Africans in the top 10,0 percent of the population earned 10,2 times more than those in the bottom 40,0 percent. When one compares this to other developing countries such as Brazil and India, where the top 10 percent earned 2,7 and 3 times respectively more than the bottom 40 percent of their populations (Trapeznikova, 2019), it becomes apparent that South Africa's income distribution is highly skewed. Notably, it is not surprising that recently published statistics by both the World Bank (2018) and Statistics South Africa (2017), show that South Africa is ranked as one of the most unequal countries in the World, with a Gini Coefficient (for income) of 0,68 (Statistics South Africa, 2017). Notwithstanding the slight decrease in the Gini coefficient based on per capita income from 0,76 in 2006 to its current level of 0,68 in 2015 (Statistics South Africa, 2017), inequality levels remained high over the past decade.

Additionally, as alluded to in the previous section, the South African government has developed various programmes and policies to assist individuals who are poor and live in the bottom two quintiles of the income spectrum.

These initiatives include but are not limited to, the setting up of an indigent register, which is used to provide qualifying poor households, with free basic municipal services; provision of RDP housing, which has recently been replaced with serviced plots; free basic education and healthcare, and social grants. Despite the fact that the government spends approximately R1,21 trillion per annum through the national budget (National Treasury, 2021), on the provision of social services, to assist in reducing the inequalities in society, Statistics South Africa (2017) reported that 55,5

percent of the population were still living in poverty according to the upper-bound poverty line[1].

Furthermore, only 85,0 percent of South African households were connected to the mains electricity supply; 88,2 percent had access to piped water (Statistics South Africa, 2020) and 63,7 percent (own calculation, Statistics South Africa, 2020) had access to a flush toilet. During 2019, approximately 31,0 percent of South Africans reported being recipients of social grants (Statistics South Africa, 2020).

The knock-on effect of the inequalities in the country are seen through the increase in public protests for service delivery, the rise in poverty levels, and most recently, the effects of the Corona virus pandemic on individuals and households in relation to their lack of access to decent healthcare, telecommunication tools for education purposes, and various kinds of social and financial support.

1.3 Problem Statement

The persistently high levels of inequality in South Africa, as reported by Statistics South Africa (2017), confirms that inequality must remain a serious policy concern. Initially, policy makers dealt with poverty, inequality and unemployment through focusing on economic growth (Chibba & Luiz, 2011); hence most of the official measurements of inequality are based on calculating the gap between individual incomes. In later years, the South African government started paying more attention to improving the social conditions of its people, hence the steady rise in the social wage bill. However, the manner in which the country reports official inequality does not adequately reflect this contribution. Arguably, the government's efforts to address social and economic injustices are therefore downplayed by the techniques used when measuring and reporting official inequality.

[1] The upper-bound poverty line for South Africa, is defined by Statistics South Africa (2017), as the food poverty line plus the average amount derived from non-food items of households whose food expenditure is equal to the food poverty line.

Statistics South Africa (Stats SA) is the government agency that is responsible for measuring and reporting inequality in the country. In addition, it is also the agency responsible for monitoring and reporting the progress South Africa makes towards achieving the UN's SDGs.
The measurements used by Stats SA for reporting inequality in South Africa, are primarily outcomes-based. Therefore, most policies and targets of development, aimed at measuring and reducing inequality in South Africa, are based on how much a household or individual earns, where earnings are generally based on income from work and other sources; their education levels, and in some instances their wealth status.

All the official inequality measures in South Africa are largely based on household survey data from the Living Conditions Survey, Income and Expenditure Survey, or the General Household Survey (Statistics South Africa, 2019). Furthermore, the inequality indices used to report "official inequality" in South Africa are the Gini Coefficient, [2]Theil index and the Palma ratio (Statistics South Africa, 2019). The problem with the current official measures of inequality, is that each of the indices is only used to estimate one aspect of inequality, namely, unequal outcomes, while neglecting other reasons that may have led to it.

By definition, the inequality of outcomes reflects inequalities that are due to social and economic differences, which result in skewed income distributions (Lefranc, Pistolesi & Trannoy, 2006). With the current official inequality indicators solely measuring the differences in individual outcomes, it fails to firstly identify the reason for these differences and secondly, to track the progress made in reducing the differences that cause these unequal outcomes. This therefore leads one to assume that the measures presently being used by Stats SA may be inadequate, as it

[2] The Theil is a statistical measure of inequality and is derived from the mathematical concept of entropy; entropy measures the probability of an event occurring weighted by its occurred probability of occurrence (E Roberto, 2016)

focuses solely on the monetary side of inequality, while failing to properly capture inequality resulting from the social injustices in the country.

Recent studies conducted in South Africa and other developing countries show that measuring the “unfair inequalities” in society that have an effect on one’s abilities to achieve certain outcomes, such as income, can assist in better understanding total inequality. These unfair inequalities are also known as “inequality of opportunity”. Even though the concept of inequality of opportunity is still new, it plays a critical part in understanding inequality in its totality (Brunori, 2017). If Statistics South Africa was able to quantify and track what proportion of total inequality can be attributed to the unfair inequalities in society; it could lead to an improved estimate of inequality.
The literature available on measuring inequality of opportunity in South Africa is, however, very limited. Amongst this literature is a report that was published by the World Bank (2018), titled “*Overcoming Poverty and Inequality in South Africa: An Assessment of Drivers, Constraints and Opportunities*”. The report made use of data from the Income and Expenditure Surveys (IES), Living Conditions Surveys (LCS) and the National Income Dynamic Studies (NIDS); however, when measuring inequality of opportunity, only the NIDS dataset was used. The publication focused mainly on assessing the levels of inequality of opportunity in South Africa and its impact on the life outcomes of children. The findings from the report established that circumstances such as race, parent’s education, and father’s occupation are the key contributors to inequality of opportunity in South Africa. The findings from this report are in line with some of the international studies on measuring inequality of opportunity. Bourguignon, Ferreira, and Menéndez (2005), for example, identified parents’ education as the circumstance contributing the most to an individual’s outcome in Brazil. Singh (2010), on the other hand, found that in India, father’s occupation and education level were the factors that had the greatest effect on individual life outcomes.

The question that now remains is whether the current approaches used by Stats SA to report inequality in South Africa could be improved upon; and which approach would be most? suitable for this purpose.

1.4 Research Purpose and Objective

For South Africa to be successful in reducing the persistently high levels of inequality, the method used by Stats SA to measure inequality needs to be reviewed. There is no doubt that the amount of work done by Stats SA on measuring and providing data to inform inequality reducing policies in South Africa is substantial, but as mentioned previously, the failure of these approaches to properly capture all forms of inequality in South Africa, is of concern.

Given South Africa's history of unfair and unequal opportunities based on race and spatial segregation, adopting an additional measure of inequality, specifically inequality of opportunity, holds great potential for significantly transforming the manner in which inequality is reported and possibly impacting on inequality reduction strategies.

The purpose of this research is thus to contribute in providing an alternative view, on how Stats SA can measure and report inequality in South Africa. There are three aspects to this research: a) first identifying the circumstance and effort variables that have a significant impact on an individual's income; b) second, estimating the contribution of these conditions to total inequality, and c) lastly, recommending certain improvements to the current data collection instrument used for gathering inequality data in South Africa. In doing so, Stats SA will be able to provide an improved tool to policy makers which will enhance evidence-based decision making when inequality reduction strategies are devised while simultaneously providing additional data for reporting on the SDGs and South Africa's NDP targets.

This report will hopefully add to what has already been done by Stats SA, in the field of measuring and reporting inequality, by providing the basis for developing a more robust official measure of inequality in South Africa.

The objectives of the study are to

- provide Statistics South Africa with an alternative or additional approach to measuring official inequality in South Africa;
- Determine what variables constitute “circumstances” and “efforts” in the South African context;
- Quantify the proportion of total inequality that can be attributed to inequality of opportunity;
- provide Stats SA with an additional, and possibly more effective domesticated, indicator for reporting progress on the UN’s SDGs; particularly SDG 10; and
- provide the South African government with additional data for monitoring progress on achieving the targets of the national development framework, the NDP

1.5 Research Questions

Understanding the conceptualisation and measurement of inequality of opportunity for South Africa is imperative for Stats SA and policy makers to better measure and address the high levels of inequality. If done successfully, this research report could contribute meaningfully to the current suite of indices used in measuring total inequality in South Africa.

The research question that this report will attempt to answer, as an input to improving the measurement of inequality in South Africa is,

- Which circumstance and effort variables, significantly impact the outcome variable – income?
- What proportion of total inequality can be attributed to inequality of opportunity?

The Research sub-question

- How will improving the techniques used to measure official inequality benefit Statistics South Africa and the South African government at large?

1.6 Structure of the report

Chapter one of the report provides an introduction and background to the study. It indicates the current situation with regards to inequality in South Africa, where the problem originates from and what has been done to try and remedy the situation. It further outlines the problem statement the research will seek to answer, the purpose and objectives of the study, and concludes with the questions this research attempts to answer.

Chapter two discusses the various scholarly research articles available on the different forms of inequality. The chapter begins with an introduction that provides a brief overview of inequality and highlights what will be discussed in subsequent sections. The remainder of the chapter delves deeper into previous studies already conducted on inequality of opportunity, the importance of understanding and measuring inequality of opportunity for South Africa, the theoretical framework of the research and concludes with the research hypothesis.

Chapter three provides the blueprint for the research conducted. It explains the research approach used, the type of data used for the research, how data was analysed and also notes the ethical considerations of the research and the positionality of the researcher.

Chapter four illustrates the results from the data analysed and provides brief interpretations of the results. In addition, this chapter lays the foundation for the further discussion on the results and the recommendations put forward, in the concluding chapter, namely chapter five.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The demographic landscape in South Africa is characterized by the troika of unemployment, poverty and inequality, with the majority of black Africans and coloureds living in poverty, while those in the Indian/Asian and white population groups have a disproportionate hold on economic power (Statistics South Africa, 2017, 2019). Furthermore, while nearly 42,0 percent of households are headed by females (Statistics South Africa, 2020), such households are found to be more vulnerable to an incidence of poverty compared to male-headed counterparts; 50,0 percent and 33,0 percent, respectively (Statistics South Africa, 2017). Similarly, the 59,3 percent of households headed by children (0-17years), are more prone to experiencing a higher incidence of poverty than any other age-cohort (Statistics South Africa, 2017).

A major contributor to these social ills in South Africa is the poor provision of public basic services, such as health, housing and education that poorer communities are subjected to (Statistics South Africa, 2020). Given these economic and social ills, achieving the egalitarian ideal in South Africa is a mammoth task, given the highly-skewed distribution of available resources. Furthermore, as a result of racial segregation during the apartheid era, individuals from the different population groups are not treated equally. Even though South Africa is 27 years into democracy, the devastating after-effects of the past are still rife, and have had a direct impact on the opportunities available to the poor black majority.

With the rising concern for reducing inequality, several new studies have emerged in the inequality literature. ‘Equality’ or ‘inequality of opportunity’ is a term that finds its roots in the theory of egalitarianism, where the concept of equality for all individuals forms the basis of the paradigm (Arneson, 2013). Hence, the egalitarian ideal, in which all persons in society are treated equally and all have an equal share, is the ultimate goal.

Furthermore, the concept seeks to eliminate inequalities that originate from situations outside one's control and hence are deemed to be morally wrong or unacceptable in society.

Checchi and Peragine (2010), as cited in Wendelspiess Chavez Juarez and Soloaga (2014). refers to this type of inequality as the 'ethically offensive' part of inequality, and is therefore undesirable. The question about what is seen as fair or unfair differs according to how individuals define social justice.

With the various concepts and interpretations of equality of opportunity available in the literature, each with its own unique viewpoint, determining which framework and measurement is most appropriate for understanding what these unfair inequalities are, is critical for correctly measuring total inequality in South Africa.

In order to gain an understanding of the inequality of opportunity in South Africa, one needs to have a holistic picture of inequality in the country. This chapter therefore analyses the literature on the various facets of inequality in South Africa, including the relationship between poverty and inequality; a general overview of inequality and the measurement thereof in South Africa; the impact of the Corona virus pandemic on inequality; and the problem with the official reporting of inequality. Thereafter, the 'inequality of opportunity' will be discussed, followed by the theoretical framework of the study. The chapter concludes with the hypotheses that will be tested in this report.

2.2 The nexus between poverty and inequality in South Africa

Poverty and inequality are inter-linked, especially in South Africa, where the injustices of the Apartheid regime had a profound impact on both phenomena (Chibba & Luiz, 2011; Francis & Webster, 2019; Mubangizi, 2018). It would therefore be irresponsible to mention one without making reference to the other. Since the start of democracy, there has been a plethora of research on trying to understand and reduce poverty in South Africa (Francis & Webster, 2019), while inequality and the study thereof was treated "as the stepchild" to research on poverty.

However, over the last decade, the increasing importance of reducing inequality and the need for research that focuses more on inequality in South Africa have emerged (Francis & Webster, 2019).

2.3 A "snapshot" of inequality in South Africa

The origins of inequality in South Africa can be traced back to the history of the country (Assouad, Chancel & Morgan, 2018; Von Fintel, 2018; Wilson, 2011). The manner in which jobs were allocated, basic services such as housing, health, and education were provided and the geographical locations of residences, all stem from the unfair, racially aligned segregation policies adopted by the Apartheid regime (Von Fintel, 2018; Wilson, 2011). The consequence of these prejudiced practices is still being experienced today, where the distribution of social and economic resources remains skewed across the different population groups (Assouad et al., 2018; Francis & Webster, 2019; Ozler, 2007; Statistics South Africa, 2017, 2019; World Bank, 2018).

In 1994, when the newly elected democratic government came into power, one of the many challenges it needed to overcome, was addressing the injustices experienced by the majority of black South Africans (Chibba & Luiz, 2011; Francis & Webster, 2019). Thus, the adoption and implementation of various economic and social development policies over the years, represented an attempt to 'right the wrongs' of the past (Chibba & Luiz, 2011; Francis & Webster, 2019; Ozler, 2007).

While the South African government has done a lot to improve the living circumstances of the previously disenfranchised, South Africa remains the country with the highest levels of inequality (Mbeki & van der Berg, 2020; McLennan et al., 2016; World Bank, 2018), and the white minority continues to control the country's economic resources (Assouad et al., 2018; Dowdeswell et al., 2020; Mbeki & van der Berg, 2020; Statistics South Africa, 2017, 2019; World Bank, 2018). The elements that continually perpetuate inequality in South Africa are the unequal share in wealth, income and access to basic

services (Dowdeswell, Hoobler & Mahlatji, 2020; Mbeki & van der Berg, 2020; Statistics South Africa, 2017, 2019; World Bank, 2018). These factors are further fuelled by discrimination based on race, sex, disability status and land ownership (Mbeki & van der Berg, 2020; Von Fintel, 2018).

2.4 Measuring inequality in South Africa

The most commonly used method to understanding inequality in South Africa is based on the skewed distribution of income, earnings, wealth and assets (Argent, Finn, Leibbrandt & Woolard, 2010; Assouad et al., 2018; Chatterjee, 2019; Finn et al.,2012; Hundenborn et al., 2019; Leibbrandt & Wittenberg, 2017; Statistics South Africa, 2019; Tregenna & Tsela, 2012; World Bank, 2018). The studies conducted on income inequality in South Africa, make use of income, earnings or expenditure data (Hundenborn, Jellema & Woolard, 2019; Statistics South Africa, 2019; Tregenna & Tsela, 2012; World Bank, 2018). While the methods and data used may vary, the results remain consistent with a Gini coefficient ranging between 0,65 and 0,72 (Cheteni, 2019; Statistics South Africa, 2019; Tregenna & Tsela, 2012).

The income inequality levels in South Africa are not only high by local standards but also internationally when compared to countries in Latin America and the rest of Africa (Hundenborn, Jellema & Woolard, 2019; Tregenna & Tsela, 2012). In addition to having the highest levels of income inequality globally (Tregenna & Tsela, 2012; World Bank, 2018), South Africa is also classified as the country with the highest wealth inequality (World Bank, 2018). The top 10,0 percent of households own 71,0 percent of household wealth, as compared to the bottom 60,0 percent, who only own 7,0 percent of household wealth (World Bank, 2018).

Furthermore, over the last few decades between-group inequality has remained the key driver of disparities amongst the different racial groups; however, in recent years the differences reported in within-group inequality has become more predominant (Francis & Webster, 2019; Mangaliso & Mangaliso, 2013; Statistics South Africa, 2017; World Bank, 2018). The increase observed

in racially aligned inequalities indicates that there is a need for greater social cohesion among all citizens in South Africa (Cheteni, 2019), to promote inclusion and acceptance of all, regardless of colour or ethnicity.

Another feature of inequality is the unequal provision of basic services in South Africa. Basic services include education, health, housing and other municipal services. The poor provision of basic services, coupled with the substandard quality of these services in South Africa, is a situation that contributes negatively to the economy and society at large; while consequently widening the gap between the rich and poor (Booysen, Gordon & Mbonigaba, 2020; De Villiers, 2021; Mangaliso & Mangaliso, 2013; Mbeki & van der Berg, 2020; Statistics South Africa, 2019; 2020; World Bank 2018). The unfair provision of poor basic services, as is the case with lack of income and wealth, is mostly concentrated in areas where those considered to be previously disadvantaged, reside (Statistics South Africa, 2020). The inequalities in access to basic services such as poor sanitation, lack of water or electricity and the poor provision of public health care has a direct influence on the school attendance of children (Ataguba, Day & McIntyre, 2015; Basu, Stuckler & McKee, 2011; Booysen et al., 2020; De Villiers, 2021; Koch & Omotoso, 2018; Mubangizi, 2018; Pillay, 2006; Statistics South Africa, 2019, 2020). One can thus deduce, that children born into households with poor access to basic services, are automatically at a disadvantage; as compared to their more privileged counterparts.

The final measurement of inequality that will be analysed here, has recently gained a lot of momentum, namely, spatial inequality. Based on South Africa's geographical landscape, where the country's poorest provinces also house the former homelands (Statistics South Africa, 2019), spatial inequality plays an important role in understanding the divide between urban and rural dwellers (McLennan et al. 2016; Turok & Visagie, 2020, 2021; Von Fintel, 2018).

2.5 The rude awakening: Corona virus exposes the inequalities in South Africa

With the outbreak of the Corona virus pandemic in late 2019 and its subsequent spread globally, the lives of all individuals around the world were disrupted. It would be negligent not to discuss the effect the pandemic has had on the majority of South African citizens, given their already tenuous economic and social positions in society.

The Covid-19 pandemic negatively affected countries all over the world, but the impact it had on South Africa was devastating, as the country was already struggling with a fragile economic and social climate (Davids, 2021; Turok & Visagie, 2021). During the first quarter of 2020, South Africa's Gross Domestic Product (GDP) declined by 1,8 percentage points, followed in the second quarter of 2020 by a further contraction of a staggering 51,7 percentage points (Statistics South Africa, 2021a). Added to the economic crisis, was the rise in unemployment rates from 30,1 percent in the first quarter of 2020 to 32,6 percent in the first quarter of 2021 (Statistics South Africa, 2021b), indicating the impact the pandemic had on job losses in the country.

In addition to the economic decline in South Africa, the spatial inequalities between urban and rural dwellers, was another driver of the hardships experienced by South Africans during the Covid-19 pandemic (Davids, 2021; Dowdeswell et al., 2020; Kihato & Landau, 2020; Turok & Visagie, 2020, 2021). Households living in rural areas particularly those in the former homelands, were more vulnerable to social and economic shocks, than those who reside in urban areas (Von Fintel, 2018). The vulnerability of rural households given their lack of resources to endure these shocks, became apparent during the pandemic, especially in relation to accessing health care, education, loss of income and food insecurity (Davids, 2021; Dowdeswell et al., 2020; Turok & Visagie, 2020, 2021).

Furthermore, the already overburdened education and health systems in South Africa were placed under extreme pressure during the pandemic, as the lack of infrastructure, human resources and amenities such as running water and sanitation was revealed (Davids, 2021; Turok & Visagie, 2021).

While the Covid-19 pandemic did not cause the high levels of inequality in South Africa, it unquestionably increased the awareness surrounding the stark injustices between the poor and non-poor (Turok & Visagie, 2021), and more than likely, exacerbated already existing income and other inequalities.

2.6 If we know all of this, what's the problem?

The various forms of inequality prevalent in South Africa are as a result of both unequal outcomes and opportunities (Osakwe, 2020). Notably, most of the literature in the field of inequality, focuses on understanding the final outcomes of inequality in South Africa, i.e., the skewed income levels, low levels of educational attainment, poor access to health and other municipal services. While this approach is not intrinsically wrong, it is limiting when dealing with a country like South Africa, where the social and economic disparities are interlinked (Osakwe, 2020). It is therefore crucial, that the lens through which inequality is analysed in South Africa be broadened to include measures of inequality of opportunity.

2.7 A possible solution: Inequality of opportunity

Taylor-Cummings (2017) equates "inequality of opportunity" to lining up a group of individuals from different social backgrounds for a race, where those from privileged backgrounds hold an unfair advantage over their less privileged counterparts. Another term associated with eliminating inequality of opportunity is "levelling the playing field" (Roemer & Trannoy, 2016). The crux of the concept incorporates two principles, namely freedom and equality, where opportunities are equalised when individuals are free to select any opportunity from an available set (Brunori, 2016).

However, the concept of equality of opportunity is still very ambiguous, as supporters of the theory have not yet reached a consensus, as to what an "equal opportunity" is (Joseph, 1980; Riva, 2015). Consequently, when attempting to define the concept of inequality of opportunity, the outcomes are extremely heterogeneous.

On the one hand, the formal definition promotes inclusivity, where resources are distributed equally amongst individuals, regardless of their circumstances; on the other, the utilitarian approach, focuses on eliminating the differences in circumstances, through the pursuit of redistribution, in an attempt to equalise opportunities (Brunori, 2016).

Given that there is no real consensus on how inequality of opportunities should be defined or dealt with, it follows that every author has her/his own assumptions and theories. For some, equalizing opportunities means the equal share of resources early on in one's life regardless of the circumstances they are born into, while others believe that providing compensation for any variations in people's abilities and resources early on in life, can assist in levelling the playing field (Riva, 2015).

Joseph (1980) defines the notion of equality of opportunity in its most basic form, as the ability of individuals to obtain a social good on the basis of their skills or talents. However, this view fails to recognise the effect that a person's race, sex, social status or religion has on these abilities. Ramos and Van de Gaer (2016); Roemer (2002); and Roemer and Trannoy (2012), define equality of opportunity on the premise that an individual's abilities and skills, are influenced by both "circumstances" and "efforts". Circumstances are defined as variables that an individual has no control over, such as sex, race, the family one is born into or the community you are raised in, while efforts are perceived as variables that an individual has control over and come about as a result of personal choices or preferences.

Inequalities resulting from circumstances are therefore deemed unjust, while inequalities resulting from individual's own efforts are seen as fair and morally acceptable (Ramos *&* Van de Gaer, 2016; Roemer, 2002; Roemer & Trannoy, 2012). Based on the latter assumption, the theory on equality of opportunity does not promote perfect equality, but rather suggests that any disparities that may exist in society are solely due to an individual's efforts, which is interpreted as being morally acceptable inequality (Ramos *&* Van de Gaer, 2016).

It is important to note that the type of community and family an individual is born into, plays an instrumental role in forming the mind of an individual, as alluded to by Ramos and Van de Gaer (2016); Roemer (2002) and Roemer and Trannoy (2012). If one is exposed to a nurturing environment that encourages and supports the development of skills and talents, it becomes easier for that individual to accomplish things later on in life.

However, due to circumstances beyond one's control, the most basic concept of equality of opportunity, where an individual's ability to acquire a social good should be based on one's natural talent and skills (Joseph,1980), is not always possible. Thus, outlining which definition of equality of opportunity will be used, is imperative.

Furthermore, Joseph (1980), classifies 'equality of opportunity' into two types; "formal equality of opportunity", which looks at equalising opportunities using an individual's performance as measured by their achievements and talents; while "compensatory equality of opportunity" includes the former, but also states that an individual's achievements should not be hampered by the circumstances they are born into.

The kind of equality of opportunity selected, depends upon the theory of distributive justice that is followed (Joseph, 1980). A meritocratic theory of distributive justice believes that individuals should be rewarded on merit, i.e., skills, efforts and achievements. Thus, distribution under this theory suggests that individuals get appointed into social roles based on merit alone. Subsequently the grouping of social roles and hence the rewards are also based on merit alone (Joseph, 1980). Notably, according to Joseph (1980), a meritocratic view on equality of opportunity ultimately leads to inequality between social classes.

Another aspect considered by Joseph (1980) when defining equality of opportunity, are the reasons for wanting to achieve equality of opportunity in a society. The two reasons Joseph (1980) identifies are 'competitive' and 'developmental'. The former applies when individuals are given an equal opportunity to compete for a social position purely based on merit, such as the meritocratic view on equality of opportunity.

This view also allows for an equal opportunity to become unequal, as only one person will be eligible for the position and therefore receive all the privileges and rewards associated with that position. Similar to Joseph's formal definition of equality of opportunity, it totally ignores whether all individuals are at the outset equally prepared in terms of skills and abilities for the position.

Developmental equality of opportunity, however, gives each individual an equal opportunity to develop their skills and abilities to its full potential. As indicated by Joseph (1980), no two people are the same and thus there will always be differences in society; however, these differences in capabilities do not necessarily have to translate into social inequalities, unless they impact on the manner in which rewards and privileges are distributed in society.

Another theory put forward by Ramos and Van de Gaer (2016) identifies two principles that the theory on equality of opportunity embodies, namely the "compensation principle", which is similar to Joseph's (1980) developmental equality of opportunity; and the "reward principle" that can be compared to the competitive equality of opportunity.

The compensation principle provides individuals with compensation to eliminate any inequalities resulting from circumstances which are beyond their control; and can be measured using either the ex-post or ex-ante approach (Ramos *&* Van de Gaer, 2016). The ex-post approach focuses on the differences in one's outcomes while exerting similar efforts but have different circumstances; on the other hand, the ex-ante method looks at the different opportunity sets an individual faces, as a result of their circumstances (Ramos *&* Van de Gaer, 2016). Furthermore, Ramos and Van de Gaer (2016) define the reward principle as looking for ways of rewarding the efforts of individuals, with similar or identical circumstances. These rewards can either be a liberal reward or a utilitarian reward. The liberal reward states that government should not redistribute income when individuals have the same circumstances but their income levels vary, as this is a result of their own efforts. The utilitarian reward, however, says that government should not be concerned with income disparities that are as a result of differences in preferences (Ramos *&* Van de Gaer, 2016).

According to Riva (2015), an opportunity is defined as an occasion whose manifestation has the ability to potentially meet the needs of the person to whom the opportunity belongs. In addition, she explains that an opportunity can be seen as a relationship between three components namely, the “actor” who is the owner of the opportunity; the “event” that can possibly produce an opportunity; and the “circumstances” that could lead to an opportunity (Riva, 2015). Following this notion, an opportunity can be viewed as either an option or a chance. An opportunity as an option means having complete control over all the factors that influence your obtaining that opportunity; on the other hand, an opportunity as a chance means having limited control over the factors that affect achieving the opportunity (Riva, 2015).

In essence, the approaches discussed above all distinguish between two basic tenets of inequality of opportunity; that which is as a result of circumstances one has no control over; and those due to an individual’s own efforts over which they have full control.

2.8 Learning from others

2.8.1 Inequality of opportunity studies in South Africa

This section reviews the available literature on inequality of opportunity in South Africa. While the literature does not solely focus on measuring inequality of opportunity alone, there are lessons to be learnt from what others have done.

One of the studies on equality of opportunity in South Africa, undertaken by Piraino (2015), shows the relationship between intergenerational earnings and equality of opportunity. The data for the study comes from the National Income Dynamics Study (NIDS) for 2008, 2010 and 2012. To ensure that the results are comparable to similar studies conducted in other developing countries, the scope of the sample is limited to males only. In addition, the sample is further restricted to males between the ages of 20 and 44. Earnings was identified as the outcome variable and is measured using the gross monthly earnings from work of the individual.

Furthermore, race, father's education status, father's employment status and father's province of residence, are used as the circumstance variables, while the effort variable is measured using the son's level of education. The study uses various regression models to determine the intergenerational earnings mobility between a father and son. Finally, inequality is calculated and decomposed, using the Theil index, to determine the proportion of total inequality attributed to inequality of opportunity.

The study concludes that in South Africa, inequality of opportunity in earnings of children (son's), can to a large extent be explained by their parent's (father's) level of earnings (Piraino, 2015).

While the bias in the sample selection, i.e., only males, might assist with international comparisons, it suggests that the results of the study are questionable. In South Africa, gender is one of the key demographic variables used when understanding the prevalence and depth of inequality (Mbeki & van der Berg, 2020; Von Fintel, 2018). Arguably, with 41,8 percent of households in South Africa being headed by females (Statistics South Africa, 2020), limiting the scope of the study to men only introduces a wide range of measurement and gender equity issues. Another major shortcoming of the study is the choice to limit the study to income from earnings data only, as those who receive an income from earnings, are mostly concentrated in the top income quintiles of the country (Statistics South Africa, 2019). Hence, there is a view that the results from the study are prejudiced towards labour market income earners.

A second study, by Zoch (2015), examines the impact a mother and father's social background and economic status has on their children's ability to achieve certain outcomes at different stages of their lives. The research zooms in on how certain variables, such as sanitation and clean water, impact a child or adolescent's ability to complete their basic and/or higher education. Furthermore, it estimates the type of employment opportunities these children are most likely to be faced with when reaching adulthood (Zoch, 2015). The datasets used in the study are from both the KwaZulu-Natal Income Dynamics Study (KIDS) and the National Income Dynamics Survey (NIDS).

The results of the study indicate that the parent's level of income has little to no effect on children completing primary school; however, it has a significant effect on whether children complete matric or a tertiary qualification.

In addition, the socio-economic background of individuals is a key contributor towards determining access to tertiary education and high earning employment opportunities.

The research conducted by Zoch (2015) confirms the hypothesis that children from more privileged backgrounds are more likely to be successful in life.

This overview confirms the fact that unfair inequalities in South Africa contribute to intensifying other inequalities, for example, in the distribution of income and wealth. Children have no control over their parents' social and economic status, their race or their sex. However, if the living conditions they are born into improves, through the provision of good quality municipal services, the likelihood that their educational outcomes will improve is huge. In addition, the level of income an individual can possibly receive, is dependent on their level of educational attainment (Statistics South Africa, 2019), because a higher level of educational attainment is closely correlated with higher paying employment opportunities in South Africa.

The final study on inequality of opportunity in South Africa that is reviewed here is the work done by the World Bank (2018). In 2018, the Bank produced a report which examined South Africa's poverty and inequality levels for the period 1994-2015. The report used data from the NIDS, the Income and Expenditure Surveys and the Living Conditions Surveys. However, the measurement of inequality of opportunity and its contribution to total inequality was done using the NIDS data.

The study found that inequality of opportunity in South Africa is estimated to be 40,0 percent, the highest when compared to the rest of Sub-Saharan Africa and selected upper middle-income countries. A similar trend is observed with the ratio of inequality of opportunity to total inequality. According to data from the NIDS, inequality of opportunity contributes 45,0 percent to total inequality.

Furthermore, parental education (38,0 percent), race (34,0 percent), father's occupation (11,0 percent) and birth district council (10,0 percent), are the circumstances that contribute the most to an individual's outcomes and the unequal labour opportunities available to children later on in life.

The World Bank report can act as a benchmark for transforming the manner in which inequality is officially measured by Stats SA. The report further provides a motivation for why South Africa should adopt "inequality of opportunity" as an official domestic indicator when measuring the UN's SDGs. The price of the knowledge gains for informing and monitoring development policies in South Africa is invaluable.

2.8.2 Case studies of Brazil, Egypt and India

This section reviews three case studies conducted on measuring inequality of opportunity in other developing countries. Each of the country case studies has been carefully selected to represent research undertaken on inequality of opportunity in different regions of the developing world (Latin America, Asia and Africa). As South Africa is also a developing country, the research conducted in these countries may be very informative in developing a measure of inequality of opportunity for South Africa.

The section begins by reviewing work done in Brazil on measuring inequality of opportunity; thereafter, case studies from Egypt and India are discussed.

Bourguignon, Ferreira, and Menéndez (2005) made use of Roemer's "weak inequality of opportunity" method as termed by Brunori (2016), to measure inequality of opportunity in Brazil. Their approach focused on estimating how inequality will decrease, if the difference in circumstances the individuals were born into were equalised. The estimated reduction was then used to calculate what contribution inequality of opportunity had on an individual's earnings (Bourguignon, Ferreira, & Menéndez, 2005).

The data used to measure inequality of opportunity in Brazil came from the 1996 wave of the Pesquisa Nacional por Amostra de Domicílios (PNAD –

National Household Survey) (Bourguignon, Ferreira, & Menéndez, 2005). This survey is conducted annually by Brazil's Census Bureau and is nationally representative of all areas in Brazil, with the exception of the rural areas in their Northern Region (Bourguignon, Ferreira, & Menéndez, 2005). In terms of sampling, the study focused on individuals that were working and had completed their schooling; hence the sample included those individuals aged 26-60 who had completed their schooling, resided in urban areas, was the head of the household or the spouse of the head and worked for remuneration (Bourguignon, Ferreira, & Menéndez, 2005). The sample was then further divided into seven groups based on 5-year birth cohorts, which allowed Bourguignon, Ferreira, and Menéndez (2005) to estimate inequality of opportunity on earnings at a specific reference point and across the different birth year cohorts.

For the analysis, various regression models were used to measure what proportion of inequality in earnings could be attributed to the individual's circumstances. The study used hourly earnings as the dependent variable (outcome), with race, parental education, region of birth and father's occupation as circumstance variables (Bourguignon, Ferreira, & Menéndez, 2005). The effort variables were identified as years of schooling, migration and labour market status (Bourguignon, Ferreira, & Menéndez, 2005). Furthermore, Bourguignon, Ferreira, and Menéndez (2005) made use of the Theil Index and Gini Coefficient for decomposing inequality in order to estimate the proportion that inequality of opportunity contributes to total inequality in Brazil.

The research found that in Brazil, the factor that contributes the highest to inequality in one's outcomes as measured by earnings is, parental education; with the inequality due to the observed circumstances accounting for approximately a quarter of the total inequality as measured by the Theil index (Bourguignon, Ferreira, & Menéndez, 2005).

Interestingly, the findings from the study in Brazil, are similar to that of the World Bank (2018). The Bank's study found that in South Africa, parental education contributed the highest proportion to an individual's outcomes.

A second study conducted in Egypt by Belhaj-Hassine (2012), focused on estimating the proportion that inequality of opportunity contributes to inequality in earnings. The research used the same approach as Bourguignon et al. (2005) in Brazil and Roemer (2002), to measure inequality of opportunity in Egypt.

The data used for the research came from the 1988 Egypt Labour Force Sample Survey, the 1998 Egypt Labour Market Survey, and the 2006 Egypt Labour Market Panel Survey (Belhaj-Hassine, 2012). All three surveys collected data on education, employment, migration, income, parental background and demographics; furthermore, the surveys were designed with similar methodologies, ensuring comparability of data (Belhaj-Hassine, 2012).

The study conducted concentrated mainly on those individuals who earn an income; thus Belhaj-Hassine (2012), sampled individuals who were aged 12 and older, with positive earnings and no longer in school. Similar to the approach used in Brazil, Belhaj-Hassine (2012), also divided the sample into age-cohorts, which meant the analysis was conducted on each cohort individually; thereafter the data sets were pooled together and the analysis was replicated on the entire group.

The method of analysis chosen for measuring inequality of opportunity in Egypt, was the Ordinary Least Squares regression model. The dependent variable used in the regression was income from earnings, while the circumstance variables were sex, place of birth and parent's education, occupation and employment status (Belhaj-Hassine, 2012). The effort variables for individuals included school attainment, age at first entry in the labour market, skills required for current occupation, member of trade union, migration, employment status, occupational position and employment sector (Belhaj-Hassine, 2012).

Contrary to the study conducted in Brazil, where only the Gini Coefficient and Theil indices were used to decompose inequality; the research undertaken in Egypt included the former two indices and the [3]Atkinson indicator (Belhaj-

[3] The Atkinson index presents the percentage of total income that a given society would have to forego in order to have more equal shares of income between its citizens (OECD, 2015).

Hassine, 2012). The results from the study revealed that inequality of opportunity in Egypt contributes approximately 30,0 percent to total inequality, as measured by the Theil index (Belhaj-Hassine, 2012).

The third and final case study on measuring inequality of opportunity, was conducted by Singh (2010), in India. While the first two case studies, used some form of income as their dependent variable, Singh used consumption expenditure. Furthermore, the framework proposed by Ferreira and Gignoux (2008, as cited in Singh (2010)), was used to measure inequality of opportunity in India. Unlike the research conducted in Egypt, but similar to that done in Brazil, the study only made use of one survey, namely the 2004/05 India Human Development Survey conducted by the National Council of Applied Economic Research (Singh, 2010).

The survey collects data on an individual's family background, sex, religion, parental education and occupation, consumption expenditure and income (Singh, 2010). Singh (2010) singles out males aged 21-65 years, residing in both urban and rural areas, as the data available on females was incomplete. Similar to the work done by Belhaj-Hassine (2012) in Egypt, the analysis was carried out using the Ordinary Least Square regression model. As stated earlier, consumption expenditure was used as the dependent variable; circumstances were identified as father's occupation, father's education level, caste, place of residence and religion; while the Mean Log Deviation was used as the inequality index to decompose inequality (Singh, 2010).

The results from the study in India show that father's occupation and education level contribute the most to inequality in consumption expenditure. Furthermore, approximately 22,0 percent of total inequality as measured by the Mean Log Deviation, can be attributed to inequality of opportunity (Singh, 2010).

Learning from the work that has been done both locally and abroad, it is indicative that when conducting any form of analysis on inequality of opportunity, including information on parental background is fundamental.

2.9 Theoretical framework

This section lays the foundation on how the research will analyse inequality of opportunity in South Africa. First, it provides clarity on how the circumstance and effort variables will be defined. Secondly, it will provide insight into which framework the research will adopt, for measuring inequality of opportunity in South Africa.

2.9.1 Defining the circumstance and effort variables

Attempting to measure inequality of opportunity is not a simple process. There are many aspects that need to be addressed beforehand (Ramos & Van de Gaer, 2016; Peragine, 2015), one of these is distinguishing the variables that will be classified as circumstances and those that are to be seen as a result of personal life choices (Ferreira & Peragine, 2015).

While this may not appear to be a complicated undertaking, reaching a consensus on what is regarded as a circumstance and a choice, remains a conceptual problem (Ferreira & Peragine, 2015).

As a starting point, one needs to consider two important factors when determining circumstances and efforts. The first relates to how society perceives individual tastes; is it viewed as a trait that an individual has control over, as alluded to by Dworkin (as cited in Ferreira & Peragine, 2015); or is it seen in the view of Cohen and Arneson (as cited in Ferreira & Peragine, 2015), where an individual's preferences are highly influenced by the environment they are brought up in, and therefore individuals cannot be held liable for the tastes they develop as a result. Identifying which of these views to adopt, is imperative for measuring inequality of opportunity. In the literature, Fleurbaey's framework uses Dworkin's approach, while Roemer applies the methodology of Cohen and Arneson (Ferreira & Peragine, 2015).

The second factor to consider in the measurement of inequality of opportunity, is the treatment of what is called the "luck" variable (Roemer & Trannoy, 2013);

Ferreira and Peragine, 2015). Dworkin (1981) (as cited in Ferreira & Peragine, 2015) distinguishes between two types of luck, “brute luck” and “option luck”.

Brute luck is described as an unavoidable situation, whereas option luck is a result of deliberate actions taken and thus are avoidable (Ferreira & Peragine, 2015). In addition, Ferreira and Peragine (2015) classify brute luck as either initial or later brute luck. The former can be further broken up into social background luck and genetic luck; social background luck arises from a person’s family background or social status, while genetic luck originates from the natural abilities one is born with. Later brute luck refers to unplanned eventualities that occur later on in one’s life (Ferreira & Peragine, 2015).

In a country such as South Africa, where the past life circumstances of the majority dictate their future, adopting the view that individuals have full control over their preferences, would be irresponsible and insensitive, as some variables that may be considered as a preference could be influenced by the individual’s circumstances or background. An example of this would be the difference in preferences of two individuals with dissimilar backgrounds, one may have grown up in a single parent household with an income of R1000 per month and the parental educational attainment being secondary school; while the other may come from a two-parent household with a monthly income of R70 000 per month and parental post-school educational attainment. The values instilled in them and their level of exposure may not be the same; hence, the preferences or choices they make in life, may be influenced by the circumstances they were born into. Thus, the belief that one’s environment plays a significant role in your preferences, is more fitting for the South African climate. This forms the basic premises that will be used for this study.

When considering the treatment of the luck variable, it would be challenging to measure and therefore would form part of the residual (error) term. This approach is in line with how the luck variable has been treated in a number of studies (Belhaj-Hassine, 2012; Singh, 2010; Bourguignon, Ferreira, & Menéndez, 2005; Ferreira & Gignoux, 2011).

2.9.2 Frameworks for measuring inequality of opportunity

According to Ramos and Van de Gaer (2016), measuring inequality of opportunity involves a wide range of methodological and empirical problems that are rather complex to solve. With the literature on inequality of opportunity developing in various isolated directions, there is no direct connection between the theory and the measurements put forward (Ramos & Van de Gaer, 2016). However, after the contributions by Roemer and Fleurbaey (as cited in Brunori, 2016), a vast number of measurements of inequality of opportunity using different definitions of equal opportunities emerged (Brunori, 2016).

Furthermore, Brunori (2016) explains that inequality of opportunity is measured using the distance between an individual's outcomes distribution and equal opportunity.

With the relatively easy application of Roemer and Fleurbaey's measurement on equality of opportunity, there has been a plethora of work undertaken on measuring inequality of opportunity over the past few years (Brunori, 2016). The methodology proposed by Roemer (Roemer & Trannoy, 2013; Brunori, 2016), divides the factors that have an effect on individual outcomes, as circumstances and efforts. Furthermore, Roemer's theory categorizes the sample population into two groupings, which he refers to as "types" and "tranches".

A "type" consists of persons with identical circumstances, such as sex, race, family background and place of birth, while a "tranche" is used to group those that exercise similar efforts; also referred to as responsibility characteristics, into mutually exclusive sets (Roemer & Trannoy, 2013; Brunori, 2016). The approach by Roemer seeks to adopt a policy that by all accounts attempts to eradicate any possible effects, e.g., the impact that circumstances may have on one's outcomes, while ensuring that these outcomes are still sensitive to efforts (Roemer & Trannoy, 2013; Brunori, 2016). However, according to Roemer and Trannoy (2013), not all efforts are as a result of personal choices, but an individual's circumstances may influence their efforts, and thus when dealing with efforts, one should only consider those efforts that are purely as

a result of individual preference, which they term as “accountable effort”. Roemer and Trannoy (2013) measure accountable effort, by ranking the efforts exerted by individuals who have identical circumstances into different tranches. Consequently, when conducting within-type analysis, the differences observed in their outcomes are as a result of their personal choices and not their circumstances (Roemer & Trannoy, 2013).

However, when performing within-tranche analysis, it is assumed that any differences observed in outcomes, when individuals exert the same amount of effort, is as a result of the dissimilarities in their circumstances; this is also known as Roemer’s “strong” definition of equality of opportunity, as it requires all outcomes within a given tranche to be identical, regardless of the differences in their circumstances (Brunori, 2016). The ex-post measurement of inequality of opportunity adopts this approach (Brunori, 2016). Another less demanding measurement of inequality of opportunity derived from Roemer’s approach is the “weak inequality of opportunity” method which is what we observe in the ex-ante approach to inequality of opportunity (Brunori, 2016).

The ex-ante approach uses the opportunity sets available to an individual belonging to a particular type, the value of each opportunity set is derived by calculating the average outcome for each type, thus eliminating any between-tranche inequalities, and in turn defines inequality of opportunity as the variations between-types (Brunori, 2016). While this approach may be known as the weaker approach of Roemer’s framework, it is simplistic and easy to interpret, hence it is the most widely adopted measurement of inequality of opportunity (Brunori, 2016).

Another well-known approach to measuring inequality of opportunity is the framework applied by Fleurbaey, commonly known as the “responsibility-sensitive egalitarianism” model, which finds its origins in the theory of fair allocation and distributive justice (Fleurbaey, 1995; Brunori, 2016). The framework proposed by Fleurbaey is similar to that of Roemer’s, with the exception that it includes the principal of reward (Brunori, 2016). The principle of reward as mentioned in a prior section, looks at how an individual’s outcomes are influenced by their choices or what Brunori (2016) refers to as

the “responsibility characteristics”. The theory is based on the premise that individuals should, to a certain extent, be held accountable for their accomplishments in life (Brunori, 2016). Thus, it embraces the principle of reward when conducting inequality of opportunity measurements, where individuals should be rewarded on the amount of effort exerted, regardless of their circumstances (Fleurbaey, 1995; Brunori, 2016).

For the purpose of this report, the framework used to measure inequality of opportunity will be the “weaker” approach as proposed by Roemer (Roemer & Trannoy, 2013; Brunori, 2016). In a country like South Africa, where most of the inequalities stem from the racial segregation experienced during apartheid, using the approach that focuses on the between-type analysis for measuring inequality of opportunity is the most fitting; therefore, the study will adopt the ex-ante view when measuring inequality of opportunity.

Furthermore, the concept of inequality of opportunity will be grounded on providing individuals with a counterbalance, that will eliminate the differences in their outcomes, that can be attributed to external factors; and hence only remain with those elements a person has control over (Roemer & Trannoy, 2016).

2.10 Hypothesis

In light of the literature review described above, the following hypothesis will be tested for this report.

Hypothesis 1:

H_0: Circumstance variables have no effect on income

H_a: Circumstance variables have an effect on income

Hypothesis 2:

H_0: Effort variables have no effect on income

H_a: Effort variables have no effect on income

Hypothesis 3:

H_0: Inequality of opportunity does not contribute to total inequality in South Africa

H_a: Inequality of opportunity does contribute to total inequality in South Africa

CHAPTER 3: A ROAD MAP FOR CALCULATING INEQUALITY OF OPPORTUNITY IN SOUTH AFRICA: RESEARCH METHODOLOGY

3.1 Introduction

The supposition that the current official inequality indices adopted in South Africa are sufficient for measuring all forms of inequality in the country, is the perception that this research will attempt to disprove. The studies conducted in Brazil, India and Egypt, clearly show that the hypothesis that inequality of opportunity contributes to total inequality, holds.

The research methodology will therefore provide a blueprint on how the research was conducted and include the different scientific techniques used during the various stages of the study. The sections covered in this chapter, describe the research method adopted; the type of data used; the sampling techniques applied when the data was originally collected; the process followed during the data analysis; limitations of the study; the reliability and validity of the data used and ethical considerations. The chapter then concludes with the researcher stating her positionality.

3.2 Research Method

The methods that guided this research were motivated by work conducted in other developing countries, where similar studies on measuring inequality of opportunity were carried out. In these studies, data collected through various surveys conducted by other institutions for various purposes, was used. This type of research method according to Kamins and Stewart (1993), is known as secondary or desktop research. Secondary research, is an inexpensive approach to gathering data needed for research purposes. Contrary to primary research, researchers who elect to use secondary research, automatically exclude the data collection phase and instantaneously commence with the analysis of the data (Kamins & Stewart, 1993).

Moreover, the nature of this research lent itself towards a quantitative approach, which included the use of several statistical techniques.

The key objectives of the research as mentioned in chapter 1, were to firstly ascertain which circumstance and effort variables have a significant impact on an individual's income generating ability. Secondly, it was to determine what proportion of overall inequality can be attributed to inequality of opportunity.

3.3 Data

As mentioned in the previous section, the researcher adopted a secondary research approach and as such, the data used for the study was not collected by the researcher, but rather sourced from a survey conducted by Statistics South Africa (Stats SA), namely the Living Conditions Survey (LCS).

The LCS is a nationwide household survey that is conducted every five (5) years. The very first LCS was conducted in 2008/09 as a supplement to the then already existing Income and Expenditure Survey (IES). The LCS and IES were conducted alternatively, two and half years apart, until it was replaced by the recently piloted Continuous Population Survey (CPS). However, the more recent of the two surveys (IES & LCS), is the LCS which was conducted in 2014/15 and hence was the primary dataset used for this study.

The LCS collects information on living circumstances of approximately 30 000 households, which are scientifically selected to ensure full representatively of the South African population. The LCS questionnaire gathers information on demographics, education, welfare, employment, housing, access and expenditure on basic services, health, income and household consumption expenditure.

The two primary objectives of the LCS are to provide data for updating the Consumer Price Index (CPI) basket of goods and services; as well as developing the national poverty lines for South Africa.

In addition, the LCS is further used to provide official estimates on food security, subjective well-being, and inequality for South Africa.

While South Africa may have more recent data on inequality that was collected through other government-, private-, research- and academic institutions, no such data will be used in this research as the quality of these datasets are unknown and thus may compromise the credibility of the research and its findings.

Data from the LCS survey are stored in five files, namely the person file, person income file, total LCS file, household file and a household assets file. Table 1 below gives a short description of each data file.

Table 1 Living Conditions Survey 2014/15 data files

DATASET NAME	DESCRIPTION OF DATASET
LCS2015_persons_final	Includes all the person level information concerning the individuals who reside in the qualifying households.
LCS2015_Personsincome_final	All the data regarding the persons income is included in this file.
LCS2015_Total_lcs_final	All household expenditure and household income is included in this dataset.
LCS2015_households_final	Includes all household level data.
LCS2015_Household_assets_final	Includes all data on household assets.

3.4 Sample

The LCS used a multi-stage sampling design, which included stratification by provinces, metros and non-metros. Thereafter, the sample was clustered into Primary Sampling Units (PSUs), which consisted of a number of ‘dwelling units’. Dwelling units are defined as structures that households occupy. The selection of dwelling units from the PSUs followed a random-selection sampling method.

Drawing from the studies on measuring inequality of opportunity in other developing countries, where the outcome was based on individual income, the sample selection for the study included only those individuals in the survey aged 21 years and older. The rationale for this selection was based on the assumption that individuals who were aged 21 years and older in South Africa, may have had the opportunity to at least complete a tertiary qualification and the opportunity to search for employment.

3.5 Data Preparation

The researcher used the statistical software package, SAS, for the data preparation. The LCS does not collect information on parents residing outside the specific household. This meant that a subset had to be created before any analysis was done. The parameters applied to the original data were:

- Age ≥ 21
- Annualised income > 0
- Mother OR father present in the household

After the application of these parameters, the researcher was able to derive parental background variables as shown in Table 2. Once these variables were derived, they were merged into the newly created dataset. This dataset then became the main dataset from which all analysis was run. The data preparation phase drastically reduced the original number of observations in the data from 88 906 to 12 209 observations.

Table 2 Parental background variables

DERIVED VARIABLES	VARIABLES USED
Fathers' Employment Status	Father in household Father person number Employment status
Mother's Employment Status	Mother in household Mother person number Employment status
Father's Years of Schooling	Father in household Father person number Highest level of education
Mother's Years of Schooling	Mother in household Mother person number Highest level of education

Furthermore, categorical variables had to be labelled for the analysis to make sense. This meant all codes had to be changed from numeric to character. The labelling was done to most of the independent variables chosen for the analysis. A list of the variables labelled is given in table 3.

Table 3 Labelling of variables

VARIABLE	LABEL
Sex	1= Male 2= Female
Population Group	1= Black African 2= Coloured 3= Indian/Asian 4=White
Province	1= Western Cape 2= Eastern Cape 3= Northern Cape 4= Free State 5= Kwa-Zulu Natal 6= North West 7= Gauteng 8= Mpumalanga 9= Limpopo
Settlement Type	1= Urban formal 2= Urban informal 3= Traditional 4= Rural formal

3.6 Data Analysis

The variables used in the study were divided into outcome, circumstance and effort, terms coined and defined in previous chapters by Ramos and Van de Gaer (2016); Roemer (2002); and Roemer and Trannoy (2013). The outcome or dependent variable used for this research, as in other studies, was individual income. The independent variables used in the study, also known as the circumstance and effort variables are listed in tables 4 and 5.

Table 4 Circumstance variables used in the analysis

CIRCUMSTANCE VARIABLE	VARIABLE TYPE	VARIABLE	DETAIL
Sex of Individual At Birth	Independent	Sex	Male Female
Race of Individual	Independent	Population group	Black African Coloured Indian/Asian White
Family Background	Independent	Father's employment status; Mother's employment status Father's years of schooling; Mother's years of schooling	Father and mother residing in same household as child; Highest level of education of both father and mother; Employment status of both father and mother
Individual's Place Of Residence	Independent	Province	Western Cape Eastern Cape Northern Cape Free State Kwa-Zulu Natal North West Gauteng Mpumalanga Limpopo
		Settlement type	Urban formal Urban informal Traditional area Rural formal

Table 5 Effort variables used in the analysis

EFFORT VARIABLE	VARIABLE TYPE	VARIABLE	DETAIL
Individual's Years of Schooling	Independent	Years of schooling	Highest level of education
Individual's Employment Status	Independent	Employment status	Employed Unemployed

Analysis of the data was performed using the statistical software packages SAS and STATA. The first step in the analysis was to undertake exploratory analysis and co-linearity tests on the data. These were done to 1) get a general overview of the data; 2) assess the data distribution; 3) verify which independent variables used in the study were highly correlated, and consequently need to be dropped from the sample; and 4) select a set of variables to use in the study.

The second step in the data analysis was performing the multiple linear regression using the *proc reg* command in SAS. This step was directly related to answering the first research question, "*Identifying which circumstance and effort variables, significantly impact the outcome variable – income"*. The R-squared values obtained from the regression analysis indicate the percentage of the variation in the dependent variable that is explained by variations in the independent variables included in the selected regression model.

Imperative to the interpretation of the results was the inclusion of the partial R-squared, as this assisted the researcher in identifying the contribution of each of the two types of variables, namely circumstances and efforts, towards explaining variations in the dependent variable. Partial R-squared, the coefficient of determination that can be attributed to a single predictor, indicates the strength of a linear relationship between the dependent and independent variables, once the influence of all other independent variables has been removed.

It should be noted that low R-squared values, although not desirable, are not bad per se, because if there are statistically significant independent variables, these can be used to determine the effect on the dependent variable of a one (1) unit variation in the independent variable.

The third step of the data analysis was linked to answering the second research question*, "Determining the proportion of total inequality that can be attributed to inequality of opportunity".* For this part of the analysis, the STATA command *iop*, which uses the ex-ante approach to measuring inequality of opportunity as described by Wendelspiess Chavez Juarez and Soloaga (2014), was used. In addition to the point estimate for inequality of opportunity, we also calculated the influence of individual circumstances on the outcome by decomposing total inequality of opportunity using the Shapley decomposition. This decomposition will give us an indication of which circumstances has the greatest impact on overall inequality.

3.7 Limitations of the study

The main limitation the researcher experienced during the data preparation and analysis was the unavailability of certain variables in the dataset. Unfortunately, the surveys collected by Statistics South Africa do not include information on parents if they are not part of the household enumerated. Therefore, variables for family background, in particular parental information, were limited to those households where both children, over the age of 21 and parents resided. With this restriction on the data, the number of observations in the study was reduced. This reduction in sample meant that the inequality of opportunity measures derived may not be completely accurate; however, this does not have any bearing on the computations and methodologies recommended.

Furthermore, while there are other datasets available that contain this information, the use of data that has not been subjected to Stats SA's quality assessment framework, the South African Statistical Quality Assessment Framework (SASQAF); is discouraged for official statistical reporting.

Given these findings, one of the recommendations that will flow from this research, is for Statistics South Africa to consider the inclusion of parental information in all their household surveys and censuses, regardless of whether they reside in the same household as their children or not. These variables on parental information, according to studies conducted in other countries, is crucial for the calculation of inequality of opportunity.

3.8 Ethical considerations

In compliance with the rules of WITS University, every student doing a dissertation needs to apply for ethical clearance from the Universities ethics committee. The researcher thus submitted all required documentation to the committee for approval.

The study that was undertaken by the researcher did not include any vulnerable groups; therefore, the ethical clearance process was not complicated. Furthermore, the issue of confidentiality and anonymity were both addressed, in the preparation of the data. More to it though, person numbers were assigned to each individual, while any information pertaining to the exact location of the household was removed. To ensure confidentiality of the data, the analysis was carried out using resources owned by Statistics South Africa, and under no circumstances was the data allowed to be copied to a private network or hard drive.

In addition to the ethical clearance from the University, a formal request was also made to the Statistician General, requesting permission to use the data for academic purposes. While the data used in this study is publicly available, the researcher is an employee of Statistics South Africa, and thus also had to adhere to work protocols.

3.9 Positionality

The researcher is currently the Director for Country Reporting in the Statistical Reporting unit, within the South African National Statistics System (SANSS) branch, at Statistics South Africa. In her position, one of the key responsibilities

is the coordination and production of the United Nations Sustainable Development Goals country reports for South Africa. Additionally, in her previous position, the researcher was part of the unit, which was responsible for conducting the Living Conditions Survey.

It therefore follows that the researcher was involved in the development of all data collection instruments; was part of the team that managed the data collection process and spearheaded the editing and imputation of the data. The researcher was also involved in the writing and dissemination of all LCS and related statistical publications and reports.

The knowledge that the researcher had about the dataset used; and the producing organization, was both beneficial and challenging. On the one hand, it required the researcher to be extra-cautious and completely objective, when analysing the data. On the other, it provided a sense of ease when accessing the data and understanding the methodologies used during data collection and analysis. Nonetheless, to ensure complete objectivity, the researcher consulted with her supervisor, colleagues and peers, in an attempt to ensure she remained impartial throughout the process.

CHAPTER 4: VISUAL DEMONSTRATION AND VERBAL INTERPRETATION OF RESULTS

4.1 Introduction

This chapter presents the results from the secondary research conducted in SAS and STATA. The chapter's sub-headings are arranged according to the different type of data analysis conducted. These include exploratory analysis, multiple linear regression analysis and the measurement and decomposition of inequality of opportunity using the ex-ante approach. These modes of computation and analysis are all in line with the techniques discussed in the theoretical framework.

4.2 Exploratory analysis

A multicollinearity test was performed to remove independent variables that were highly correlated with each other. Therefore, the final data set used for the analysis contained 12 209 observations on 26 variables. Table 6 below indicates the final set of variables used in the analysis.

According to the summary statistics in table 6, the mean income for the sample was R25 506 per individual per annum, with 0 being the minimum amount received and R1 898 697 the maximum. Looking at the vast range in individual income per annum it is evident that income inequality in South Africa is a serious problem.

In terms of race, the majority of the sample comprised Black Africans - 81 percent. The Coloured, White and Indian/Asian groups constituted 14, three (3) and two (2) percent, respectively. Furthermore, the sample distribution between males and females was approximately 50/50, with the majority of individuals in the sample residing in Western Cape, Kwa-Zulu Natal, Limpopo and Gauteng. Individual years of schooling was on average, approximately 11 years, while their parents' years of schooling average at 3 and 7 years, for father and mother, respectively.

Table 6 Summary Statistics for key variables

VARIABLE	N	Mean	Std Dev	Sum	Minimum	Maximum
Years_ of_Schooling	12209	11,30707	3,2927	138048	0	20
Employment_Status	12209	-	0,48315	4532	0	1
Fathers_Years_O o_Schooling	12209	2,8266	4,72162	34510	0	20
Fathers_Employment_Status	12209	-	0,37057	2006	0	1
Mothers_Employment_Status	12209	-	0,46599	3891	0	1
Mothers_Years_ of_Schooling	12209	6,67196	5,03156	81458	0	20
Male	12209	0,5043	0,5	6157	0	1
Female	12209	0,4957	0,5	6052	0	1
Black_African	12209	0,80924	0,39292	9880	0	1
White	12209	0,02949	0,16917	360	0	1
Indian_Asian	12209	0,02089	0,14301	255	0	1
Coloured	12209	0,14039	0,3474	1714	0	1
Western_Cape	12209	0,12433	0,32998	1518	0	1
Eastern_Cape	12209	0,1195	0,32439	1459	0	1
KwaZulu-Natal	12209	0,18544	0,38867	2264	0	1
Northern_Cape	12209	0,0548	0,22759	669	0	1
Free_State	12209	0,06643	0,24904	811	0	1
North_West	12209	0,08608	0,2805	1051	0	1
Limpopo	12209	0,13556	0,34233	1655	0	1
Mpumalanga	12209	0,09976	0,2997	1218	0	1
Gauteng	12209	0,1281	0,33422	1564	0	1
Urban_Formal	12209	0,51765	0,49971	6320	0	1
Traditional_Area	12209	0,4074	0,49137	4974	0	1
Rural_Formal	12209	0,02555	0,15781	312	0	1
Urban_Informal	12209	0,04939	0,21669	603	0	1
Income	12209	25506	57931	311402109	0	1898697

4.3 Multiple Linear Regression analysis

Multiple regression analysis using SAS was performed on the variables to determine the set of independent variables (circumstances and efforts) that significantly impact income, the dependent variable.

Regression analysis was used to explain the statistical relationship between the dependent variable γ and a set of independent variables $x_1, x_2, \ldots, x_n$.

The resulting regression model is defined by the regression equation:

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots \beta_n X_n + \varepsilon$

Where Y Is the dependent variable

β_0 = constant or intercept

β_1 = the coefficient for X_1; β_2= the coefficient for X_2, etc., and

X_i (X_1, X_2, X_3…, X_n) = the dependent variables explaining the variance in Y

ε = error term

Important statistics to consider in this regression analysis are Type II SS estimates, F-statistics, as well as R-squared, the coefficient of determination. Whereas the R-squared value provides an indication of how well the model fits the data, the Type II SS estimates measure the amount of variability in Y that could be explained by the inclusion of a particular variable into a model, when all other variables have already been included; while the F-statistics indicates whether the overall model are statistically significant in explaining Y. The test of significance is done by considering the p-values associated with the individual t- and F-values against the significance level, which was set at 5 percent levels of significance.

Stepwise regression analysis was performed using annualised income adjusted for inflation, as the dependent variable and the variables listed in Tables 4 and 5 as independent variables.

These variables covered five (5) main areas of interest, namely sex of the individuals at birth, race of individual, individual's place of residence (province and settlement type); parental background (parents' years of schooling as well as parents' employment status) and individual's background (employment status and years of schooling). The first four (4) groups of variables are sets of circumstance variables while the last group contains effort variables.

The independent variables found to be statistically significant and therefore included in the resulting regression model, categorised as either circumstance or effort, are given in Table 7 below. Statistical significance does not necessarily imply that the contribution of each of these variables is numerically significant or large. The regression analysis process resulted in a model containing 13 of the original 26 independent variables.

Table 7 provides the Analysis of Variance (ANOVA) results for the complete model. The p-value (Pr > F) for the model, which is less than 0,0001, indicates that the model is significant and therefore provides a good fit to the data.

Furthermore, the R-squared results for the model indicate that approximately 31 percent of the variation in the dependent variable, income, could be explained by the model. The Maslow C(p) criterion (14,1231) is approximately the same as the sum of the 13 independent variables in the model plus the intercept or constant (13 + 1 =14). This indicates that the multiple regression model produces relatively precise and unbiased estimates.

Table 7 Regression analysis results

ANALYSIS OF VARIANCE

SOURCE	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	1.268822E13	9.760171E11	420.86	<.0001
Error	12195	2.828114E13	2319076695		
Corrected Total	12208	4.096936E13			

R-Squared = 0.3097 C(p) = 14.1231

VARIABLE	PARAMETER ESTIMATE	STANDARD ERROR	TYPE II SS	F VALUE	PR > F
Intercept	-22227	1720.89596	3.868885E11	166.83	<.0001
Individual's Years of Schooling	2257.74119	144.91077	5.6294E11	242.74	<.0001
Individual's Employment Status	52068	945.99740	7.025381E12	3029.39	<.0001
Father's Years of Schooling	293.58732	119.70748	13949129413	6.01	0.0142
Father's Employment Status	-7403.79823	1488.83189	57349935575	24.73	<.0001
Mother's Employment Status	-6932.64097	1022.36559	1.066351E11	45.98	<.0001
White	62404	2674.56217	1.262494E12	544.39	<.0001

Indian/Asian	20765	3114.37947	1.030934E11	44.45	<.0001
Urban Formal	5659.73914	968.41055	79211623473	34.16	<.0001
Rural Formal	-7011.87132	2833.95900	14196976392	6.12	0.0134
Free State	-6546.65705	1786.37558	31146463677	13.43	0.0002
Eastern Cape	-3279.97490	1366.30179	13364812789	5.76	0.0164
Male	-3237.28948	878.71105	31476469215	13.57	0.0002
Mother's Years of Schooling	435.93273	101.86321	42473623467	18.31	<.0001

While both effort variables (individual's employment status and years of schooling) remained in the model, only 11 of the circumstance variables, namely parental background (father and mother's employment status and father and mother's years of schooling); sex at birth of individual (male); race of individual (White and Indian/Asian); and place of residence (Eastern Cape, Free State, Urban formal and Rural formal) were found to be statistically significant and therefore remained in the model.

Table 8 Partial R-squared

STEP	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	Employment status	1	0.2351	0.2351	1307.65	3752.42	<.0001
2	White	2	0.0409	0.2760	587.264	689.39	<.0001
3	Years of Schooling	3	0.0203	0.2964	229.958	352.77	<.0001
4	Indian/Asian	4	0.0040	0.3003	161.598	69.47	<.0001
5	Urban Formal	5	0.0023	0.3026	123.489	39.73	<.0001
6	Mother's employment status	6	0.0022	0.3048	85.9243	39.31	<.0001
7	Father's employment status	7	0.0012	0.3060	66.9051	20.92	<.0001
8	Mother's Years of schooling	8	0.0012	0.3072	47.9849	20.85	<.0001
9	Male	9	0.0008	0.3080	36.7320	13.22	0.0003
10	Free State	10	0.0007	0.3087	25.5937	13.12	0.0003
11	Father's Years of schooling	11	0.0004	0.3091	21.4009	6.19	0.0129
12	Rural Formal	12	0.0003	0.3094	17.8861	5.51	0.0189
13	Eastern Cape	13	0.0003	0.3097	14.1231	5.76	0.0164

Table 8 shows the 13 significant variables obtained from the multiple regression analysis which were used to establish the relative contribution of each variable towards the total R-squared of 0.3097, by calculating the individual and overall partial R-squared values for the independent variables.

In Table 9 below, the contribution of each of the major groups of variables, namely circumstance and effort variables, is isolated, as well as the contribution of each variable within each of the major groups. This was done to facilitate between-group (circumstance vs effort) comparisons as well as within-group comparisons (amongst variables of the same major group).

It is clear from a between-group analysis that the two groups' relative contribution to the total R-squared is significantly different. While the combined effort variables' contribution towards the overall R-squared amounted to 0,2554 (a massive 82,47 percent of the overall explained variation of 0,3097), the remainder of the total R-squared, namely 0.0543 was collectively contributed by the group of 11 circumstance variables.

Table 9 Partial R-squared by circumstance and effort variables

VARIABLE		PARTIAL R-SQUARED	
CIRCUMSTANCE	**EFFORT**	**CIRCUMSTANCE**	**EFFORT**
	Employment Status		0.2351
White		0.0409	
	Years of Schooling		0.0203
Indian/Asian		0.0040	
Urban Formal		0.0023	
Mother's Employment Status		0.0022	
Father's Employment Status		0.0012	
Mother's Years of Schooling		0.0012	
Male		0.0008	
Free State		0.0007	
Father's Years of Schooling		0.0004	
Rural Formal		0.0003	
Eastern Cape		0.0003	

If we consider within-group contributions to the partial R-squared within the effort variable group, it is clear that the individual's employment status contributes the most towards this group's partial R-squared (approximately 92 percent) and also the most towards the overall R-squared (nearly 76 percent).

Although the contribution of the group of circumstance variables towards the overall R-squared is relatively low, a few very interesting observations can be made from within-group comparison of partial R-squared values. Amongst the circumstance variables, the White group's relative contribution is the highest at 0,0409. This contribution is approximately 10 times the contribution of the Indian/Asian group, as well as the second highest contributor to the overall R-squared. Overall, race of the individual is the greatest contributor to the circumstance variables' contribution of the total R-squared, at nearly 83 percent (0,0449 out of 0.0543). Furthermore, when considering parental contribution to partial R-squared, the mother's employment status (nearly twice as large as father's) and level of education (three times as large as father's) were found to be more significant than those of the father. Living in an urban formal area is significantly more influential in its contribution to the overall partial R-squared as well as the overall R-squared than residing in a rural formal area (with a 7,7 times larger contribution).

While most of the variation in income can be ascribed to variations in an individual's own efforts, it is worth noting that certain circumstances within an individual's environment, and outside of his/her sphere of control, do play a role in how the individual will perform economically.

4.4 Inequality of opportunity: Ex-ante approach

Having established the variables influential in determining an individual's ability to generate an income, as well as the relative contribution of efforts and circumstances towards explaining variations within income, this section measures the overall contribution of circumstances, followed by the decomposition of inequality of opportunity into its constituent parts, namely the circumstances contributing to inequality of opportunity and finally the relative influence of each individual circumstance on the outcome, income. The analysis was performed using the iop package in STATA.

The ex-ante method of determining inequality of opportunity uses the regression approach to provide point estimates of inequality of opportunity (either absolute or relative measures of inequality of opportunity). The point estimate is computed using OLS estimation. According to Wendelspiess Chavez Juarez and Soloaga (2014), circumstances should not meaningfully influence outcomes of an individual when everyone has the same opportunities in life; and thus, the regression model should have a low R-squared value, which would indicate the absence of inequality of opportunity. On the other hand, inequality of opportunity exists if the circumstances influence the outcome.

Wendelspiess Chavez Juarez and Soloaga (2014) measure "inequality of opportunity" using the absolute inequality measure: $\boldsymbol{\theta}_{\alpha} = I(\hat{y})$, where I(.) is a common inequality measure applied to the vector of circumstances ($\hat{y}$).

By dividing the absolute inequality measure by the same metric *I*(.) applied to the actual outcome *y* gives a relative measure of inequality of opportunity:

$$\boldsymbol{\theta}_{r} = I(\hat{y})/I(y).$$

Using this method, absolute and relative measures of inequality of opportunity were computed using 7 252 observations on the 11 circumstance variables only. Point estimates for both the absolute and relative measures of inequality of opportunity are given in Table 10 below.

The absolute inequality of opportunity is 0.117165, while the relative inequality of opportunity is high at 0,6133. The relative inequality of opportunity value indicates that slightly more than 60 percent of the variation in income is due to the included circumstances; and is thus not attributable to an individual's own efforts or due to luck.

Table 10 Inequality of opportunity

METHOD	ABSOLUTE	RELATIVE
Ferreira-Gignoux (With Scale)	0.171165	0.613261
Bootstrap Std. Err.	(0.010294)	(0.010294)
Ferreira-Gignoux (Without Scale)	not defined	0.201763
Bootstrap Std. Err.		(0.010812)

Lastly, we decompose inequality of opportunity using the Shapley method, into its sources by estimating the relative importance of certain categories of circumstances. The circumstance variables were categorised into four (4) groups. Group 1 contained parental background variables, group 2 contained the sex of individuals at birth, group 3 was composed of population group categories, while group 4 represented the settlement type and provinces individuals reside in. Thus, decomposition of inequality was done through clusters of related variables rather than individual variables.

Table 11 Decomposing inequality of opportunity

VARIABLE	VALUE	IN PERCENTAGE
GROUP 1: Fathers Years Of Schooling Mothers Years Of Schooling Fathers Employment Status Mothers Employment Status	0.120758	19.69%
GROUP 2: Male	0.137313	22.39%
GROUP 3: White Indian/Asian	0.175294	28.58%
GROUP 4: Free State Eastern Cape Urban Formal Rural Formal	0.179896	29.33%
TOTAL	0.613261	100.00%

The data in Table 11 clearly shows that race and place of residence are the two top contributors to inequality of opportunity, with the place of residence group, comprising four variables, accounting for just more than 29 percent of the inequality of opportunity. Race of individuals play an equally important role in determining inequality of opportunity amongst individuals and accounts for just under 29 percent, while sex of the individual and parental background factors account for approximately 22 percent and 20 percent respectively.

CHAPTER 5: “AND THEY ALL LIVED HAPPILY EVER AFTER”: FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

Understanding the various facets of inequality is a daunting task. However, this research has attempted to make a contribution towards improving the manner in which South Africa measures this phenomenon. Inequality of opportunity is not a new term; however, it is an unfamiliar one. The findings from the research will assist in providing new insights into inequality measurement, while also proposing various recommendations to Statistics South Africa, for measuring official inequality.

Chapter 5 includes a summary of the research results and various other sections according to the research questions and sub-questions as indicated in the first chapter.

The research questions were the following:

- Identifying which circumstance and effort variables significantly impact the outcome variable - income; and
- Determining the proportion of total inequality that can be attributed to inequality of opportunity

The research sub-question was as follows:

- How will improving the techniques used to measure official inequality benefit Statistics South Africa and the South African government at large?

Furthermore, the chapter also includes recommendations on the measurement tool used by Statistics South Africa in collecting inequality data as well as concluding remarks on the study.

5.2 Summary of analysis and results

The main purpose of the study was two-fold, firstly it was to calculate which circumstance and effort variables are fit for use in South Africa. From this we were able to identify the circumstance and effort variables relevant for use in the country. Secondly, the study set out to decompose inequality, to determine what the major contributors of inequality of opportunity were.

Before any regression analysis could be conducted, a multi-collinearity test was run to identify which independent variables were highly correlated and subsequently had to be removed before performing the regression modelling. The outcome of the collinearity tests left 26 independent variables in the sample of 12 209 observations.

Once the 26 variables were identified, they were all included in the regression model. Stepwise regression was run on the dependent variable, annualised income adjusted for inflation and the list of independent variables as shown in tables 4 and 5. The stepwise regression, removed 13 of the independent variables, due to them not being statistically significant. The other 13 variables that were deemed statistically significant formed part of the interpretation of the regression analysis results.

The final step in the analysis was decomposing inequality. Inequality was decomposed using the *iop* function in STATA. One should remember that when doing the decomposition only the 11 circumstance variables were used.

The results obtained from both the regression analysis and decomposition, follow a slightly different trend than those of previous scholars as discussed in chapter 2. The inequality of opportunity studies conducted in India, Brazil Egypt and South Africa showed that parental background had the highest effect on one's income. However, based on this research, when excluding effort variables, race and place of residence are the main drivers in determining income outcomes in South Africa. In a country such as South Africa, where the inequalities between race groups is extremely prevalent, this finding is justifiable. Furthermore, the effects of spatial segregation as a result of apartheid also comes through in the results; place of residence was the highest

contributor to inequality of opportunity. While these findings are not surprising, given the socio-economic characteristics of the country, it should raise some alarm bells for the government. Particularly when attempting to deal with poverty and inequality reduction strategies.

5.3 Circumstance and effort variables relevant to South Africa

One of the key objectives of the study was to evaluate the following hypothesis:

H_0: Circumstance variables have no effect on income

H_0: Effort variables have no effect on income

Based on the results obtained there is clear evidence to accept the alternative hypothesis.

From the various studies conducted on inequality, and more recently on various forms of inequality of opportunity, it is clear that inequality of opportunity gives some individuals an unfair advantage in life while impeding others in their search for a better life. This is both an unethical and undesirable state of affairs that should be eradicated. Understanding what constitutes the drivers of inequality of opportunity in South Africa can greatly assist in facilitating strategy development aimed at alleviating, and hopefully eliminating this scourge. The first step towards successfully measuring inequality of opportunity, is determining which variables should be considered a circumstance and which an effort (Ferreira & Peragine, 2015). Once this distinction has been made, deriving inequality of opportunity measurements become simpler.

An individual's employment status (effort), years of schooling (effort), being from the White and Indian/Asian race groups (circumstance), the parental level of education and employment status (circumstance), being born a male (circumstance) and residing in either Eastern Cape, Free State, Urban formal or Rural formal, (circumstance), were identified as having the biggest effect on individual income in South Africa.

Furthermore, the large contribution by both effort variables to income, speaks to the importance of 1) creating employment opportunities; and 2) ensuring universal access to both basic and tertiary education, in South Africa.

Interestingly, while the White and Indian/Asian race groups' contribution towards explaining variations in individual income, was the highest amongst all the circumstance variables, these race groups only constituted 8,3 and 2,5 percent of the South African population in 2015, respectively (Statistics South Africa, 2015). The results point to the unfair advantage that these two groups, but in particular White individuals, enjoy over other race groups in South Africa.

Since parental levels of education and employment status are key determinants in the income generation ability of their children, it strengthens the case for improved access to education for all. This is particularly true for women as the mother's contribution exceeds that of the father. This, coupled with the fact that 42 percent of South African households are headed by females, points to the need for special attention to be granted to the circumstances of, and opportunities for females.

Identifying the circumstance and effort variables relevant in the South African context was instrumental in establishing the basis for measuring inequality of opportunity. While the list of variables used in the regression may not be exhaustive, due to data limitations, it does provide Statistics South Africa with a good starting point for the inclusion of inequality of opportunity, as an additional official inequality indicator.

5.4 Inequality of opportunity: measurement and decomposition

The third hypothesis that had to be investigated was:

H_0: Inequality of opportunity does not contribute to total inequality in South Africa

Inequality of opportunity can be measured using various methods and approaches; however, for this research the ex-ante approach to inequality of opportunity was used.

In this specific approach only variables beyond an individual's control (circumstance) are included in the model. The results from the ex-ante method showed that, when excluding effort variables, approximately 60 percent of the disparity in income can be attributed to inequality of opportunity and not to either luck or the individual's own efforts. Put differently, factors outside one's control, such as race, sex, family background and place of residence, were found to be key determinants of inequality of opportunity in South Africa.

In the light of the results obtained, inequality of opportunity in income of individuals in South Africa, to a large extent, can be explained by their parent's level of education and employment status, where they reside, the race group they belong to, and their sex.

For a country like South Africa, where the skewed distribution of income and resources are particularly high between race groups; males and females and place of residence, using the inequality of opportunity index can bring huge benefits to measuring the progress made towards rectifying these injustices and possibly delivering better outcomes for future generations.

In light of the results obtained it is clear that inequality of opportunity does contribute to total inequality in South Africa, and therefore we are accepting the alternative hypothesis.

5.5 Improving lives through better inequality measures

With the persistently high levels of inequality in South Africa, introducing new ways of understanding and measuring inequality can provide South Africa with new insights into the problem. Inequality of opportunity, as shown in earlier sections, allows one not to just measure inequality, but also to understand the factors that contribute to these high levels of inequality. Furthermore, the type of information derived from producing the inequality of opportunity index, provides information that can be very useful to government and specifically policy makers. By quantifying the problem, it becomes easier to track and manage the progress being made in resolving it. Thus, through understanding what proportion circumstance variables contribute to outcomes, policy makers

are afforded the opportunity to draft certain policies and programmes in such a manner that it may assist in counter-acting the negative effects of the unavoidable factors, that are outside of one's control, such as race, sex and family background.

Applying the results from the study to current social and economic policies and programmes implemented by the South African government it is clear that a lot more resources need to go towards negating the negative effects of circumstances. In addition to providing a monitoring and evaluation tool for the South African government, to track the reduction in inequality; inequality of opportunity also gives one a deeper insight into the nature of the inequities in the country. While some may feel that putting the blame of the social and economic injustices South Africans still face today, on an unfair system that ended more than 20 years ago, the reality is that while apartheid might no longer exist, the aftermath of such an oppressive system still hobbles the ability of individuals from particular race groups and geographical locations to prosper, today.

If we have to look further into the results of the study and compare it with what has happened in the 20 plus years of democracy in South Africa, it is rather hard to imagine that race can still play such a pertinent role in society. However, while the segregation laws may no longer exist, the generational impact of what the previously disadvantaged communities experience today makes it difficult, and in some cases impossible for them to rise above their circumstances given the lack of opportunities presented to them, as a result of situations they were born into and thus have no control over. Being born a non-white in South Africa, even during the times we live in, in many ways detrimentally affect the lives of these individuals. This is the essence of what inequality of opportunity is trying to reduce. Once, a child is born into this world and have the same chances as any other individual regardless of race, sex or family background then we would have achieved the ideal egalitarian society, we claim to want. This is however not something that will happen overnight and without great effort form various role players, both private and public. While government should do everything in its power to compensate for, and

reduce this injustice, society in general as well as the private sector should find their own unique ways of contributing to a better life for all.

5.6 Recommendations and Conclusion

This study has laid the foundation for further research into what can be a promising instrument in the fight against poverty and inequality in South Africa. Furthermore, the research shows that inequality of opportunity can play a vital role in achieving a more egalitarian society if the appropriate policy interventions are initiated.

The inclusion of an inequality of opportunity index as a domestic indicator for the United Nations Sustainable Development Goals would greatly enhance the suite of indicators used for reporting on inequality in South Africa; however, more work is required to make this a reality. In order to work towards this goal, the following recommendations are put forward regarding future research in this regard:

- Additional research needs to be done to refine the variable selection process and thus the suite of variables to include in the research;
- Statistics South Africa needs to improve its data collection tools by including parental background information, irrespective of whether the parents reside in the household or not;
- More research to further the development and refinement of inequality of opportunity measurement tool should be conducted; and
- The variables that constitute the drivers of inequality of opportunity should be further refined, once an improved set of variables is available.

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