THE IMPACT OF COVID-19 ON INEQUALITY IN SOUTH AFRICA

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DECLARATION OF ORIGINAL WORK

This page declares that the work produced in this thesis is my own and was conducted whilst completing the degree of Master of Commerce whilst at Rhodes University. Any work that is not my own has been credited accordingly. This thesis has not been submitted to other universities, Technikons or colleges for degree purposes.

Signed: Peace Nyumbaiza

Date: November 2022

ABSTRACT

The COVID-19 pandemic has raised concerns regarding its possible adverse income distributive consequences, and its different impact according to socioeconomic subgroups (Furceri *et al.* 2020). This research measures the impact of COVID-19 on inequality in South Africa. To do this the study uses the National Income Dynamic Study (NIDS) wave 5 (2018) and the National Income Dynamic Study Coronavirus Rapid Mobile (NIDS-CRAM) survey waves 1 – 5 (2020 - 2021) datasets to study income inequality in South Africa prior to and during the COVID-19 pandemic until mid-2021. The factor method developed by Lerman and Yitzhaki's (1985) is used to identify the overall contribution of the different factor sources to income inequality. Labour income is identified as the largest contributing factor and so labour income inequality is decomposed by income determinants using the regression-based decomposition method proposed by Fields (2003). The analysis reveals that labour income worsened during the periods of strictest COVID lockdown, before returning to pre-pandemic levels of inequality as lockdown was eased. Education is the most important determinant of labour income inequality across all time periods, particularly for White, urban and female participants. Although education remains a driving factor of labour income inequality during the national disaster, its contribution lessens as the economy starts recovering by March 2021. Consequently, the contributions of gender, race, age and region increase during the same period. Identifying whom the inequal impact of pandemic has affected worse offers insight that emphasizes the importance social grant systems to aid bridge the inequality gap associated with COVID-19.

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CHAPTER 1: INTRODUCTION

1.1 Introduction

The concept of inequality has been widely researched on a global scale (e.g. Casale and Posel (2020); Ranchhod and Daniels (2020);Kohler and Bhorat (2020); Nwosu and Oyenubi (2021) in attempts to address its roots and alleviate the socioeconomic issues that are commonly associated with it. South Africa has been listed as one of the most unequal countries in the world, with an alarming Gini coefficient of 0.63 (World Bank, 2020). The high level of pre-existing inequality in South Africa is likely to have contributed to the perpetuation of COVID-19-related inequality in wealth, income and other social inequalities (gender, racial, regional). This research aims to add to the limited body of knowledge on the inequality impact of the COVID-19 pandemic in South Africa.

As the pandemic unfolded, middle to low-level earners suffered major job losses and income cuts which perpetuated income inequality, while the wealthy received high returns from the stock market, and had the option of working from home. This research analyses the National Income Dynamics Study (NIDS, 2018) and the National Income Dynamics Study-Corona Rapid Mobile Survey (NIDS-CRAM, 2021) datasets in estimating the change in overall and income inequality before and during the COVID-19 pandemic for different sub-groups. The intention is to identify programmes and strategies whereby South African policymakers can simultaneously increase economic growth, while reducing COVID-19 inequality impacts by protecting the most vulnerable population groups.

1.2 Research context

The rapid increase in COVID-19 cases and deaths around the world has led over 100 countries into either a full or partial lockdown (a restriction policy for people or a community to stay at home, usually due to specific risks to themselves or to others) (WHO, 2021). The consequent rise in business closures, increased unemployment, and the disparities in the ability of individuals to work from home meant that these restrictions had greater detrimental impacts on some socioeconomic groups than on others (WHO, 2021).

The Berkhout *et al.* (2021) International Survey, *The Inequality Virus* (2021), comprising 295 economists from 79 different countries, reported that 87% of respondents expected a moderate to strong increase in income inequality in their respective countries due to the pandemic (Lakner *et al.,* 2020). Furthermore, over 50% of respondents expected gender inequality to rise, while 66% suggested the same about racial inequality, and agreed that government did not yet (at the time of the survey) have proper measures in place to combat such rising inequality (Christensen and Wells, 2021).

In South Africa, studies by StatsSA (2020) and Nwosu and Oyenubi (2021) initially began by showing signs of decreasing wealth inequality as the stock exchange took a big hit in the beginning of 2020, resulting in the world's millionaires losing large portions of their wealth. The closure of various businesses led to job losses and income cuts, particularly for female, non-white, and rural workers, while the high earning workers were likely to benefited from Work-from-home policies (WFH), remained unaffected (Nwosu and Oyenubi, 2021).

The lootings that took place in July 2021 in South Africa have been blamed in part on both the impact of COVID-19 and persistently high levels of inequality (News24, 2021). This is therefore a pertinent time to examine changes in income and wealth inequality since the onset of the pandemic, to add to the limited research for strategies whereby South African policymakers can increase economic growth while simultaneously aiming to reduce COVID-19 inequality impacts. The first theoretical explanation of inequality is from Kuznets (1955) who studied the relationship between inequality and economic development. Kuznets (1955) found an inverted U-shaped trend between income inequality and GNP per head. Kuznets (1955) argues that inequality rises in the early stages of development (when there is shortage of capital, which earns high returns, and an excess of low-skilled labour, which means low wages) and drops when economic development progresses beyond a certain point.

While there are various debates on the causes of inequality, most scholars agree that inequality is indeed rising on a global scale (Summers, 2014), which contradicts Kuznets' (1955) hypothesis of growing inequality in developing countries alone. As a result, the hypothesis has increasingly been criticized by various scholars, including Gottchalk and Smeeding (2005), Lind and Mehlum (2010), Deininger and Squire (1996), and Piketty (2014). In his book, *Capital in the 21st Century*, Piketty (2014) claims that rising inequality is a consequence of accumulated wealth. Piketty (2014) builds his argument on two pillars; first, that the rate of return of capital (r) is always higher than the economic growth rate (g); second, that wealthy individuals and families pass down their wealth from generation to generation which perpetuates inequality, as wealth is concentrated among a limited number of individuals (Piketty, 2014).

However, contrary to Piketty's (2014) claims of wealth being the main driver of inequality, Summers (2014) and van der Berg (2010) maintain that income inequality is actually caused by growing disparities in the labour market. In recent decades there has been a shift in the labour market from agriculture to the financial and services sector. This shift has led to an increase in the demand for highly skilled labour, which was unfavourably matched with an excess supply of low-skilled labour, particularly in developing countries (Leibbrandt *et al.*, 2001). This has resulted in a widening gap in labour income, as low-skilled workers are forced to either lose their jobs or settle for low wages, while highly skilled workers get paid relatively large salaries (Klasen and Woolard, 2009). The gap between the wages of low- and highly skilled workers in the labour

market, according to Summers (2014) and van der Berg (2010), is what has driven increased income inequality, particularly in South Africa (Leibbrandt *et al.,* 2001).

Evidence on the main drivers of inequality has been collected from global studies by Gould (2019), Zhou and Song (2016), Yue *et al*. (2011), Krever and Zhang (2011) and Ahn *et al.* (2016). These studies present evidence which suggests that rising inequality in the labour market is closely associated with the state-dominated nature of big organisations, the widening gap between Large Conglomerates (LCs) and Small- and Medium-sized Enterprises (SMEs), and the reduction in collective and individual bargaining power of workers, as well as the substantial wage gains for those at the very top of wage distribution. The persistently high labour income inequality trend is likely to be worsened at the hands of the COVID-19 pandemic.

Past pandemics and economic crises such as the Black Death in the 14th century, the Spanish Flu (1918–20), the Great Depression (1929–33) and the 2008 Global Financial Crisis (2008) provide possible insights into the potential adverse impacts of the COVID-19 pandemic on income and wealth inequality. According to Alfani (2020), the 14th century bubonic plague ("Black Death") pandemic was associated with reduced income inequality, mainly because the extremely high mortality rate led to labour scarcity and a rise in real wages. Surviving low-skilled workers (the poorest) received a boost in their bargaining power and were able to negotiate better working conditions (Godde, 2020). The extremely high mortality rate during the Black Death also resulted in widespread redistribution of inherited properties. A growing number of houses were offered on the market, reducing property prices thereby reducing wealth inequality (Yaussy, 2022).

In contrast, according to Furceri *et al*. (2020), the 1918–1920 Spanish Flu resulted in increased income inequality due to the drastic decline in income experienced at the bottom deciles of the population, while high income earners experienced little to no change in their income levels. Unlike the Black Death, the gravity of the Spanish Flu was perpetuated by poor living standards and ineffective non-medical interventions (Barro *et al*., 2020). The impact was therefore greater on the poor than the rich. Furceri *et al*. (2020) notes that in Italy, the virus initially grew in impoverished municipalities where infected Italian World War I soldiers were deployed. The long-term effects of the Spanish Flu on increasing income inequality are affirmed by Galleta and Giommoni (2020) who found that regional inequality in Italy has remained high for the past 100 years.

Economic crises such as the Great Depression and the 2008 Global Financial Crisis had contradictory impacts on inequality. While the Great Depression was associated with declining inequality, the 2008 Global Financial Crisis was characterized by rising inequality in Italy and in the US. According to Winsten (1963), in the USA, the Great Depression led to the implementation of the New Deal, whose programmes led to a 33% increase in union membership, allowing workers to gain more bargaining power (DeWitte and Wissler, 2022). The median wages of workers increased as a result during this period, while labour productivity doubled. Higher wages coupled

with the implementation of a progressive tax system resulted in decreased wealth and income inequality (Winsten, 1963).

The Global Financial Crisis is linked to increasing inequality due to the collapse of house prices, a substantial devaluation of middle-class household asset portfolios, as well the quick rebound in the stock market which increased the wealth of the rich (Khun *et al*., 2021). As most of their wealth is held in the form of stock, the top 10% of wealthiest household benefited most from the stock market booms, and were less affected by the drop in residential real estate prices (Lysandrou, 2011). By contrast, middle, and low-income earners experienced loss of wealth due to the drop in house prices which further widened the wealth inequality gap (Van Treeck, 2014).

The history and trends of pandemic and economic crises demonstrate the complexity of determining whether calamitous events will lead to a rise or fall in inequality. The impact depends upon the nature of the pandemic or crisis, as well as the policy responses. The pandemic and economic crises that have spread equally across the population have contributed to inequality reduction, while those that have spread disproportionally (leaving socioeconomically disadvantaged groups worse off) are likely to widen inequality. In the case of COVID-19, it is important to note that lockdown regulations were implemented periodically in South Africa from 2020 to date and thus the wealth and income inequality impacts of the COVID-19 pandemic may also vary across different time periods.

The initial stage of the pandemic was characterized by a crash in the stock exchange, high levels of job losses, and global income reductions, all of which are indicative of decreasing wealth and income equality (Blundell *et al*., 2020). This however changed in magnitude as the pandemic unfolded. Studies by Lakner *et al.* (2021) (2021), Alfani *et al*. (2020), Blundell *et al*. (2020), and Templeton *et al.* 2020). show evidence of an initial fall in wealth inequality, which was associated with the fall in the stock exchange and the initial spread of the COVID-19 virus in rich countries, followed by the implementation of strict social distancing restrictions that fell hardest on low-skilled workers and other socioeconomically disadvantaged groups.

The economic damage that developed as a consequence of lockdown regulations deemed the spread of COVID-19 socially regressive (Plümper and Neumayer, 2020). Although the COVID-19 pandemic seemed to contributed to the fall in wealth inequality, the second phase of the pandemic revealed that the virus itself did not necessarily affect the poor more than the rich, but it was the ability to take efficient precautionary measures against the risk of infection that separated the impact felt by the rich versus the poor (Wills *et al.,* 2020). In the second phase of COVID-19, the virus reached the poor and resulted in more detrimental socioeconomic disadvantages for socially disadvantaged groups as opposed to rich, White, male, and highly skilled workers across different countries (Casale and Shepherd, 2021).

The impact of COVID-19 was prone to cause disparities that went beyond wealth and income inequality as explored in the sections above. The impact has not been felt equally when observing the social measures of inequality. The literature includes global evidence on the impact COVID-19 has had on race, gender and regional inequality in Brazil, the United States, Germany, South Africa, and other nations. With regard to race, gender and regional inequality, various studies from the Lakner *et al.* (2021); StatsSA (2019); Tanith *et al*. (2020); Dang and Viet Nguyen (2020) provide evidence that both ethnicity and gender inequality were significantly associated with a greater risk of COVID-19 related deaths, which emphasizes the importance of implementing control and recovery measures at government level for these disadvantaged communities in order to eradicate the perpetuation of inequality.

The impact of COVID-19 has not been felt equally in every region. The initial spread of COVID-19 took place in developed countries. As the pandemic unfolded, and the virus spread to underprivileged regions, studies by Shen *et al*. (2021), Irlacher and Koch (2021), Sweatman *et al*. (2021), Rocha *et al*. (2021), and Berkhout *et al.* (2021) show evidence that poorly resourced, overcrowded, poor regions experienced the highest COVID-19-related death rates compared to rich countries and regions. The alarming pre-existing levels of wealth and income inequality in South Africa are likely to be perpetuated by the severity of the COVID-19 inequality impact, particularly for the poor, low-skilled, Black, and female workers who experienced high levels of job losses, income cuts, and the inability to work from home. In contrast, the wealthy have increased both their wealth and income through the booms in the stock market, and benefited from the ability to work from home during lockdown periods. The impact of COVID-19 is thus expected to increase overall inequality South Africa.

1.3 Goal of the research

The goal of the research is to measure the short-term inequality impact during the first year of the COVID-19 pandemic on income and wealth in South Africa for different sub-populations.
Sub-goals:

1. To measure changes in the contribution of income sources (including wealth, labour, social grants and in-kind income) and their marginal effect on overall income inequality in South Africa pre-COVID-19.

2. To measure changes in labour income inequality by income determinants including gender, race, age, region, and level of education before and during the COVID-19 pandemic.

3. To measure changes in labour income inequality by income determinant sub-group, particularly within gender, race, and geographical region, education before and during the COVID-19 pandemic.

1.4 Method and data

A quantitative research approach is employed to achieve the research goals. The paradigm is positivist, and looks to estimate social realities and human behaviour through both observation and reason (Sciarra *et al*., 1999).

To determine the impact of COVID-19 on inequality in South Africa, the National Income Dynamic Study (NIDS) (2018) and the National Income Dynamic Study Coronavirus Rapid Mobile (NIDS-CRAM) survey (2020) datasets will be employed. The NIDS is a panel dataset compiled biennially by the South African Labour and Development Research Unit (SALDRU, 2017) based at the University of Cape Town (UCT). In 2008, the 1st Wave of data was administered to a nationally representative sample of 28 000 individuals from 7 300 households (HH). The 5th Wave (2018) saw a significant increase in participants to a total of 37 000 individuals and 13 719 HHs (SALDRU, 2017).

The NIDS-CRAM is a computer-assisted telephone interviewing (CATI) survey, which was initially conducted in May and June of 2020. The NIDS-CRAM data sample comprises 7 074 randomly selected participants from the adult sub-sample of the 5th Wave of the NIDS (2018). Employment, earnings, and household-level economic outcomes data from the NIDS (2018) and the NIDS-CRAM (2021) datasets are employed, and the different income sources are presented. The NIDS (2018) and the NIDS-CRAM (2021) databases are employed owing to the uncomplicated manner in which they present socioeconomic data collected for the period under study and the availability of different measurement points as the pandemic has unfolded.

The analysis uses the factor decomposition method developed by Lerman and Yitzhaki (1985) as well as the regression-based decomposition method proposed by Fields (2003). These two Gini decomposition methods allow for the decomposition of total income by income sources and then for the decomposition of labour income by income determinants for different sub-population groups before and during the COVID-19 pandemic in South Africa. The factor decomposition method is best suited for understanding the overall contribution of the different factor sources to inequality. Similar factor decomposition methodologies have been proposed by Kakwani (1977) and Shorrocks (1983, 1982). However, Shorrocks' decomposition rule applies to the coefficient of variation, while Lerman and Yitzhaki's (1985) approach applies solely to the Gini coefficient of income sources. The regression-based decomposition method proposed by Fields (2003) provides an efficient way to quantify the contribution of income determinants in a multivariate context, and has been employed in studies by Morduch and Sicular (2002) and further developed by Fields (2003).

The first sub-goal of the research is to measure changes in the contribution of income sources (including wealth, labour, social grants, and in-kind income) and their marginal effect on overall income inequality in South Africa pre-COVID-19. This is achieved by using the factor

decomposition method proposed by Lerman and Yitzhaki (1985) employing the income variables from the NIDS (2018) wave dataset. Using the STATA software, the Gini decomposition equation for total income ($G = \Sigma kk=1\ Sk.Gk.Rk$) is used to generate the Gini coefficients for each income type and their respective marginal effect to overall income inequality.

The second and third sub-goal of the research is to measure changes in labour income inequality by income determinants (including gender, race, age, region, and level of education) and at sub-population level before and during the COVID-19 pandemic. This is achieved through Field's (2003) regression-based decomposition on labour income. The four main steps included in estimating the labour income impact of COVID-19 are: the generation of Gini coefficient of labour income determinants, an income generating model, the decomposition of income sources by income determinants, and the decomposition of labour income at sub-population level.

Research limitations include the limited wealth data included in the NIDS-CRAM (2021) (which excludes important household wealth variables, such as pension funds) in estimating wealth inequality Gini coefficients. While tax record data would be a broader and better database to estimate the changes in wealth, they do not exist for short-term changes, and thus the NIDS (2018) and the NIDS-CRAM (2021), are the most appropriate national representative household surveys available.

It is important to note that the method used in collecting the NIDS (2018) Wave 5 income data differs significantly from those used to collect the NIDS-CRAM (2021) income data. The NIDS (2018) consists of an in-depth, in-person two-hour long interview, while the NIDS-CRAM is a short questionnaire (20-minute phone call) (NIDS-CRAM, 2021). This may raise concerns for the degree of comparability between the two datasets.

However, the research will use longitudinal survey data which links the NIDS-CRAM (2021) respondents back to their Wave 5 NIDS (2018) records. The longitudinal nature of the NIDS-CRAM provides a rich set of 2018 individual and household-level characteristics to draw from. Since the NIDS-CRAM (2021) is a stratified 30% sub-sample of participants in Wave 5 of the NIDS (2018), this will increase the comparability of the results. Furthermore, post-stratification weights will be applied for both waves of the NIDS (2018) and the NIDS-CRAM (2021) datasets to allow for more accurate results of population estimates (SALDRU, 2017).

1.5 Structure of remaining chapters

The remaining chapters present the theoretical background upon which the study is based, the literature review highlighting the relationship between the COVID-19 pandemic and overall income inequality, the analytic approach, research findings, conclusion, and publicity implications.

Chapter 2 discusses the global debates on inequality by presenting theoretical and empirical evidence from various countries. The chapter also provides a discussion on causes of rising and falling inequality in the labour markets of different nations, which serves as a guide in observing the main causes of rising inequality in South Africa.

Chapter 3 focuses on presenting the findings from global studies on the relationship between inequality and COVID-19. A detailed discussion on the inequality trends associated with past pandemics and economic crisis is presented, followed by the wealth and income inequality impacts of COVID-19 at different time periods of the pandemic. Chapter 3 ends by narrowing down the gender, regional, and racial inequalities that have worsened at the hands of the pandemic in South Africa.

Chapter 4 provides a detailed discussion of the methodology, data, and analytic process taken to fulfil the research goal and sub-goals mentioned above, Lerman and Yitzhaki's (1985) factor decomposition method, as well as the regression-based decomposition method proposed by Fields (2003). These two Gini decomposition methods permit the decomposition of total income by income sources, and the decomposition of labour income by income determinants at sub-group level before and during the COVID-19 pandemic in South Africa, using the NIDS (2018) and the NIDS-CRAM (2021) datasets.

Chapter 5 presents the results of the analytic process and provides a detailed explanation of the income inequality changes associated with COVID-19 in South Africa for different ages, genders, races, geographical regions, and education levels. Lastly, Chapter 6 provides the summary and conclusion of the study as well as policy implications and prospects for future research on the most effective approaches to alleviating the inequality impact of COVID-19 in South Africa.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The study is focused on identifying the causes of rising inequality in South Africa, and how inequality has been reduced or worsened by the COVID-19 health regulations for different socioeconomic groups. To have a better understanding of what drives inequality and how these factors have been affected by the pandemic, this section includes an overview of the economic theories on the main drivers of inequality which have been globally supported and critiqued by various scholars. The chapter attempts to address the question of "What causes inequality?" by presenting theoretical and empirical evidence on the main drivers of inequality both globally and in South Africa. Kuznets' (1955) hypothesis suggests that inequality is greater in developing countries where capital is still scarce and labour productivity is low, compared to developed countries that have high levels of capital and high labor productivity, while Piketty (2014) argues that inequality is growing as a consequence of accumulated wealth that occurs under capitalism, where the argues rate of return of capital (r) is always higher than the economic growth rate (g). However, more compelling evidence particularly in South Africa, presented by Summers (2014) and van der Berg (2010) show that the gap between the wages of skilled and unskilled workers in the labour market is what has driven increased income inequality. The chapter therefore sets the scene for the examination of which drivers of inequality may have been adversely affected by COVID-19.

2.2 Theories on the causes of inequality

2.2.1 Kuznets theory of inequality

Simon Kuznets (1955) studied the relationship between economic growth, development, and inequality. Kuznets' (1955) hypothesis suggests that inequality rises in the early stages of economic development and falls when economic development progresses beyond a certain point. Using a combination of cross-country data and time series, Kuznets (1955) found an inverted U-shaped trend between income inequality and Gross National Product (GNP) per head – what is today known as the Kuznets curve. Kuznets (1955) initially attempted to study the trends between development and inequality by observing countries such as Prussia, the United Kingdom (UK) and the United States (US) prior to the World War 1 period which had experienced increasing levels of inequality with relatively large levels of wealth accumulation. The findings of this study showed that although the pre-World War events were characterized by rising inequality, post-World War periods actually experienced diminishing inequality over time, mainly because most of the income accumulated by top earners decreased in post-war times, while that of the bottom quintiles began to rise, as show in Figure 1.

In attempts to explain the reasons behind the rising inequality (particularly in developing countries), Kuznets (1955) notes that populations in the upper-income brackets had a high concentration of savings, while those in the lower-income percentiles had no or limited savings. Kuznets (1955) notes that this would perpetuate inequality as the rich remained the main beneficiaries of a continuous cycle of savings, returns and reinvestment, while the poor did not (or merely could not) do the same. However, Kuznets (1955) later notes that although there is a "cumulative effect of saving" for the wealthy, their share of wealth shows little to no rise over time (Kuznets, 1955). Kuznets (1955) argues that the share of top-income earners did not rise due to political and legislative decisions, such as the implementation of a strict progressive tax system, and induction of inflation which undermined the economic value of the total wealth accumulated during that period. Kuznets (1955) adds that the study was conducted in the early stages of industrialization, where business struggled to keep up (in terms of development and technology) with the new and fast-growing industries that were establishing themselves.

Building on Kuznets' (1955) studies of falling inequality in developed economies, supporting studies from scholars, such as Kaldor (1956), agree that the wealthy's marginal propensity to save is much higher than that of the poor. Kaldor (1956) notes that periods that are initially characterized by income inequality would be met with high levels of aggregate savings from the top earners due to their ability to save more than low-income earners (Kuznets, 1955). This would then result in higher levels of capital accumulation and thus promote economic growth. According to Kaldor (1956), inequality and development have a positive relationship.

The "accumulative saving" cycle is not the only reason Kuznets (1955) attributes to the hypothesized positive relationship between inequality and growth. Kuznets (1955) assumes that income distribution of the total population is the sum of rural and urban populations' income distribution. Rural populations earn most of their income in agricultural sectors, and their per capital income is lower than that of urban populations who earn their income from industrial sectors (Kuznets, 1955). The rise of the industrialization world pushed more rural populations into urban areas, and thus a higher percentage of the population was able to become more industrialized, and earn a high per capita income, resulting in diminished levels of inequality (Kuznets, 1955).

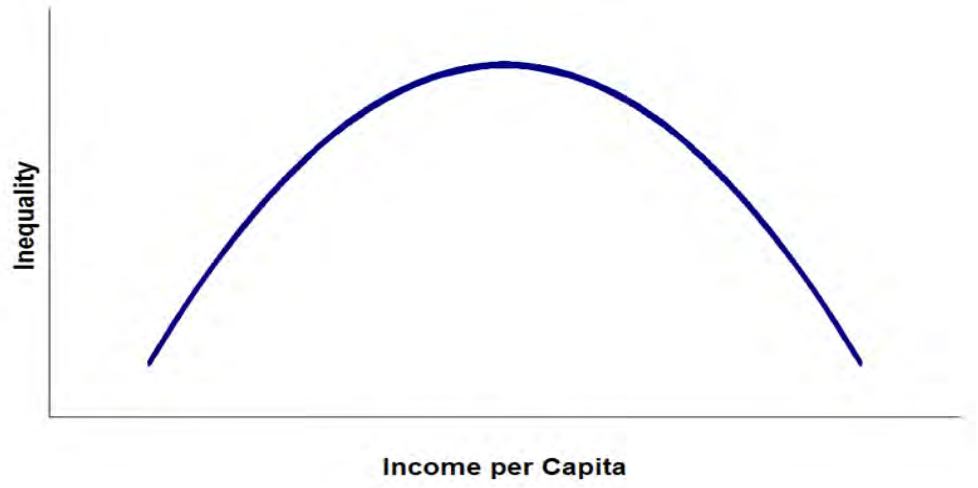

Figure 1: The Kuznets Curve
Source: Higginson and Williamson, 1999:7

Figure 1 explains Kuznets' (1955) view of inequality as part of the economic development process, suggesting that in the early stages of development there is a shortage in the supply of capital which is contrasted with an over-supply of low-skilled labour. This would result in the price of capital being high (high return on capital), and the price of labour being low (wages). As the economy develops to a certain point, the supply of capital rises (more people can afford to save and own capital), leading to a fall in the overall return on capital (Kuznets, 1955). At the same time, the growing economy becomes conducive for rising skills and increased job creation, leading to higher labour productivity and higher wages. The fall in the return on capital coupled with the rise in wages led to a fall in inequality. As a consequence, Kuznets' hypothesis suggests that inequality is more prominent in developing countries, where capital is still scarce and labour productivity is low, as opposed to developed countries where capital is more plentiful and labour productivity is high (Kuznets, 1955*).*

Thornton (2001) tested the Kuznets hypothesis by running a regression of the Gini coefficient, income quintiles, as well as the real GDP per capita in 96 countries including Britain, the US, and Germany in the period between 1945 and 1960. Thornton's (2001) findings suggest that the degree of association between inequality and economic development corresponds to an inverted-U, as implied by Kuznets (1955). The results also suggest that the turning point on the inverted-U occurs when income is still relatively low (Thornton, 2001). Other scholars who have tested the Kuznets hypothesis include Aghion, and Bolton (1992), as well as Galor and Tsiddon (1996). The results of both these studies supported the inverted-U relationship between inequality and economic development.

However, modern studies have found that, contrary to Kuznets' predictions, inequality has been rising in developed countries in recent decades. One such study was conducted by Gottchalk and Smeeding (2005) who show evidence that income inequality has been growing in 20 industrialized countries (including Brazil, South Korea, Georgia, and Indonesia) as far back as the period 1970 to 1990. The results of this study indicate that most industrialized countries experience a wider range of inequality during these decades, with the most unequal countries experiencing a level of inequality which is more than twice the level found in the most equal nations (Gottchalk and Smeeding, 2005).

Similarly, Lind and Mehlum (2010) used annual United States data from 1917 to 2007 to examine the relationship between inequality and economic development. The results of the study are inconsistent with the claims made by Kuznets (1955) of an inverted U-shaped curve relationship between inequality and economic development. Deininger and Squire (1996) collected the first large-scale data set of Gini coefficient estimates from over 100 studies on the relationship between inequality and economic development in individual countries. Their main conclusions proved inconsistent with the Kuznets hypothesis and suggested that inequality in most countries changes gradually over time, more in line with a U-shaped curve (not an inverted-U) relationship between inequality and economic development (Deininger and Squire, 1996).

2.2.2 Piketty's views on inequality

Thomas Piketty (2014) has contributed significantly to the inequality debate. In the renowned *"Capital in the 21st Century",* Piketty (2014) analyses the shares of over-all income and wealth taken by multiple groups over time, which include both the top decile of the income distribution and the top percentiles in the US between 1910 and 2010. Piketty also collected income tax data from various countries, such as France, Britain, and Japan, in order to study the inequality trends within a predominantly capitalist system. Piketty's (2014) findings suggest that rising inequality is inevitable in a capitalist system and he thus regards wealth as a dominant cause of persisting inequality.

Piketty (2014) argues that the rate of return of capital is always higher than the economic growth rate (which drives the growth of wages) in the long run. He expresses this relationship as $r > g$, and suggests that the rich, who are the owners of capital, will continue to accumulate more and more wealth, and this, together with the higher returns on capital, results in a growing income gap between the already-wealthy owners of capital, and the majority of the population who depend on labour income.

Piketty (2014) claims that concentrated wealth in the hands of a small number of individuals and families is passed down from generation to generation, resulting in the perpetuation of inequality. He (Piketty, 2014) notes that capital accumulation has critical implications for economic mobility and economic opportunity as accumulated wealth calcifies into future stock of capital, which

means that the individuals and families who do not have accumulated capital do not benefit from the same financial opportunities, and thus inequality is perpetuated (Piketty, 2014). The perpetuation of inequality is also economically inefficient as rich individuals benefit from their wealth and rise to the top ranks in business and society, not because of their ability, but because of their inherited capital (Piketty, 2014).

The findings and policy recommendations presented by Piketty (2014) have been widely challenged and criticized by various authors, including Summers (2014), and van der Berg (2010). Although Summers (2014) acknowledges that Piketty's (2014) *"Capital in the Twenty-First Century"* is a Nobel prizeworthy contribution to the study of inequality, he raises some important concerns regarding the logical development in Piketty's (2014) findings and policy recommendations. The foundation on which Piketty (2014) labels wealth as the main cause of inequality is the view that the returns on capital always grow at a rate that exceeds the economic growth rate ($r > g$). Summers (2014) challenges this view on two main counts: the first, whether the returns on wealth are in fact largely reinvested in capital and passed from generation to generation as Piketty (2014) claims; and the second being that Piketty's (2014) claims on capital ($r > g$) contradict the globally accepted law of diminishing returns (as more capital is accumulated, the return on an additional unit of capital declines).

First, Summers (2014) challenges Piketty's (2014) claim that returns on wealth are largely reinvested by the rich in new capital. He suggests that Piketty (2014) ignored the need to replace depreciating capital, and the higher costs of depreciation and maintenance costs as the stock of capital increases. Summers (2014) disproves Piketty's (2014) claim by looking at research on the American housing market which concluded that a $1 increase in wealth leads to an additional $.05 in spending, which essentially offsets the claimed accumulation of returns.

Summers (2014) also looked at the Forbes list of the 400 wealthiest Americans in 1982 and 2012. Contrary to Piketty's (2014) claim of inherited wealth as the main driver of inequality, the Forbes list comparison showed that less than one-tenth of people on the 1982 list were still present on the 2012 list. This suggests that many new rich individuals and/or families enter the list of the wealthiest in the United States every decade, implying that the inherited share of the wealthiest individuals and families is not perpetuated across generations as Piketty (2014) claimed. This, Summers (2014) puts down to the fact that the number of individuals in a family who are inheriting increases for each additional generation, so the initial wealth is split over increasingly numerous individuals.

In line with Summers' (2014) study, the *Sunday Times Rich List* for the UK was examined by the Centre for Economics and Business Research (CEBR, 2017) and the results suggest that wealth is often gained and lost within three generations. The list of the top 1000 richest people in Britain is constantly changing. The study shows that although there is a high amount of accumulated wealth

held by a small percentage of people in Britain, increased capital mobility has contributed to the reduction of long-term generational wealth accumulation (Brinded, 2017). This finding, too, contradicts Piketty's (2014) claim that passed down generational wealth perpetuates inequality (Brinded, 2017).

Second, Summers (2014) recollects that the law of diminishing returns suggests that the more capital the wealthy accumulate, the lower the marginal productivity of additional capital will become, which in turn decreases the rate of returns on the addition units of capital over time. Summers (2014) notes that he has observed several studies that prove the law of diminishing returns applies to capital, and none that shows a continuous rise in the rate of capital returns as Piketty (2014) claims (Summers, 2014).

Rognlie (2015) also argues that the return on capital does not grow faster than the return on labour as claimed by Piketty (2014), and that capital accumulation actually results in a fall in capital's share of total income. Rognlie (2015) based these conclusions on a study of net capital income of seven industrialized countries (the United States, France, the UK, Japan, Mauritius, Canada, and Germany) after accounting for depreciation. The results suggest that the only long-term rise in capital's share of income is in housing, and not in any other industry. Rognlie (2015) finds that the r-g ratio is most likely to result in a fall in capital's share of income because the net rate of return of capital falls relative to the rise in g. Rognlie (2015) concludes that researchers concerned about rising income inequality should shift their focus away from the r-g ratio and look to other distribution factors such as growing inequality within the labour market and the causes of rising housing costs.

Furthermore, a study by Goes (2016) to test Piketty's claims that the rate of return of owning capital is higher than the economic growth rate in the long run ($r > g$) examined a sample of 19 advanced economies from 1980 through 2012. The result of the study suggests that for 75% of the countries there is little to no evidence that a rise in the r-g gap drives inequality (Goes, 2016). The study suggests that Piketty (2014) might have overlooked a few important factors, including the cyclical nature of the saving rate, which especially balances off large increases in the capital share, as well as the disparities which may have stemmed from the difficulty in measuring wealth variables. Goes (2016) concludes by suggesting that after analysing the given data set and the results thereof, the cause of inequality remains ambiguous. Goes (2016) concludes that researchers should refrain from targeting the r - g gap as a reliable factor to explain increasing inequality, and should rather focus on targeting labour market inequality.

2.3 Empirical evidence of the causes of growing inequality

Although a few scholars, including Thornton, (2001), Aghion and Bolton (1992), Galor and Tsiddon (1996) have conducted studies which support the Kuznets' inverted-U relationship

between inequality and economic development, more recent studies suggest that inequality is rising in developed countries. Studies by Gottchalk and Smeeding (2005), Lind and Mehlum (2010), and Deininger and Squire (1996) all find that inequality is growing in industrial countries. This section includes imperial evidence from globally studies on inequality. Given that Kuznets (1955) inequality theory has been disproved by rising inequality globally, the next important question is whether this growing inequality is driven by wealth, as suggested by Piketty (2014), or the labour market, as claimed by Summers (2014) and van der Berg (2010).

2.3.1 Wealth inequality

The literature shows copious studies with evidence of growing income inequality, however, Piketty's (2014) study on the distribution of wealth has been imperative in understanding both the importance and contribution of wealth inequality to overall inequality. Piketty (2014) explains that inequality inevitably rises because the gap between capital owners and income earners widens (r >g). In support of his hypothesis, Piketty (2014) analysed France's inherited wealth flows in the 1900s and found that inherited levels were initially high, followed by a fall in the mid-20th century, and then rose again after that (Piketty, 2014). This suggests that the rate of return of capital is always higher than the economic growth rate (which drives growth of wages) in the long run, and that the inherited share of the wealthiest individuals and families is passed down from generation to generation resulting in levels of inequality being perpetuated (Piketty, 2014).

Piketty's (2014) findings shed light on both the contribution and significance of wealth inequality to overall inequality, however, many scholars including Leibbrandt *et al.* (2012), Rognlie (2015), Brinded, (2017), Goes (2016), Summers (2014) and Milanovic (2017) have raised concerns regarding the validity and accuracy of Piketty's (2014) findings and policy recommendations. Milanovic (2017) argues that Piketty's (2014) findings are mainly based on 28 developed countries, however due to the low levels of capital stock in developing economies, the application of the r > g ratio resulted in higher wages being offered as opposed to high returns: r is thus pushed up and thus do not remaining constant as Piketty (2014) claimed. In line with Milanovic's (2017) argument, Summers (2014) also challenged Piketty's (2014) findings on two main accounts, the first being that Piketty underestimated the importance of diminishing returns on capital.

Summers (2014) notes that he observed various studies that proved that the more capital is accumulated, the return on an additional unit of capital declines. Summers (2014) notes that he could not find studies that show a continuous rise in the rate of capital returns as Piketty (2014) claims. Summers' (2014) view was supported by Rognlie (2015), Homburg (2015), and Goes (2016) who conducted studies on net capital returns of industrial countries, and concluded that the r-g ratio is most likely to result in a fall in capital's share of income because the net rate of return of capital falls relative to the rise in g.

The critique of Piketty's (2014) findings suggest that while wealth inequality may not be the main cause of rising inequality, studies from Sicular (2013), Krever and Zhang (2011), Zhou and Song (2016). Zhou and Song (2016) show that wealth is still a significant factor in tracing rising inequality. Zhou and Song (2016) analysed the causes of rising inequality in China in the period 2002 to 2013. The results of the study suggest that inequality of capital distribution from the functional distribution of economic activity has become a major contributor to the rising income inequality in China, particularly between returns on capital and wages. The study shows that China's rapid economic growth depends heavily on a system that pays high returns to financial capital and real estate, but ownership of capital is highly unequal.

Similarly, Sicular (2013) argues that ownership of private property is a new source of inequality in China. Private property generates income for households (through interest earnings, dividends, rents, and return on capital). Sicular (2013) reports that asset income contributed to 8% to 10% of national income inequality in 2002, and 13% to 19% in 2007. Furthermore, Krever and Zhang (2011) also report that amongst the different causes of rising inequality in China property income has been the prominent factor perpetuating unequal income distribution. The studies above thus illustrate the importance of wealth and how rising wealth inequality leads to rising income inequality, and consequently the next section deals with globally acclaimed evidence on rising inequality in the labour market.

2.3.2 Income inequality

Today most economists agree that there is growing income inequality globally, as stated above, the major debate is whether this growing inequality is primarily driven by inequality of labour income or by wealth inequality. Studies by van der Berg (2010) and Summers (2014) note that the actual reason why income inequality is rising is unclear but affirm that the causes lie within the labour market.

The introduction of reform programmes (policies aimed at boosting employment and growth) in Africa, for example, was followed by a fall in the share of low-skilled labour in employment and a consequent rise in unemployment (Summers, 2014). Globalization, and technological advances (specifically in the manufacturing sector) have also contributed to the fall in low-skill labor demand and therefore a widening gap between the wages of low- and high-skilled workers (Summers, 2014). The labour market has experienced a shift toward the financial and services sector, which has led to an increasingly high demand for high-skilled labour (Summers, 2014). The high demand for skilled labour has been contrasted with an over-supply of low skilled labour, particularly in developing countries such as South Africa (van der Berg, 2010). This creates a gap in the labour market, as low-skilled workers would have to either settle for very low wages or become jobless, while high skilled workers get paid relatively large amounts of money (van der Berg, 2010).

Summers (2014) further argues that company owners tend to pay workers with particular skill sets a very large amounts of money because of their ability to generate more profits for the company on a global scale. Although aimed at increasing productivity, technological advances have radically reduced the amount of low-skilled labour in the manufacturing sector, and thus contributed to the growing income gap at the bottom end of the earning scale (Summers, 2014). According to Summers (2014) and van der Berg (2010), the wage gap between low and high-skilled workers in the labour market, is the main driver of increased income inequality globally, not wealth inequality as Piketty (2014) claimed.

A number of studies have provided global evidence of growing inequality in the labour market and have examined the main reasons for the rises and falls in labour income inequality in different countries.

High levels of inequality have generally been associated with many South American countries including Mexico, Argentina and Brazil (Lustig *et al.,* 2012). Brazil had an exceptionally high Gini coefficient of 0.625 in 1989. However, in more recent years there has been a distinctive shift in the inequality trend in Brazil, as shown by a 10% fall in the Gini coefficient to 0.537 by 2009 (Lustig *et al*., 2012). This is furthered demonstrated by Mendoca and Esteeves (2014) who examined income inequality trends in Brazil over the period 1999 to 2008. Mendoca and Esteeves (2014) found that inequality declined in the time periods where the employment rate increased.

The adoption of social policies, and labour market regulations reinforced a direct positive effect on the poorest families in Brazil within the period under study (Mendoca and Esteeves, 2014). The finding of the study suggest that inequality is inversely related to employment, and hence low levels of employment (weak and or unregulated labour market) can lead to growing inequality (Mendoca and Esteeves, 2014). Lustig *et al.* (2012) affirms that the key factors behind the successful reduction of inequality in Brazil were the demand and supply for labour, as well as social welfare programmes such as government cash transfers. According to Barros *et al.* (2010) 51% of the fall in overall inequality in Brazil between 2001 and 2006 can be accounted for by the changes within the distribution of household labour-income per adult. The average labour income of working adults increased over the same period and the labour-income inequality amongst the working population declined (Lustig *et al.,* 2012).

The Bolsa Familia model, one of the most successful programmes of its kind globally, is a conditional cash transfers scheme introduced in Brazil in 2003. This programme enables underprivileged families to get cash transfers from the government on the condition that they can prove that they have kept children in school, and take them for regular medical check-ups (Ansilieero, 2008). This programme led to a significant increase in school participation, reduced infant mortality, and most importantly for this review, a decline in household income inequality. The Bolsa Familia model also contributed to 35 million Brazilians no longer living in extreme

poverty. This social grant programme was a major determinant in the decrease in unemployment in Brazil from 13% in 2003 to a low of 4.6% by December of 2012 (Ansilieero, 2008).

Similarly, Soares *et al.* (2009) compared the family per capita income distribution of Brazil, Mexico and Chile before (1990s) and after (mid-2000s) the conditional cash transfer programmes were introduced. Soares *et al.* (2009) looked at the concentration coefficient for each type of income (labour, social security and conditional cash transfer income) and found that changes of -0.028 and -0.027 points in the Gini coefficient of Brazil and Mexico accounted for a 5% reduction in overall inequality in both countries, while the Gini coefficient of Chile was fairly constant (Soares *et al.,* 2009). Although labour was the main source of income, the decline in inequality in Brazil and Mexico, according to this study, was mainly associated with an increase in the share of social security incomes (Soares *et al.,* 2009).

According to Barros *et al.* (2010), falling labour market inequality was also an important cause in the reduction of overall income inequality in Brazil. A major determinant of this fall in inequality in the distribution of labour income per working adult is education. Barros *et al.* (2010) found that the price and substitution effects of changes in the distribution of schooling resulted in changes in the distribution of labour-income. The major increase in Brazil's education participation meant that more people had access to education and were thus able to acquire more skills, which in turn made them more productive and led to higher wages (Barros *et al.,* 2010). This traces a direct path in the relationship between educational inequality (which determines skills and productivity) and income inequality. In Brazil, the conditional cash transfers programme enabled more people to gain more equal access to higher levels of education. This led to an increase in the supply of skilled workers, resulting in the reduction in the skills premium paid to workers (Lustig *et al.,* 2012). The decrease in inequality of education thus translated into a decline in income inequality in Brazil (Lustig *et al.,* 2012).

The above studies show that inequality is predominantly rising in the labour market, where social security policies and reduced education inequality have contributed to falling income inequality in Brazil and Mexico. In line with this view, Indonesia's Statistics Agency (BPS, 2016) reported a decline in inequality in the Gini coefficient from 0.408 in March 2015 to 0.397 in March 2016. This development was mainly attributed to increased earnings among Indonesia's middle-income segment, as well as government-led labour-intensive infrastructure development projects. BPS (2016) reported that the daily income for Indonesia's agricultural workers rose by 2.3%, and 3% for construction workers in March 2016.

Suryamin (2016) the head of department of BPS (2016) noted that this growth was caused by the state's 12 economic policy packages, as well as heavy public investment in infrastructure development (BPS, 2016). However, it is important to note that Indonesia's decreased income inequality was also influenced by a decline in earnings of Indonesia's high-income segment (the

price fall in its key commodities: crude oil and coal), resulted in the nation's elite earning less. Other factors that contributed to shrinking income inequality in Indonesia include the government's social assistance programs and increases in civil servants' salaries (BPS, 2016).

The evidence presented above show that falling levels of labour market inequality is associated with a reduction in overall inequality. The question thus rises, is the opposite true? That it, is there substantial evidence showing that rising income inequality leads to higher levels of overall inequality? The answer lies in the research findings from various countries (United States, China, South Korea) as presented below.

Summers (2014) observed the share of the top 1% of Americans income recipients and found that their share of total income increased significantly from 10% to 20% in recent years. This study suggests that more than half of the income gains in the twenty first century have been absorbed by the top 1%. Summers (2014) suggests that this is caused by growing inequality in the labour market which is itself influenced by globalization and technological developments in the manufacturing sector.

Similarly, despite sustained US economic growth, Gould (2019) reports that the majority of America's population have experienced disappointing growth in their living standards. The percent of household income for the bottom 90% of the US population that came from wages and wage-related sources dropped from 86.9% to 84.0 between 1979 and 2015 (Gould, 2019). The rise in income for most households resulted from increasing work hours, while hourly wages remained the same (Bivens *et al.,* 2014). Given that the majority of household income for the bottom 90% comes from labour income, growing wage inequality is the central cause for the slow growing income of most Americans (Gould, 2019). In the period 1979 to 2017, the level of labour productivity rose 70.3%, but hourly compensation of production and non-supervisory workers increased by only 11.1%, meaning that the level of productivity grew six times faster than the typical worker's pay (Gould, 2019). Gould (2019) further argues that the rise in wage inequality has been primarily driven by a reduction in the collective and individual bargaining power of US workers. This, coupled with substantial wage gains of those at the very top of the wage distribution, has contributed to rising income inequality in the US (Gould, 2019).

Yue *et al*. (2011) also shows that rising labour market income is a significant contributor to rising income inequality in China. Yue *et al*. (2011) notes that monopoly industries are dominated by government-owned enterprises and that workers who are employed in these monopoly enterprises earn more than those in other sectors. Data shows that more than 50% of the inequality wage gap between monopoly industries and competitive industries can be explained by the monopoly status or the state-dominated nature of these organizations (Yue *et al.,* 2011).

In accordance with this view, South Korea has been internationally praised for its rapid industrialization and export-led growth, which was initially accompanied by fairly equitable income distribution. However, in the last decade, South Korea has been negatively affected by the Asian financial crisis and the 2008 global financial crisis which led to a rise in income inequality (Ahn *et al.,* 2016). The major determinant in South Korea's rising income inequality is associated with the widening gap between Large Conglomerates (LCs) and Small- and Medium-sized Enterprises (SMEs) in terms of size, productivity, wage rate and the composition of regular versus non-regular workers (Ahn *et al.,* 2016).

Small- and Medium-sized Enterprises in South Korea suffer low wages, low productivity and are largely dominated by non-regular worker, resulting in a wider salary gap between their workers and those of LCs (Ahn *et al.,* 2016). Unlike LCs, SMEs do not have well established transactional process and costs. Although labour market duality impede access to well-paid and secure jobs, non-regular workers tend to earn less than regular workers as they have limited social insurance coverage, and because they have more prevalent in SMEs compared with LCs. This contributes to high wage inequality.

The literature suggests that analysing the global trends in both wealth and income is important in understand the main causes of overall inequality. The empirical evidence section highlights the importance of wealth, while maintaining that a lot more globally acclaimed evidence suggesting growing inequality in the labour market. The next important question is whether labour market inequality is the main cause of overall all inequality within the South African context. The following section aims to address this question.

2.4 Inequality in South Africa

A StatsSA inequality report (2019) provides an in-depth analysis of economic, wealth and social inequality in South Africa, and how these have changed since 2006. The report discusses the detrimental socioeconomic issues associated with high inequality and examines progress made in addressing these issues. The report uses various credible surveys and studies on inequality trends in South Africa to measure inequality in South Africa and changes therein. The StatsSA inequality report (2019) uses per capita expenditure to measure economic inequality in the period 2006- 2015. It finds that both real mean and median expenditure per annum increased between 2006 and 2011 but declined between 2011 and 2015. Total income inequality declined over the period.

Although there was a decline in the Gini coefficient of several South African provinces between 2006 and 2015, inequality amongst Black Africans has risen and remains the highest contributor to overall inequality in South Africa. Sub-groups such as female-headed households, rural dwellers and the coloured population group had lower per capita expenditure as opposed to male-headed households, urban dwellers, and white households. The report shows that gaps between the mean and median expenditure for the combined sub-groups (demographics and geographic location) has

widened, which suggest that inequality has increased between sub-groups. The main findings of the report help highlight the interventions that are required to achieve a more equal society in South Africa.

According to the StatsSA inequality report (2019), while social and income inequality in South Africa remains exceptionally high due to its history of apartheid, significant improvements have been achieved since 2006. According to the Palma ratio used in the report, the top 10% of the population spent 8.6 times more than the bottom 40% in the year 2006, but this ratio was reduced to 7.9 times in 2015. The improvements occurred mainly because the bottom/poorer deciles in South Africa began to depend less on income from the labour market, and more on social welfare grants. This suggests that while overall inequality, measured at a national level, remains very high, it declined between 2006 and 2015. Inequality in South Africa is particularly high in the labour market which accounts for 74.2% of overall inequality. Racial and gender inequality also remain persistently high, with female workers earning 30% less, on average, than male workers, while the mean real earnings of Black Africans between 2011 and 2015 were less than one-third of the White racial group.

The main findings of the StatsSA inequality (2019) suggest that in 2015, approximately 74.2% of household income came from wages from the labour market, making it the largest contributor to overall inequality in South Africa. The high level of labour market inequality is mainly driven by the little to no real earnings growth amongst low earners, coupled with high levels of real earnings growth amongst the very high earners. These findings are congruent with theory and empirical evidence noted by Summers (2014), Rognlie (2015), Goes (2016), van der Berg (2010); Leibbrandt, Finn and Woolard (2012); Wittenberg and Leibbrandt (2017); Finn and Leibbrandt (2018), who claim that inequality is persistently high in developing countries due to the growing disparities in the labour market. Piketty's (2014) claim that income inequality is caused mainly by unequal income on wealth is not supported. "Other income" is very unequally distributed in South Africa, but its contribution to total income inequality in 2015 (22.6%) was much less important than unequal labour income.

The StatsSA inequality report (2019) shows that the high level of inequality in the labour market is rooted in South Africa's apartheid history, as Black Africans and females not only have the lowest employment rates compared to White and male workers, but the limited share of Black Africans who are employed earned one-third of White workers, while females earn 30% less than males on average between 2006 and 2015 (Seekings and Nattrass (2008); Francis and Webster (2019). Table 1 and 2 show that despite the rises in especially Black African and Female unemployment, the reduction in inequality in the labour market between 2006 and 2015 suggests that the fall in labour inequality has benefited the employed, especially males, but not the growing share of the population which is unemployed.

Table 1: Distribution of mean and median annual per capita income, 2006, 2009, 2011 and 2015 (constant 2010 Rands) 1

Income sources	2006		2009		2011		2015	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Labour market income	35 275	10 548	37 831	12 862	38 671	13 978	39 047	15 097
Social grants	3 477	2 375	3 555	2 320	3 243	2 399	3 323	2 601
Remittances	2 654	1 059	4 288	1 653	2 320	845	7 075	1 079
In-kind Income	1 266	142	1 883	182	2 236	356	2 372	451
Other income	6 769	922	7 729	608	10 239	1 800	9 516	1 554
Total income	34 826	9 647	33 755	10 572	40 227	12 822	39 747	13 546

Source: IES 2005/06, LCS 2008/09, IES 2010/11, and LCS 2014/15 in StatsSA, 2019: 80

Table 2: Ratio and rand difference for distribution of mean and median annual per capita income (2006, 2009, 2011 and 2015) (constant 2010 Rands)

Income sources	2006		2009		2011		2015	
	Rand difference	Ratio	Rand difference	Ratio	Rand difference	Ratio	Rand difference	Ratio
Labour market income	24 727	3,3	24 969	2,9	24 693	2,8	23 950	2,6
Social grant income	1 102	1,5	1 235	1,5	844	1,4	722	1,3
Remittance income	1 595	2,5	2 635	2,6	1 475	2,6	5 996	6,6
In-kind income	1 124	8,9	1 701	10,3	1 880	6,3	1 921	5,3
Other income	5 847	7,3	7 121	12,7	8 439	5,7	7 962	6,1
Total income	25 179	3,6	23 183	3,2	27 405	3,1	26 201	2,9

Source: Authors own calculations; IES 2005/06, LCS 2008/09, IES 2010/11, and LCS 2014/15 in StatsSA, 2019: 85.

[1] The more skewed a data set the greater is the difference between the mean and the median. When the mean is greater than the median the data are skewed to the right - which is the case when income is unequally distributed, the incomes of the rich raising the value of the mean (Lane, 2003). Unfortunately, the StatsSA (2019) report does not give any reasons for the dramatic changes in remittance in 2015. The Rand value of mean remittance income, which fell in real terms in 2009 and 2011 increase threefold in 2015 and the ratio between the mean and medium jumps from 2.6 times to 6.6 times in 2015. This suggests a very large and very unequal increase in remittances between 2011 and 2015. The source of this requires further research.

This is also in line with Summer (2014) and van der Berg (2010) who suggest that there is a shortage of skilled labour, particularly amongst Black households, while globalization and rapid technological advances have resulted in an increase in high–skilled labour demand, thus widening the gap between the wages of skilled and unskilled workers (Summers, 2014). This results in a gap in the labour market, as low-skilled workers are forced to either lose their jobs or settle for low wages, while high-skilled workers get paid relatively large amounts of money as shown in the report (van der Berg, 2010). These findings suggest that researchers targeting inequality should focus less on wealth, and more on the labour market. This is contrary to Piketty (2014) who claims that rising inequality is a consequence of accumulated wealth (where the rate of return of capital (r) is always higher than the economic growth rate (g)) and so suggests a tax on wealth is the only solution to income inequality.

In South Africa, social grants and remittances also played a significant role in overall inequality reduction. The report notes improvements in education, health care, and basic services. With regards to education, state-led school programmes ("no fee" policy, and the nutritional programmes) resulted in a 4, 7 % increase in school attendance for learners aged 6 to 8 in 2017. However, the high attendance fails to reflect a large quality difference between paying and non-paying schools. Regarding health, the report notes a slight (1%) increase in medical aid coverage, while basic services such as quality healthcare, electricity and water were much less accessible to black Africans, rural dwellers and female groups relative to other groups in the period 2002 and 2017.

For the year 2015 social grants accounted for approximately a quarter of total income for the poorest 60% of households, and over a third for the poorest 30% (Makgetla, 2020). For the households which benefited from these welfare grants, old-age and disability grants provided 50% of their total income, while child-support grants contributed 25% of income to beneficiary households in the poorest 60% (Makgetla, 2020). The increased availability of social welfare and remittances have played a significant role in alleviating poverty and rising overall inequality in South Africa.

The StatsSA (2019) report notes that wealth inequality in South Africa has declined in the period 2006 to 2015 due to the rise in average asset scores for females and Black African, coupled with the moderate improvements in In-kind and Other income inequality. Although Other income (interest, dividends, capital gains from shares) is the second biggest contributor (22.6% in 2015) to overall inequality, Table 2 shows that the mean/median ratio of other income shrank (from 7,3 to 6,1 times) between 2006 and 2015, suggesting there has been a modest improvement in inequality in this area.

Moreover, the rise in average asset scores for Black Africans contributed significantly to the decline in asset inequality between groups. The reduced wealth inequality has a lower impact than

the reduced income inequality had on overall inequality. This suggest that, although wealth had a crucial indirect impact on income inequality by enabling rich households to survive adversity and take advantage of new economic opportunities, it is not the biggest driver of high inequality in South Africa as claimed by Piketty (2014). Rather, inequality in labour market, as claimed by Summers (2014), van der Berg (2010), Rognlie (2015) and Goes (2016) is the principal driver of income inequality in South Africa.

Having identified labour market inequality as the biggest determining factor in rising total income inequality, it is important to understand how education, the most important determining factor of labour accumulation, affects inequality particularly in South Africa as found by Spaull (2013); Spaull and Kotze (2015); Spaull (2019); Liu (2021). To do this, it is important to look back at Kuznet's (1955) view of growing inequality across developing and developing countries, although it does not accurately paint the picture of growing inequality in South Africa, it still forms the basis for the education expansion. Education expansion is key in explain how education impacts inequality, and it consists of two main ideas.

The first is the composition effect, which notes that increases in years of schooling do not result in reductions in income inequality because of higher earnings rates of returns for those with high levels of education. However, as the economy develops, the compression effect comes into effect, that is, as more skilled workers enter the labour market, earnings rates of returns for those with high levels of education reduces and so does inequality (Clift and Robles, 2021). South Africa has high and increasing rates of returns to education and these have also been growing over the years – so although there are higher average levels of schooling, income inequality is not reducing because of the higher earnings returns for the top (composition effect). How the closure of schools due to the pandemic affects income inequality is expanded upon in the research paper.

2.5 Conclusion

Theoretical background provides different reasons for rising inequality quality globally and nationally. More empirically evidence point towards the growing income inequality being linked to disparities between skilled and unskilled workers, particularly in the South African labour market. This raises concerns on whether labour market inequality will be perpetuated by the pandemic and whether some socioeconomic groups will be affected worsen than others.

The preceding section shows evidence that the persistently high levels of inequality in South Africa are mainly driven by labour market inequality, which is itself worsened by wealth inequality. The question at hand is, will the high levels of wealth and income inequality be improved or worsened by the COVID-19 pandemic and its lockdown measures? Now that the theoretical basis of the paper has been laid, the next chapter looks to present literature on the global wealth, income and social impacts of COVID-19, with a concluding section narrowing down on the COVID-19 inequality impacts within the South African context.

CHAPTER 3: COVID-19 AND INEQUALITY

3.1 Introduction

The COVID-19 pandemic has raised numerous about the possible negative income and wealth distribution consequences. To identify what drivers of inequality may have been negatively affected, it is useful to examine past pandemics and economic crises for possible insights into the likely impact of the pandemic on inequality. Historical evidence suggests there is a negative correlation; that is, historically pandemics have been shown to most often worsen inequality. Initial studies of the impact of COVID-19 on inequality globally and in South Africa are also examined in this chapter. The literature suggests that the impact on inequality of COVID-19, similar to past pandemics and crises, has been negative. In South Africa, loss of jobs, school shut downs, and other COVID-19 regulatory actions have been linked to increased levels of gender, regional and racial inequality. A goal of the thesis is to measure these impacts, which is dome in Chapter 5.

3.2 Pandemics and Economic Crises

Past pandemics and economic crises and their wealth and income inequality impacts are examined in this section.

3.2.1 The Black Death (1346-51)

The so-called "Back Death" (bubonic plague) was the most fatal pandemic in human history, killing over an estimated 200 million people in Eurasia, America, and Europe between 1346 and 1351(Alfani, 2020). The Black Death resulted in significantly decreased income and wealth inequality in various European countries (including Italy, France and Spain) (Alfani, 2020), chiefly for two reasons. First, the aftermath of the plague resulted in a significant rise in labour scarcity and thus in real wages. This led to a large number of low-skilled workers (the poorest) receiving a boost in their bargaining power, and they were thus able to negotiate better conditions (evidence of reduced income inequality). Second, the extremely high mortality associated with the pandemic resulted in large wealth redistribution in the partible inheritance system (Alfani, 2020).

The redistribution of wealth occurred through many people inheriting more properties than they needed, and a growing number of houses being offered on the market (Bazillier and Hericourt, 2017). Essentially, falling property prices coupled with higher real wages were the leading components for wealth inequality reduction during this period. It is important to note that the growth in real wages during this period is also an indicator of a reduction in income inequality (Alfani, 2020). However, various authors such as Furceri *et al.* (2020), Galleta and Giommoni (2020) argue that the extremely high mortality rate which characterized the Black Death makes its impact on wealth inequality unique in this regard.

3.2.2 Spanish Flu (1918-20)

The Spanish flu, otherwise known as the Great Influenza Pandemic, was an airborne infectious disease which peaked between 1918 and 1920 and led to the death of 20 to 50 million people (2.1% of the world population) (Johnson and Mueller, 2002). The pandemic unfolded in three main waves, the first being in March 1918, followed by the second wave from September 1918 to February 1919, and the last wave prolonged all the way to 1920 (Furceri *et al.,* 2020). The gravity of the Spanish Flu was mainly due to poor living standards for the majority of the population, ineffective non-medical intervention, as well as the end of World War I on Italian territory (Furceri *et al.,* 2020).

Italy experienced the highest mortality rate during this pandemic with approximately 600 000 deaths. Among many, Galleta and Giommoni (2020) as well as Furceri *et al*. (2020) conducted studies on the impact of the Spanish Flu pandemic on inequality and found that the pandemic was mainly and initially spread by Italian soldiers who, during relocation, carried the disease from the war front to Italian municipalities (Tognotti, 2015). The Galleta and Giommoni (2020) study provides empirical evidence on the redistributive effects of the Spanish Flu using a proxy of the variation in the number of Italian soldiers who returned home or relocated during the peak of the pandemic (Galleta and Giommoni, 2020). The results of the study show that the per capita number of soldiers who died in their hometown from illness at the peak of the pandemic (in 1918) was strongly correlated (0.874) to national monthly variation in the excess mortality of citizens (Galleta and Giommoni, 2020). The findings also provide evidence that the cities which were hit hardest by the pandemic also had soldiers enlisted in camps with high numbers of Spanish Flu cases (Galleta and Giommoni, 2020).

The Furceri *et al*. (2020) study sourced inequality measures by collecting the income declarations for 24 Italian provinces in 2000 municipalities in 1924. The result of the study suggests that a standard deviation of 1 in the proxy for Spanish Flu exposure in 1918 resulted in a 2% rise in inequality as a measure of the 1924 municipal Gini index (Furceri *et al.,* 2020). The report shows a 3.4% increase in the Gini index after comparing the municipalities that had at least one soldier who passed on due to illness, with those who did not (Furceri *et al.,* 2020).

The increased income inequality associated with the Spanish Flu pandemic was mainly due to the drastic decline in income experienced by low earners of the Italian population, while there was little to no impact for high-income earners (Furceri *et al.,* 2020). The long-term effects that the Spanish Flu had on income inequality also proved to be negative, as the study shows that even after 100 years, the Italian municipalities that were most affected by the pandemic still suffer from an unequal distribution of income, while those that were less affected reported lower levels of income inequality (Galleta and Giommoni, 2020). Supporting evidence of rising inequality due to the influenza pandemic has been reported by other authors, including Cutolo *et al.* (2020) and Carillo and Jappelli (2020).

3.2.3 The Great Depression (1929–1939)

Following a decade of rapid economic growth, the unprecedented crash in the stock exchange (October 1929) led to the American economy shrinking by 50%, leaving a majority of firms bankrupt and thus unable to pay workers (Rossman *et al.,* 2021). This period is also known as the Great Depression, a global economic crisis which resulted in a major decline in investments and consumer spending, which consequently drove the fall in industrial output and employment, with millions of workers laid off by failing companies (Wheelock, 2020). The initial trigger of the Great Depression was the crash in the stock exchange market, when the value of the stock market drastically declined by 90% and failed to recover for 25 years (Amadeo, 2021). This meant that the proportion of the population who held most of their wealth in the form of stocks were initially worse off, leading to an initial decline in wealth inequality (Rossman *et al.,* 2021).

During this economic crisis, 40% of American banks collapsed, economic output declined by 25%, and unemployment reached a steep rate of 25% (driven mostly by deflation) (Margo, 1993). The recovery from the crisis was very slow, and the stock exchange rates were not able to return to post-crisis conditions (Amadeo, 2021). In 1933, the election of President Roosevelt as the new US President led to the implementation of New Deal programme; a series of programmes that provided support to the groups that were most affected by the crisis, that is, the unemployed, farmers, and the youth (Wheelock, 2020). The implementation of the New Deal programmes led to a 33% increase in union membership, which allowed workers to gain more bargaining power (Margo, 1993). The median wages of workers increased during this period, while labour productivity doubled, both of which are indicators of an initial decrease in income inequality (Margo, 1993).

However, in attempts to expand the economy and pay back high levels of accumulated debt, data from the Federal Individual Income Tax Rates History (2013) shows that marginal tax rates were increased by a staggering 94% on all incomes that exceeded $200 000 in 1944. The top tax rate remained this high for four decades. The high tax rate discouraged workers from bargaining for higher wages and firms from offering such compensation (Margo, 1993). This also contributed to a significant decrease in income inequality from its peak in 1929. In the years 1930 to 1941 the richest accounted for approximately 15% of total wealth (which dropped further and stabilised to 8% between 1950 and 1980), indicating a decrease in wealth inequality as well (Wheelock, 2020).

3.2.4 Global Financial Crisis (2008-2009)

A study by Khun *et al.* (2018) illustrates how the 2008 financial crisis impacted inequality by compiling the Historical Survey of Consumer Finances (HSCF). The study found that wealth inequality increased during the crisis. Furthermore, the findings suggest that wealthy and less-wealthy individuals own different types of assets which were not equally affected by the Global Financial Crisis (Palley, 2018). The wealthy hold most of their wealth in the form of stocks, while

middle-class income earners hold their wealth in the form of property (Khun *et al.,* 2021). The implication of this finding is that a boom in the housing market leads to wealth gains for middle-class households, while a boom in the stock market leads to increased wealth for the rich (Bordo and Meissner, 2012).

The difference in the form of assets owned means that changes in wealth inequality depends upon the relative performance of the housing and stock markets (Khun *et al.,* 2021). This implies that a change in the price of an asset can potentially shape wealth distribution; that is, when asset price rises, wealth increases even without savings by households. This can compensate for the negative effects that lower income and declining savings rates have on wealth accumulation (Bazillier and Hericourt, 2017).

This pattern implies that asset price changes shape the wealth distribution and can decouple trends in income and wealth inequality for extended periods of time. When asset prices rise, wealth grows even without savings by households, and hence can compensate for the effects that low-income growth and declining savings rates have on wealth accumulation (Bordo and Meissner, 2012). During the Global Financial Crisis, the middle class rapidly lost ground to the top 10% with respect to income, but was still able to maintain its wealth share thanks to substantial gains in housing wealth (Bazillier and Hericourt, 2017).

While incomes of the top 10% have more than doubled since 1971, the incomes of middle-class households increased by less than 40%, and incomes in the bottom 50% stagnated in real terms (Khun *et al.,* 2021). When it comes to wealth, the picture is different. For the bottom 50%, wealth doubled (with 97% of the growth accredited to asset price changes) between 1971 and 2007, despite zero income growth. For the middle class and the top 10%, wealth increased by approximately 60% (Bordo and Meissner, 2012). The large increases in wealth, particularly for the middle and lower-middle class helped soften the blow of declining income for some time (Khun *et al.,* 2021).

The Global Financial Crisis was characterized by the collapse of house prices, leading to a substantial devaluation of middle-class household asset portfolios, coupled with a quick rebound in the stock market which boosted the wealth of the rich (Bazillier and Hericourt, 2017). As most of their wealth is held in the form of stock, the top 10% wealthiest households benefited most from the stock market booms, and were less affected by the drop in residential real estate prices (Khun *et al.,* 2021). By contrast, middle- and low-income earners experienced loss of wealth due to the decline in house prices, which further widened the wealth inequality gap (Khun *et al.,* 2021). It is also important to note that, with the decline in house prices, the rising inequality that had been happening in income for the last four decades suddenly became more prominent (Wisman, 2021).

3.3 COVID-19 pandemic

Coronavirus (COVID-19) is an infectious respiratory disease that resulted in a global pandemic, leading over 100 countries into either full or partial lockdown[2] measures in 2019 onwards (WHO, 2021). The first wave of the pandemic occurred in December 2019 and took a heavy toll on the global economy, which experienced a low employment rate of 5.42% and 3.6% Gross Domestic Product (GDP) rate (Clift and Robles, 2021). The initial wave of COVID-19 was characterised by rapid increases in COVID-19-related cases and deaths which government officials attempted to combat with strict measures, such as closing non-essential businesses (some businesses remained open, with workers attempting to work from home) and closing schools (the alternative being online learning for institutions and learners who had the capital and systems to support it). The consequent rise in unemployment and pre-existing inequality meant these restrictions were likely to have greater impacts on some socioeconomics groups than others (WHO, 2021).

Research findings from the Berkhout *et al.* (2021) report, International Monetary Fund (Clift and Robles, 2021), and World Bank and the Organisation for Economic Cooperation and Development (OECD, 2021) have all expressed deep concerns that the COVID-19 pandemic would drive up inequality globally, which could potentially result in deeply unfavourable social and economic impacts. Clift and Robles (2021) estimated that inequality, as measured by the average Gini coefficient of income, would increase by 2.6% points in emerging markets and low-income countries in the year 2020 as a result of the global pandemics (Clift and Robles, 2021). This section of the research uses globally acclaimed studies and empirical evidence to show the impact of COVID-19 with regard to income and wealth inequality (Christensen and Wells*,* 2021)

A survey comprising 295 economists from 79 different countries including England, France and the United States to measure the inequality impact of COVID-19 was conducted by the Lakner *et al.* (2021) report. The reports suggest that 87% of the respondents expected a moderate to strong increase in income inequality in their respective countries due to the COVID-19 pandemic (based on 77 out of 79 countries) (Berkhout *et al.,* 2021). More than 50% of respondents expressed that gender inequality was expected to rise, while 66% suggested the same about racial inequality and agreed that government did not yet at the time of the survey (January 2021) have proper measures in place to combat the rising inequality (UN, 2020).

After studying the history of past pandemics (the Black Death and Spanish Flu) and economic crises (the Great Depression and Global Financial Crisis) as presented above, it remains difficult to determine with precision whether such global events would ultimately result in a rise or fall in inequality. Any shift depends upon the nature of the pandemic/economic crisis as illustrated in preceding paragraphs. The pandemics and economic crises that have spread equally across the world population have contributed to the reduction of inequality, while those that have had an

[2] Lockdown is a short-term policy imposed by government officials to restrict physical mobility as well as work/school engagement of individuals in attempts to prevent further spread of the Coronavirus (Carson, 2020).

unequal spread were likely to perpetuate the inequality gap by leaving socioeconomically disadvantaged groups worse off. The following section concentrates on COVID-19 and its impact on wealth and income inequality on a global scale.

3.3.1 Inequality impacts of COVID-19

The COVID-19 pandemic caused various socioeconomic shocks globally during its different stages. How the wealth and income inequality impact of the COVID-19 pandemic differed across different economies during the varying stages of the pandemic are highlighted in this section.

3.3.1.1 Initial inequality impact of COVID-19

The COVID-19 pandemic was shown to have a detrimental impact within and across the nation's social and economic structures, resulting in over 3.1 million deaths (and counting), as well as major job losses (leading to over 120 million people worldwide being pushed below the poverty line), as well as a global recession (Ferreira, 2021).

The consequences of the pandemic have not been equally felt as data shows that the less-educated, low-income earners were impacted far more severely than the better educated, high-income earners who benefited from the Work-From-Home policies (Deaton, 2021). Although the rise in income inequality was combated by income support initiatives from government officials in many countries, there is still a general belief that the pandemic is likely to increase global income inequality. Stiglitz (2020) notes that COVID-19 has perpetuated income inequality both within and between countries as most poor countries lack efficient healthcare facilities and social systems to deal effectively with the pressures of the pandemic as opposed to advanced economies. This shared concern for rising inequality both within and between countries has been supported by Goulding and Muggah (2020).

With regard to global wealth inequality, the initial wave of the COVID-19 pandemic was also closely associated with a crash in the Stock Exchange in 2020 which was indicative of decreasing wealth inequality; however, this changed in magnitude as the pandemic unfolded as the stock market recovered rapidly.

A study by Advani *et al.* (2020) on the UK's wealth distribution and characteristics of high-wealth households notes that the richest 1% of people in the UK held approximately 17% of total wealth prior to the global pandemic. The Advani *et al*. (2020) report explains that wealth comprises five main assets: mainly housing, pension funds, financial assets, business assets and physical assets (items such as household contents, cars, and collectables). For the majority of the population, the few who possess wealth hold it in the form of housing and pension funds, while the wealthiest households mainly hold theirs in the form of financial wealth and business wealth. Observing the differences alongside changes in asset prices, it is possible to infer the changes in wealth inequality.

However, it is important to note that changes in wealth not only depend on shifts in the value of existing wealth but also on additional savings (Advani *et al.,* 2020). The report provides increasing evidence that UK households accumulated large savings in the year 2020 of approximately £250 billion (Advani *et al.,* 2020). Britons were able to save money as COVID-19 control measures were implemented (lockdown measures resulted in travelling and entertainment costs mostly for high-income households who usually spent more on these activities) (World Bank*,* 2020). As savings accumulate for households that can afford to put money aside, the gap between wealthier and less wealthy households is likely to increase again, particularly since many low-income earners experienced loss of income and rising debt before the crisis, which made it more difficult to save.

The changes in asset prices outlined above have not persisted, limiting the impact on those holding financial wealth (World Bank, 2020). Although the stock market has not completely recovered to its pre-COVID-19 level, it has gradually returned to around the level of early March 2020 (Advani *et al*. 2020). At the same time, house prices have continued to rise, growing by almost 7% over the year 2020 to February 2021 (Nationwide) (UN*,* 2020).

The earlier days of the pandemic also saw the value of housing and pensions increase while financial and business asset values dropped significantly (Ferreira, 2021). The decline in financial and business wealth occurred as the stock exchange plummeted, with the Financial Times Stock Exchange (FTSE) 100 Index declining by close to 30% between 4 and 16 March, 2020 (Advani *et al*., 2020). Although the stock market crash would also have reduced the value of defined contribution pensions, recent data on house prices in the UK suggest that these were broadly flat or, if anything, rising in the first half of 2020 (World Bank, 2020). This trend suggests that wealth inequality may have been slightly reduced in the beginning of the pandemic mainly due to the decline in the value of existing financial and business wealth held disproportionately by the wealthiest households in the UK (Advani *et al.,* 2020).

The Berkhout *et al.* (2021) Report (2021) confirms these findings by showing that the beginning of the pandemic resulted in a collapse in the stock exchange, significantly reducing the wealth of the top 1000 billionaires. However, the drop in the world's richest was short lived as they were able to recover their wealth in short period of nine months. Although the real economy for many countries initially saw a decline, the stock market has since been booming again, driving up the wealth of billionaires by a staggering $3.9tn (trillion) between 18 March and 31 December 2020 (Lakner *et al.,* 2021). The rise in wealth for the world's richest contrasted with hundreds of millions of people losing their jobs and facing destitution and hunger, and suggesting a rise in both income and wealth inequality during the pandemic period (World Bank, 2020). Berkhout *et al.* (2021) estimates that the total number of people living in poverty may have increased by 200-500 million in 2020, and it is unlikely that the number of people living in poverty will return to its pre-pandemic level over the next 10 years (Berkhout *et al.,* 2021).

With regard to global income inequality, Deaton (2021) conducted research on the global impact of COVID-19 on income inequality using the income capital data of 193 countries from the IMF World Economic Outlook of October 2020, as well as the data on total deaths per million from Our World in Data (collected in December 2020). The countries researched in the study include India, Austria, Australia, Belgium, Canada, Chile, Colombia, and China. Contrary to popular belief, Deaton (2020) found that advanced economics experienced more deaths than poorer countries in the initial stages of the pandemic and thus experienced greater per capita losses. Deaton (2020) thus claims that "this has not driven countries further apart and the downward trend in global inequality continued into 2020, indeed it fell somewhat faster".

However, when Deaton (2020) weighted countries by their population, he found a slight increase in global inequality. This rise in income inequality is attributed to the major drop in per capita incomes in India; however, Deaton explains that "the exceptionally positive experience of China was still an equalizing force, so that, without China, the uptick in weighted inequality would have been larger" (Deaton, 2021).

Findings from the Lakner *et al*. (2021) and Development Finance International's Commitment to Reducing Inequality Index (CRI, 2021) show that 103 countries went into the pandemic with at least 66% of their workforce lacking labour rights and protection such as sick pay. The pandemic has exposed inequalities in the labour system, with hundreds of millions of workers losing their jobs. In the United States, 90% of the top income quartile have a right to paid sick leave, compared to only 47% of the bottom quartile (UN, 2020).

In support of these findings, Forsythe *et al.* (2020) examined evidence from vacancy postings and Unemployment Insurance (UI, 2020) claims in the US and reported that there was a 30% reduction in the job vacancy rates (which shows a decrease in labour demand) in the US during the initial months of the pandemic (Nwosu and Oyenubi, 2021). A similar study by Montenovo *et al.* (2020) which analysed the determinants of disparities in COVID-19 job losses in the US found that COVID-19-associated unemployment exceeded that of the 2001 recession and the Great Recession of 2008 (Nwosu and Oyenubi, 2021). Furthermore, in the Kilts Nielsen Consumer Panel surveys in the US, 50% of survey participants also reported income losses due to the COVID-19 pandemic (Nwosu and Oyenubi, 2021).

Blundell *et al.* (2020) observed the different stages of the pandemic and how wealth and income inequality have been affected by them. In the years prior to the crisis, there was no growth in wages of the bottom-earners in the UK, which already put many households under financial strain. The study by Blundell *et al.* (2020) suggests that the initial outbreak of COVID-19, which was met with strict regulatory measures (such the lockdown), led to a significant decrease in economic activities as well as the shutdown of non-essential businesses that was unlikely to impact all groups

equally (Blundell *et al.,* 2020). The study further highlights that the impact of the COVID-19 pandemic is likely to be worse when met by pre-existing inequalities (based on age, race, gender, age, and geographic location). Blundell *et al*. (2020) note that "the most vulnerable groups by socioeconomic background and health status are also those that may be hit the hardest."

In the UK the applied lockdown regulations led to the closure of various businesses in the retail, hospitality, transport, restaurant sectors, and many more. The direct impact of this was disproportionately felt hardest by young, female, and low-skilled workers (Blundell *et al.,* 2020). In support of these findings, Adams-Prassl *et al.* (2020) conducted a survey on the impact of the pandemic on the labour market with 4000 UK individuals in March of 2020. The findings of this study show that low-income earners and young workers had higher chances either experiencing a fall in wages, or of losing their jobs completely. This finding is further confirmed by the Understanding Society Panel report (2020) consisting of 17 400 UK participants, where data suggest that the self-employed as well as low-skilled workers experienced a reduction in income, while young people and the less-educated also experienced high levels of inequality.

The unprecedented shutdown of various sectors also impacted household spending (the differences in the spending pattern of UK household prior to the pandemic, is another reason why households have not been equally affected by the pandemic). A study by Crawford *et al.* (2020) shows that top-income earners spend approximately 33% of their income in sectors that were mostly affected by the pandemic (holidays, hospitality, leisure, and entertainment) and thus may find themselves saving large amounts of money (provided they have not suffered from drastic reductions in income). On the other hand, low-income earners who used to work in these very same sectors were being retrenched; this group spent over 50% of their income on basic necessities (groceries, housing) prior to the pandemic. The evidence presented in the Blundell *et al.* (2020) study points to the perpetuation of pre-existing inequality during the onset of the COVID-19 pandemic in the UK. As well as other socioeconomic inequalities heighten that were of little concern prior to the pandemic.

Additionally, Carta and Mart's (2021) study on the impact of the COVID-19 pandemic's shock on labour income inequality, using data from the Italian Labour Force Survey for the first quarters of 2020, suggests that upon the implementation of lockdown measures in Italy to contain the virus, business activities and employment were severely affected. Findings of the study suggest that low-income earners were more harshly affected by the COVID-19 shocks than wealthy households, which indicates a rise in labour income inequality during the first two quarters of the pandemic. However, it is important to note that the Italian government's initial implementation of social insurance benefits was to compensate for the loss in income and for the increased income inequality.

Templeton *et al.* (2020) also analyse the impact of COVID-19 on income inequality in Australia using the Longitudinal Labour Force Survey data up to the end of May 2020. The results of the study show that labour-force participation (LFP) decreased by 2.1%, while unemployment rose by 1.1% (this period was also met by a one-hour reduction in weekly working hours). The less-educated, rural dwellers and low-skilled workers had much lower LFP and working hours compared to other groups prior to the pandemic (Templeton *et al*., 2020).

The empirical evidence provided in the global studies above point to the initial perpetuation of both wealth and income inequality due to the pandemic, with poor countries, the less educated, and low-income earners (amongst other disadvantaged socioeconomic group) having been impacted much more drastically. It is also important to note that the COVID-19 pandemic hit a world that was already facing high levels of both wealth and income inequality, where for the past 40 years the riches 1% have earned more than double the income of the bottom half of the global population, and the growing gap between the rich and poor has been both built on and exacerbated by age-old inequalities of gender and race (UN, 2020).

The pre-existing inequality prior to the pandemic means that the world's poor population did not have any resources to help them survive the harmful socioeconomic impacts COVID-19 created (Lakner *et al.,* 2021). More than 3 billion people did not have access to healthcare, 66% of workers had no access to social protection (such as unemployment benefit or sick pay), and over 50% of workers in in low- and lower-middle-income countries were in working poverty (World Banks, 2020). The following section seeks to answer whether the initial wealth and income inequality rising impacts of COVID-19 have been persistent as the pandemic unfolds.

3.3.1.2 Successive inequality impacts of COVID-19

Although the initial COVID-19 pandemic appeared to have had a slight equalizer effect (Deaton, 2021) as early cases and deaths were initially more prominent amongst high-income individuals and households (who contracted the virus during their travels to foreign countries; predominantly in Asian and European countries), as the pandemic unfolded over time and began to spread globally, the impacts of COVID-19 were no longer felt equally, given both the nature of the virus (airborne), and the harsh restrictions that were implemented to prevent its spread (lockdown, and closing down of non-essential industries). The initial crash in the stock market (in early 2020) was not long lived as the world's richest were able to recover their wealth within nine months of the pandemic. Although the real economy for many countries faced high levels of economic downturn, the stock market has since been booming again, driving up the wealth of billionaires by a staggering $3.9tn (trillion) between 18 March and 31 December 2020.

Sánchez-Páramo *et al.* (2021) conducted a study on the inequality impact of the COVID-19 pandemic by looking at income losses experienced at different places on the global income distribution by making use of the Global Economics Prospects report (World Bank, 2021) growth

forecasts. The findings of their (Sánchez-Páramo *et al.,* 2021) study suggest that the wealthiest two deciles representing the top 20% of the world's wealthiest people, lost approximately 5% of their income in 2020, compared to the poorest 20% who experienced a 6% capital loss. Sánchez-Páramo *et al.* (2021) note that the gap between the wealth of the richest and poorest has since increased in 2021, which implies that the impact of the pandemic has not been felt equally and is increasing over time. The GEP report (2021) further predict the speedy recovery of the top 20% of the world's richest (to its pre-pandemic state), while the poorest 20% "are expected to further lose 5% of their income" (World Bank*,* 2021). This study reveals a 2.8% difference in wealth income loss experienced by the bottom 40% as opposed to the top 60% (Cuesta and Pico, 2021).

Along with the apparent rise in wealth inequality, the unfolding of the pandemic resulted in vulnerable and socioeconomically disadvantaged groups being at greater risk of exposure to COVID-19-related cases and deaths due to overcrowded housing, reliance on public transport, employment in essential occupations, unequal access to effective healthcare, and the higher prevalence of chronic illnesses (Stiglitz, 2020). The COVID-19 pandemic saw hundreds of millions of people lose their jobs and face destitution and hunger. The Lakner *et al.* (2021) Report (2021) forecast that the total number of people living in poverty could rise by 200 to 500 million in 2020, and it is unlikely that the number of people living in poverty will return to its pre-pandemic level over the next 10 years (Berkhout *et al.,* 2021).

Dwivedi *et al.* (2020) conducted a study on the impact of COVID-19 on children's lives and looked at 37 countries across Asia, East Africa, and southern Africa. The findings of the survey suggest that three out of four households, that is, 75% of poor households, had experienced a decline in income since the start of the pandemic. Approximately 44 million people in the US lost their jobs, and unemployment rose to 15% between April and June 2020. The fall in income and consequent rise in job losses during the second wave of the COVID-19 pandemic was met with a staggering rise in the stock market, with fortunes of the top five billionaires soaring to $102 billion, leading to an increase in the total wealth of US billionaires by 82.3% ($3.6 trillion), which is more than the net wealth of the whole African continent (Dwivedi, 2020). The biggest beneficiaries of the strict lockdown regulations put in place to reduce the spread of COVID-19 are rich individuals with high stakes in technology sectors (mainly digital retail vendors, conferencing platforms and social media groups) (Landivar *et al.,* 2020).

Congruent with these studies, The Global Economics Prospects report (WORLD BANK, 2021) notes that both between-country and within-country inequality is on the rise due to the COVID-19 pandemic, with emerging markets (EMDEs) facing a much weaker recovery rate (developing economies have been predicted to experience a slight economic expansion of only 2.9% in 2021) than developed economies. This is mainly because of the slow pace of vaccination, major income and job losses experienced by low-income earners, as well as the rise in global inflation

(specifically, the rise in food prices), as well as other pandemic-related shocks (closing down of schools) (Dwivedi, 2020).

The Global Economics Prospects report (2021) further suggests that, in order to decrease the rising within-country inequality in EMDEs (which the report states "accounts for about a third of the global extreme poor") and to promote a more equitable economic recovery across countries, government officials are encouraged to develop policy packages which prioritize vulnerable population groups. Broadening the access and quality of education, digital services, infrastructure, and health care are also amongst the main suggestions offered to alleviate the inequality impacts of the pandemic (Global Economics Prospects, 2021).

Plümper and Neumayer (2020) note that as the adoption of social distancing measures continued in Germany, the rate of new infections, active cases and the mortality rate began to decline on 17 April 2020 . However, as the second wave of the pandemic hit, the country's inability to maintain social distancing protocols became the driver of the further spread of the Coronavirus (Casale and Shepherd, 2021). While rich, highly skilled workers own private cars and have the option to work from home (WFH), low-skilled workers and the poor either lost their jobs or had no choice but to be forced attend work using public transportation in overcrowded conditions (Wills *et al.,* 2020).

The economic damages that arose as a consequence of lockdown regulations has deemed the spread of the Coronavirus as socially regressive (Plümper and Neumayer, 2020). Although the pandemic may have started out as "the rich man's disease" in Germany and most other countries, the second phase of the pandemic revealed that the virus itself does not necessarily affect the poor more than the rich; it is the ability or inability to take efficient precautionary measures against the risk of infections that separates the impact felt by the rich versus the poor. In the second phase of COVID-19, the virus reached the poor and resulted in further detrimental socioeconomic disadvantages for minority groups (including rural dwellers, low-income earners, Black and female workers) as opposed to rich, male, White, and highly skilled populations across and within various countries (Casale and Shepherd, 2021).

The World Bank's most recent Global Economic Prospect report (2021) notes that there is evidence of disparities even when observing the rate of recovery for developed countries versus developing economies. The GEP report (World Bank, 2021) projects a 1.4% fall in global growth between 2021 and 2022, and a 2.3% fall by 2023 amid the surge of new COVID-19 variants, well as rising debt and inflation, particularly in developing countries. Although there has been a significant downturn in leading economies, such as the United States and China, following the surge of the COVID-19 pandemic, the GEP report (World Bank, 2021) shows that similar advanced economies will experience a 2.2% decline in economic growth between 2021 and 2022 and a 2.7% decline by 2023. Despite the significant downturn in growth, under fiscal and monetary

moderation, advanced economies will still be able to restore investment and output to their pre-pandemic levels.

However, in emerging economies, the GEP report (World Bank, 2021) notes that "growth is expected to drop from 6.3% in 2021 to 4.6% in 2022 and 4.4% in 2023" (WORLD BANK, 2021). While developing countries are forecast to have made a full output recovery by 2023, the report suggests a 4% downturn in output for developing countries below their pre-pandemic levels. The setback is even larger for vulnerable economies ("fragile and conflict-affected economies") and island states that are expected to face a 7.5% and 8.5% fall, respectively, in output below their pre-pandemic levels.

The main challenges opposing the sustainable recovery in the growth of emerging economies are: rising inflation (which hits low-income workers the hardest, and has caused a withdrawal of policy support in many developing economies in attempts to contain inflationary pressures), rising debt (as total global debt has reached its highest levels in the last 50 years), the boom-and-bust cycles of commodity prices in developing countries which are mostly dependent on commodity exports, as well as rising global inequality, which has spilled over to other spheres, including the availability of vaccines, the ability to work from home, access to education, and many others which will be explored in successive sections of this paper.

3.3.2 COVID-19 and inequality determinants

The impacts of the COVID-19 pandemic are prone to cause disparities that go beyond wealth and income inequality as illustrated in the sections above. The studies presented above allude that consequences of the pandemic may not have been felt equally when looking at social measures of inequality (also known as the determinants of inequality). The following section includes evidence on the inequality impact of COVID-19 on gender, race and geographical regions from Brazil, the US, South Africa, Germany and various other nations.

3.3.2.1 Gender and Racial Inequality

The Berkhout *et al.* (2021) Inequality Report (2021) notes that women employed in global industries have been hit the hardest by the COVID-19 pandemic. Had there been a more equal proportion of men than women in those sectors, approximately 112 million women would no longer have been at risk of losing their jobs during that pandemic. Evidence from the World Bank (2020) suggests that, in Brazil, people of Afro-descent have been 40% more likely to die from COVDI-19 than White ethnic groups (Lakner *et al.,* 2021). Had Afro-descent death rates been equal to those of White populations as of June 2020, approximately 9,200 Afro descendants would have still been alive today (UN*,* 2020).The Berkhout *et al.* (2021) Report (2021) also notes a similar pattern in the US, where Latinx and Black populations were more likely to die of COVID-19 than White ethnic groups (the report notes that approximately 22 000 Latinx and Black people

would still be alive if their death rates had been the same as those of White ethnic groups (Christensen and Wells, 2021)). This implies that the onset of the pandemic led to an initial rise in both gender and racial inequality in the countries mentioned.

Further findings of the UN (2020) Report (2021) suggest that 92% of women in lower-income countries (developing economies) work in jobs that are both informal and insecure, and thus have had to bear the brunt of the pandemic (Christensen and Wells, 2021). The rapidly increasing number of unpaid and underpaid care work which is predominantly done by women has also been closely associated with the COVID-19 pandemic, particularly for women facing racial and ethnic marginalization (Lakner *et al.,* 2021). A catastrophic loss of income without any protection led to an explosion in global hunger, with an estimated 6,000 daily deaths resulting from COVID-19-related hunger by the end of 2020 (Christensen and Wells, 2021).

Tanith *et al.* (2020) analysed the racial inequality impact of COVID-19 by observing the degree of association between the composition of Black, Asian and Minority Ethnic groups (BAME), income deprivation, and COVID-19 mortality rates in England. Tanith *et al.* (2020) made use of a multivariable negative binomial regression, using the proportion of the population aged 50–79 (and those over 80 years) and the duration of the epidemic in each area (Tanith *et al.,* 2020). The findings of the study suggest that local authorities with a greater proportion of residents from marginalized ethnic groups had statistically higher COVID-19 mortality rates, as did local authorities with a greater proportion of residents experiencing deprivation related to low-income. After Tanith *et al.* (2020) adjusted for income deprivation (low-income groups) and other related variables, they found that a 1%-point increase in the proportion of Black and Asian population groups was associated with a 1% increase in the COVID-19 deaths. Additionally, a 1%-point increase in the proportion of the population experiencing income deprivation was associated with a 2% increase in the COVID19-related deaths (Tanith *et al*., 2020).

Similarly, the Office for National Statistics report (Nazroo and Becares, 2020) analysed COVID-19-related deaths by ethnicity in England and Wales by linking the number of deaths that occurred between 2 March and 10 April 2020 with the 2011 Census records. This large database was used to scrutinise the mortality variations by ethnicity and then follow individuals for deaths occurring during COVID-19 pandemic (Nazroo and Becares, 2020). The Nazroo and Becares (2020) Report's findings suggest that there were significant disparities in the risk of COVID-19-associated deaths among non-White ethnic groups relative to those of White ethnicity (Nazroo and Becares, 2020). The report further explains that, when taking age into consideration, Black males were 4.2 times more likely to die from COVID-19 than White males, while Black females were 4.3 times more likely to lose their lives to the COVID-19 pandemic than were White females (Nazroo and Becares, 2020).

The Nazroo and Becares (2020) Report also notes that mixed ethnicities and Indian ethnicities were at a significantly higher risk of COVID-19-related death than White ethnic groups. However, it is important to note that the high levels of disparity amongst racial groups in England and Wales is reduced when considering age and other socio-demographic measures of self-reported health and disabilities recorded in the 2011 Census (Nazroo and Becares, 2020). The Office for National Statistics (2020) Report notes a 1.9 reduction in COVID-19-related death disparities for Black males and Black females compared to White ethnic groups. Similarly, males in the Bangladeshi and Pakistani ethnic group were 1.8 times more likely to have a COVID-19-related death than White males, which was reduced to 1.6 when considering age and other socio-demographic characteristics and measures of self-reported health and disability from the Census (Nazroo and Becares, 2020). The results of the report suggest the socioeconomic disadvantages of marginalized groups partially resulted in the significant disparities in COVID-19-related deaths amongst ethnic groups, with non-White ethnicities being affected more severely than White ethnic groups (Nazroo and Becares, 2020).

Dang and Viet Nguyen (2020) also studied the potentially negative impact that COVID-19 has had on gender inequality using data from a six-country survey, covering various income, expenditure, savings and job loss levels. Dang and Viet Nguyen (2020) found that women were 24% more likely to lose their job than men, and their labour income was expected to fall 50% more than men's in the future. Findings also suggested that women were more likely to reduce their consumption and increase their savings due to the concerns that the COVID-19 pandemic raised. The gaps in unequal gender participation rates in global work industries most affected by the pandemic may be highly important in explaining the rising gender inequalities during this period. Dang and Viet Nguyen (2020) also note "heterogeneous effects of the COVID-19 pandemic on women across countries", which emphasize the importance of government-led policies that support both women and non-White ethnic groups.

The latest Global Gender Gap report (Shankar *et al.,* 2021) uses data from the World Economic Forum to measure the changes in global gender gaps amid the surge of the COVID-19 pandemic. In this cross-country study of 156 nations (including Namibia, Sweden, Rwanda, and Iceland), data show evidence that the COVID-19 related economic downturn was felt hardest by women rather than by men. The Global Gender Gap report (Shankar *et al.,* 2021) measured the evolution of gender inequality in collaboration with the International Labour Organisation (ILO) and the Institute de Publique Sondage d'Opinion Secteur on four pillars, mainly: economic participation, educational attainment, health and survival, and political empowerment.

The report notes that global gender inequality increased by 0.6 percentage point between 2020 and 2021 and that "the Global Gender Gap score (based on the population-weighted average for each of the 156 countries included this year) in 2021 is 67.7%", suggesting a remaining 32.3% global gender inequality gap that is yet to be closed. Data from ILO (2021) suggests that only 3.9% of

male workers lost their jobs during the onset of the pandemic as opposed to 5% of female workers. Furthermore, evidence from Ipsos (2021) shows that the closure of schools and the limited accessibility of care services led to higher levels of anxiety, stress and job insecurity, and the inability to maintain a healthy work-life balance, particularly for women with children (Shankar *et al.,* 2021).

The surge of COVID-19 also precipitated digitalisation through Work From Home (WFH) policies, particularly in work industries with low levels of female representation. Examples of this included the Cloud Computing industry, which employs only 14% of female workers, as well as Engineering, for which women only make up 20% of the total workforce. The rapid changes and disruptions in the labour market with the arrival of the pandemic are likely to have a long-term effect on the future economic opportunities of women, that is, putting them at high risk for inferior job roles and a continuous drop in income. The Global Gender Gap report (2021) recommends gender-positive policies that focus on increased investment into the care sector, as well as unbiased hiring and promotion practices in order the alleviate the growing gender disparities that have been perpetuated by the pandemic (Shankar *et al.,* 2021).

The studies mentioned above provide empirical evidence that both racial and gender inequality are significantly associated with a greater risk of COVID-19 related deaths, emphasising the importance of implementing control and recovery measures at government level for these disadvantaged groups in order to mitigate the perpetuation of inequality.

3.3.2.2 Regional inequality

The COVID-19 outbreak was met by many nations adopting the "stay at home" measures in attempted to mitigate the spread of the disease. These strict measures resulted in many workers in non-essential industries with limited options for remote working being disadvantaged (laid-off), whereas those in highly skilled sectors benefitted from WFH policies. Given that the onset of the pandemic simulated regional disparities in the share of jobs with the opportunity to work from home, it is likely to also increase regional inequality if the share of jobs that can be done from home are disproportionally distributed within countries and across nations (Irlacher and Koch, 2021); Dang and Viet Nguyen (2020).

Shen *et al.* (2021) analysed the regional inequality impact of COVID-19 by looking at a sample of 295 cities in 31 Chinese provinces. Using the distribution dynamics approach, Shen *et al*. (2021) compare the changes in the income per capita of each city before, during and at later stages of the COVID-19 pandemic. The findings of this study suggest that the COVID-19 pandemic had multiple negative economic impacts during the first quarter of 2020, causing most cities in China to have lower disposable income than at pre-pandemic levels (given that the pandemic persists) (Shen *et al*., 2021).

The Shen *et al.* (2021) findings further show that cities which experienced longer lockdown periods during the pandemic also experienced an increase in regional income inequality, while regional income inequality declined in cities with shorter-term regulatory policies (Shen *et al.,* 2021). There is also a distinct difference between the financial recovery time of rural and urban residents in the cities under study. While urban residents were able to recover their disposable income in the later stages of the pandemic (when the virus was contained using lockdown measures), rural occupants' disposable income suffered from no recovery, and many have been left worse-off than at pre-pandemic. Shen *et al.* (2021) suggest the shock of the COVID-19 pandemic was felt hardest by rural populations, thus lowering their disposable income, which is indicative of increasing regional inequality for the majority of Chinese cities.

A similar study by Irlacher and Koch (2021) observes the link between the opportunity to work from home and wages at individual and regional levels in Germany using the latest Qualification and Career Survey (2020). Irlacher and Koch (2021) find that the main beneficiaries of WFH policies are high-income workers, with 80% of workers in the top decile of wages making use of the WFH option, compared to only 13% in the lowest decile. Using the Mincer regression, the study shows a clear and stable wage premium for jobs with the WFH option, which accounts for over 10%, particularly within highly skilled jobs. Regional disparities regarding the option of remote work in Germany have widened, according to the Irlacher and Koch (2021) study, as further findings show that districts (new federal states of the former German Democratic Republic) with a lower share of WFH jobs have been characterized by a lower average income.

Additionally, the Global Economic Policy Lab (GELP, 2021) report conducted by Sweatman *et al.* (2021) looks at "The inequality in Russia and the COVID-19 Shock" (Sweatman *et al.,* 2021). The report shows that the pandemic is likely to intensify pre-existing inequality in Russia in specific regions. The regional governments in Russian significantly increased their debt levels in order respond to the unprecedented health and social costs caused by the pandemic (net borrowing was expected to rise by $5.3 billion in 2022). Wealthy cities, such as Moscow, which the report notes "has an average income four times higher than that of Russia's poorest regions", was expected to borrow a similar amount on its own, while cities in rural areas were mostly left to fend for themselves. This is likely to perpetuate both wealth and income disparities which will be felt hardest by rural populations in Russia.

The Russian government took extremely strict steps to contain the spread of the virus, including the closure of national borders, self-quarantine, and the closing down of all non-essential public facilities (from December 2019). Owing to the implementation of these strict regulatory measures, the Russian service sector (which makes up 54% of Russian real GDP) collapsed, resulting in an 8% contraction of real GDP in the second quarter of 2020. The government's National Economic Recovery Plan then introduced measures to halt the detrimental impact of COVID-19 by equating the standard unemployment benefit to the minimum wage for five months. However, despite the

RUB[3] 6.4 trillion fiscal response, rural residents with underfunded health care systems were still hit the hardest by the pandemic. The GEPL (2021) report notes that 12 out of 20 regions with the highest rates of mortality due to the pandemic were in the bottom half of Russia's poorest regions; by contrast, 11 out of 20 regions with the lowest mortality rate (associated with the COVID-19 virus) inhabited the top half of Russia's wealthiest regions, with Moscow's mortality rate being lower than the national average (Sweatman *et al.,* 2021).

Similar findings were noted by Rocha *et al.* (2021) who studied the effect of socioeconomic inequalities and vulnerabilities on health-system preparedness and response to COVID-19 in Brazil. Rocha *et al.* (2021) developed a Socioeconomic Vulnerability Index (SVI) using household characteristics and the Human Development Index at both state and municipal levels. The correlation between state-level indicators was observed by analysing the relationship between the availability of health-care resources, socioeconomic vulnerability and state responses to the spread of the COVID-19 (Rocha *et al.,* 2021). The linear regressions on the municipality-by-month dataset from February to October 2020 were also used to characterise the dynamics of COVID-19 deaths and response to the pandemic across the Brazilian municipalities (Aquino *et al,* 2021).

The findings of Rocha *et al.* (2021) suggest that the initial spread of COVID-19 was mostly impacted by patterns of socioeconomic vulnerability as measured by the SVI rather than the age of the population who were at higher risk of contracting the virus. Brazilian states with a high SVI (socially disadvantaged groups) were able to expand hospital capacity, implement and uphold strict COVID-19-related regulations, and increase social distancing measures. However, when compared to states with lower levels of SVI, these efforts were still insufficient in preventing higher COVID-19-related deaths during the initial phase of the pandemic (Aquino *et al.,* 2021). The COVID-19 mortality rate was highest in the northern region, although these states did not have high COVID-19-related health risks (in terms of older age groups and burden of chronic disease) (Xavier *et al.,* 2022). The mortality rate was greater mainly because the northern regions were characterised by socioeconomic disadvantages, such as limited hospitals and human resources, compared to the southern regions in Brazil which had twice the number of ICU beds and physicians (Rocha *et al.,* 2021). Death rates rapidly increased until June 2020 in Brazil, particularly in municipalities with the highest socioeconomic vulnerability (Aquino *et al.,* 2021).

As the COVID-19 pandemic unfolded in Brazil, the same stringent policy responses were implemented in both the southern and northern regions and the death rates became relatively lower in the municipalities with the highest SVIs compared with those with lower SVI levels (Rocha *et al.,* 2021).The spread of and death from the COVID-19 pandemic was disproportionally felt hardest in regions with pre-existing socioeconomic disadvantages, such as overcrowding, low hospitality capacity, and lower accessibility to basic resources. This emphasises the need for implementing protective government responses targeted at states and municipalities with high

[3] Rouble Currency used in Russia

levels of socioeconomic disadvantages, as well as in low-income and middle-income countries that have high levels of socioeconomic inequalities (Aquino *et al.,* 2021).

Reports by The Organisation for Economic Co-operation and Development (OECD, 2020) document the disparities in the COVID-19 impacts across rural and urban areas around the world. Findings show that although the COVID-19 pandemic initially surged with high infection rates in the world's most developed cities, the rapid implementation of containment and social-distancing measures resulted in significantly large declines in the rate of COVID-19-related infections and deaths for the world's largest countries (Sydney, Tokyo, and Seoul). In contrast, the OECD (2020) report suggests that regions plagued with high levels of inequalities, overcrowded housing, and under-resourced health services were prone to be more vulnerable to the COVID-19 outbreak. The spread of the pandemic increased the level of digitalization, particularly in highly skilled work industries, leaving a high number of lower-skilled workers in urban and rural areas (who work in essential industries such as childcare, retail services and hospitality) at a higher risk of contracting the virus. A large share of low-skilled workers dwells in less affluent, overcrowded regions that are further crippled by weak digital infrastructure (OECD, 2020).

In rural areas, the virus arrived later, leading to a false sense of security on the part of residents who thus took improper or fewer precautionary measures. In rural areas across the world (including countries such as Germany, Ireland, and the US), high numbers of unregulated funerals, wedding parties and religious services were major contributors to the rising number of COVID-19 infections and deaths (OECD, 2020). The resistance to and hesitance to implement COVID-19 containment measures (such as wearing masks) in rural and crowded towns resulted in the rates of COVID-19 cases being higher in rural areas than in urban areas in the United States (from August 2020 onwards) (OECD, 2020). Education was also negatively affected by the regional inequality arising from the COVID-19 pandemic. The Lakner *et al.* (2021) Report (2021) notes that the global pandemic resulted in more than 180 countries temporarily closing their schools, leaving close to 1.7 billion children and youth out of school when closures were at their peak. Children in the poorest countries were deprived of four months of schooling, while those in rich countries only experienced six weeks out of school. It has been estimated that the pandemic will undermine the 20 years of global progress made in female education, resulting in increased poverty and inequality.

Findings by Shen *et al*. (2021), Irlacher and Koch (2021), Sweatman *et al.* (2021), Aquino *et al.* (2021), and the Berkhout *et al.* (2021) Report (2021) show evidence that the impact of COVID-19 has not been felt equally in every geographical region. The initial spread of the Coronavirus took place in privileged countries and regions, yet as the pandemic unfolded, the spread to underprivileged regions had a much more damaging impact. The above studies generally agree that poorly resourced, overcrowded, and poor regions experienced the highest COVID-19-related death rates, compared to rich countries and regions. Global Gender Gap report (2021)

3.4 COVID-19 pandemic and inequality in South Africa

Despite the widespread socioeconomic accomplishments since the end of Apartheid (1994), more than half (60%) of South Africa's population continue to live below the national poverty line (World Bank, 2021). The detrimental socioeconomic impact of such high levels of poverty falls hardest on people of colour, low-skilled workers, and the less educated individuals in the population. South Africa has been listed amongst the top five most unequal countries in the world, with the top 10% of richest South Africans owning 93% of the country's wealth (StatsSA, 2019). For the past ten years, South Africa has experienced weak economic growth, declining investments (34.4%), and a rising unemployment rate, which reached a shocking 64% for South African youth in 2021 (World Bank, 2021).

The economy contracted during the last two quarters of 2019, resulting in South Africa's third technical recession since 1994. More recently, the impact of the COVID-19 pandemic has had detrimental consequences on economic activities in South Africa which are illustrated in more detail in the following paragraphs. Von Fintel and Orthofer (2020) studied the degree of association between financial inclusion and wealth inequality using the National Income Dynamics Study survey and the South African tax records in order to estimate wealth and income inequality between 2010 and 2015. Von Fintel and Orthofer's (2020) findings suggest that wealth is more unequally distributed than income in South Africa, with 1% of the populace owning approximately 50% of the country's wealth, while the top percentile owns over 90%. With a 0.931–0.951 Gini coefficient, South Africa's wealth "is as unequally distributed within South Africa as it is in the world at large" (Von Fintel and Orthofer, 2020).

Further findings of the study suggest that, while financial inclusion (such as access to banking and credit) has a positive correlation with income inequality reduction, it only raises middle wealth shares (not those of the poor) (Agyemang-Badu *et al.,* 2018). In South Africa, most individuals in the top deciles already benefit from highly developed financial services, while access for middle-income earners depends on obtaining a highly skilled job (Tita and Aziakpono, 2017).

The middle-class' low share of wealth could increase as a result of increased financial inclusion; expanded access to technological and financial instruments in this economic group is likely to result in a high accumulation of savings, and thus promote more equal wealth distribution (Von Fintel and Orthofer, 2020). However, Agyemang-Badu *et al.* (2020) notes that long-run wealth accumulation in the middle deciles may only be attainable through stabilising the labour market, and increasing the portion of the population that contributes to private pension schemes Agyemang-Badu *et al.* (2018) study also finds that the large-scale rollout of bank cards which were given to cash transfer recipients did not result in higher levels of savings for those in lower-income deciles, nor did it significantly increase their share of wealth as abusive lending schemes left them with large amounts of accumulated debt. Von Fintel and Orthofer's (2020) findings

suggest a negative correlation between access to credit and an increased wealth share for lower-income deciles in South Africa.

Von Fintel and Orthofer (2020) concludes their study by noting that wealth inequality in South Africa is likely to rise if the poor to middle class are not able to save sufficiently from their incomes (Saenz and Zucman, 2016). The severity of wealth inequality is more prominent in low- to middle-income countries where the labour market is characterised by high levels of unemployment, declining wages, and a constrained ability to save (Von Fintel and Orthofer, 2020). Wealth inequality can be reduced through financial inclusion, given that the poor have access to quality financial services, and that structural impediments in small business sectors are removed as a way of strengthening middle deciles in developing countries (Tita and Aziakpono, 2017). The evidence presented in this study points to high levels of pre-existing wealth inequality, which in turn, drive up income inequality in South Africa; the question now under consideration is whether the COVID-19 pandemic has improved or worsened overall inequality in South Africa.

The pre-pandemic state of the South African economy was already stagnant, with a low economic growth of 0.1% in 2019, and the low growth closely associated with financial and operational challenges faced by Eskom (energy utility) and other structural constraints. The rebound (estimated to be 4.0%) in economic growth experienced in 2021 has been primarily attributed to "favourable global environment (trade partners' growth and commodity prices)" as noted by the World Bank report (2021). The South African economy has been severely impacted by the COVID-19 pandemic, leading to a 6.4% decline in economic growth for the year 2020 (resulting in over 2 million people living below the national poverty line), with the main contributors to South Africa's economic downturn during this period being the strict containment measures put in place, as well as high pre-existing inequality and other structural challenges (World Bank, 2021).

The regulatory measures implemented to contain the virus resulted in the closure of all non-essential businesses, which led to slow economic activity and many households and individuals losing their jobs (Nwosu and Oyenubi, 2021).The literature suggests that job losses related to the pandemic predominantly affected the most vulnerable population groups, including informal-workers, low-income earners and the less educated, as opposed to the relatively well-off households and high-income earners who worked in high-skilled sectors that enabled them to work from home (Nwosu and Oyenubi, 2021).

A study by Nwosu *et al.* (2021) uses data from the National Income Dynamics Study-Coronavirus Rapid Mobile Survey (NIDS-CRAM) conducted between May 2020 and May 2021, measuring the magnitude of the socioeconomic inequality in ability to work from home as well as its determinants for South Africa employees (Nwosu *et al.,* 2021). The findings of the study suggest that while 65% of skilled workers and 56% of professionals were able to benefit from the WFH arrangements in South Africa, those in low-skilled occupations (such as security guards and domestic workers) could not benefit from the same luxury. Furthermore, the study found that

workers who benefited from the WFH policies earned approximately two to three times more than those who could not work from home.

Other factors that heightened the disparities in WFH policy benefits include casual employment, urban residence, marital status or cohabiting, age, household size and certain occupations (technical occupational groups, compared to managers). Furthermore, the study suggests that factors such as race (non-Black racial groups relative to Black racial groups), type of housing (flat or shack), and higher education attainment were main contributors in perpetuating socioeconomic inequality in the ability to work from home. Findings showed that people who fell into the non-Black racial groups, lived in a flat/house, had obtained higher levels of education, and worked in specific industries (skilled agricultural, craft and related occupations, plant and machine operations, and elementary occupations relative to managers) were the main beneficiaries of the WFH policies and were thus able to maintain a much more stable level of income during the pandemic, relative to other groups.

The StatsSA survey (2020) found that a lower turnover was recorded for over 85% of businesses in South Africa, with 36.8% expecting their workforce to shrink, and 46.4% closing temporarily or pausing their trading activities as a result of the pandemic. A similar StatsSA (2020) survey of 2688 South Africans (18 years and older) was conducted in order to provide information on the impact of the COVID-19 pandemic on employment, income, and hunger in South Africa (StatsSA, 2020). The results of the StatsSA (2020) survey suggest that 60.2% of survey participants were employed on a permanent basis during the national lockdown (although they experienced a 9.9%-point decrease in wages), 5.2% noted that their business closed down, while 2% lost their jobs due to COVID-19; 70% of those who lost their jobs during the pandemic because of the closure of non-essential industries and the lack of customers. Further findings suggest that the percentage of respondents who reported receiving no income increased by 10.2% by the sixth week of the national lockdown, and the percentage of respondents who reported experiencing hunger increased from 4.3% to 7.0%. Additionally, approximately 25.8% of all participants reported a decrease in income during the lockdown (StatsSA, 2020).

Prior to the national lockdown, 95% of the StatsSA (2020) survey respondents reported that they had worked from non-residential buildings, while only 1.4% of the employed individuals worked from home. This changed drastically during the national lockdown, as 77.9% respondents began to work from home, and only 15.1% worked from the non-residential buildings (StatsSA, 2020). Given the high increase in people working from home during the SA lockdown period, individuals living under inhospitable housing conditions like shacks were likely to bear the brunt of the pandemic, compared to individuals who were well-off and could afford comfortable housing (StatsSA, 2020).

The deleterious labour market effects of COVID-19 were more pronounced among workers in occupations which called for face-to-face interactions as well as those in non-essential industries, particularly low-income and informal industries (StatsSA, 2020). By contrast, during the first wave of the pandemic, individuals who worked in service sectors (such as banking, health, and technology) experienced high levels of job security (generally associated with higher income jobs) (StatsSA, 2020). Previous pandemics, such as the Ebola Virus Disease, also demonstrated uneven labour market impacts, particularly in disadvantaged job sectors and geographic regions (StatsSA, 2020).

It is important to note that the COVID-19 pandemic impact on wealth and labour market inequality overflowed to other forms of inequality in South Africa. Gender, race, and regional inequalities were also highlighted with the arrival of the pandemic. Using the NIDS-CRAM (2021) survey from Wave 1 to 5, Casele and Shepperd (2021) conducted a study on the gendered effects of the COVID-19 crisis and lockdown measures in South Africa. The findings of the study suggest that during the initial lockdown period (April 2020), many more women experienced job losses than men in both absolute and relative terms; the NIDS-CRAM (2020) data show that approximately 2.9 million people (adults who were 18 years old and above) lost their jobs during that time period, approximately 66% of which were women.

Jobs recovered significantly as lockdown regulations eased from Level 5 to Level 1 between April and October 2020. However, this recovery was short lived as the second wave of pandemic hit in January 2021, leading to stricter lockdown (adjusted Level 3), and thus decreasing the net employment level. In March 2021, after the second wave of the pandemic had passed and lock down regulations were relaxed to adjusted Level 1, jobs picked up again.

The recovery of jobs was disproportionate between genders as the NIDS-CRAM (2021) data suggest that women experienced much slower job recovery than men in March 2021. While men's employment returned to pre-COVID-19 levels, women's employment stayed 8.4% below its pre-COVID level. When looking at employment-to-population ratios for adults who are 18 years and above, the employment rate for men in February 2020 (pre-COVID-19) was 59.3% and grew slightly to 60.2% in March 2021. The opposite pattern has been observed in the women's employment rate, which was 46% in February 2020 and declined to 43.8% in March 2021.

The implementation of lockdown regulations between April 2020 to March 2021 led to disparities in the mean hours worked for men and women. Women not only experienced greater job losses than men during this period, but employed women also saw a much bigger decline in the mean hours worked, relative to men. Between February and April 2020, men's mean hours worked per week fell from 38.8 to 28.8 hours (26%), while women's mean hours worked per week dropped from 35.5 to 23 hours (35%). It is important to note that the disparities between hours worked by men and women are partly driven by the large increase in individuals who reported having a job

to return to while working zero hours (furloughed workers). The reported number of furloughed workers in April 2020 constituted 36% of employed women and 26% of employed men.

With regard to regional and racial inequality, a NIDS-CRAM (2021) research study, Visagie and Turok (2021) measured the socioeconomic inequality impact of COVID-19 for different regions in South Africa. The findings of this study show that, although all South African regions experienced a 10% decline in employment during the national lockdown, rural areas (mostly populated by Black ethnic groups) recorded a steeper slump in employment of 35% in June 2020. However, rural areas also experienced a rapid recovery leading to higher employment levels (46%) than pre-pandemic times by March 2021, although it is important to note that 53% of these jobs were temporary. Visagie and Turok (2021) note that this growth in employment is closely associated with favourable production conditions in the agricultural sector. While most South African towns and cities were able to stabilize employment rates to their pre-pandemic levels, the metro employment rate recovery remain relatively stagnant compared to its pre-pandemic levels (yet metro jobs remained the most secure compared to those in other regions). The NIDS-CRAM (2021) report notes that "35% of adults in the metros were consistently employed in every period, compared with 27% in towns/cities and only 16% in rural areas". In contrast, only 39% of workers in metros had temporary employment compared to 44% in cities and a major 53% of populations in rural areas.

When investigating the regional inequality impact of COVID-19 in South African urban areas, Visagie and Turok (2021) found that shack-dwellers bore the brunt of the pandemic, characterized by the highest unemployment rate, lower job security, and little to no recovery. Conversely, suburban regions faced the mildest employment downturn (and fully recovered by March 2021), and had the steadiest jobs during the lockdown period. Additionally, the report notes that "42% of adults living in suburbs were always employed, compared with 27% in the townships, 28% of shack dwellers and only 19% in peri-urban areas". In other words, the COVID-19 pandemic had adverse employment outcomes for all South African regions; however, rural and shack-dwellers were affected far worse than other South African regions (with greater job losses and weaker recovery) as of March 2021.

Although the preliminary impact of COVID-19 on the South African labour market proved to be both detrimental and unequal, based on the StatsSA (2020) findings mentioned above, a study by Bassier *et al*. (2021) notes that over 2.8 million South Africans lost their jobs, and although many furloughed workers (those who were granted leave of absence) were able to return to work by June 2020, those who had lost their jobs did not (Spaull, 2021). However, findings from the NIDS-CRAM survey (2020) suggest that employment recovered strongly between June and October 2020, with the progressive easing of lockdown regulations, resulting in over 2.1 million people gaining employment (Spaull, 2021). The gain in employment was not necessarily by the same workers who had lost their jobs during lockdown (only 50% of workers regained employment

during this period), but a third of unemployed South Africans who were unemployed prior to the pandemic have now found work (Bassier *et al.,* 2021).

The earnings data and supporting evidence from StatsSA (2020) monthly sales data base (which are used in calculating the GDP) suggest that people are earning at least the same as they were in February 2020, and some wages may even have been higher in October (Bassier *et al.,* 2021). This highlights a major bounce-back in jobs, as well as high levels of volatility in the labour market (Spaull, 2021). Bassier *et al.* (2021) report that the NIDS-CRAM (2021) data suggest that prominent sectors in the South African economy (such as manufacturing, mining, wholesale and retail) managed to increase their October 2020 sales levels above those of February 2020 (Bassier *et al.,* 2021). This resulted in a substantial recovery of certain sectors by October 2020, which coincides with the gain in employment mentioned above (Spaull*,* 2021). Furthermore, the slight recovery experienced in South Africa for the year 2021 has been closely associated with the bust-and boost cycle in commodity prices, trade partners' growth (as South Africa is a major oil importer and minerals exporter) which have the potential to strengthen investments, economic growth and create employment.

Although there was a slight recovery in 2021, on 30 June 2021, the country entered Level 4 lockdown, and the various protests and lootings which occurred in July 2021 speak to the lack of economic growth and inclusion which threaten to further widen income inequality in the long run (Spaull, 2021). The overall effect of the COVID-19 and its regulation policies on widening or shrinking income inequality in South Africa has thus been hard, with the initial effects showing a fall in wealth inequality (due to crash in stock market), while the succeeding periods of the pandemic resulting in the unemployment of many (school and businesses close down).

The literature therefore supports the view that COVID-19 has impacted negatively on inequality in SA. The next chapter presents the detailed analytic approach used in this study, to measure this impact, starting with an explanation of the data, the methodology and the analytic process employed in decomposing income inequality by income sources for different population sub-groups in South Africa. The COVID-19 inequality impact in South Africa is analysed by estimating changes in wealth and income household inequality from the NIDS (2018) and the NIDS-CRAM (2021) databases. The Lerman and Yitzhaki (1985) decomposition method, as well as the Fields (2003) regression-based decomposition method are justifiably employed for this purpose through the analytic programmed called "Stata". The aim is to use the findings of this analysis to guide policy makers to simultaneously boost economic growth, while reducing the COVID-19 inequality impact in South Africa.

3.5 Conclusion

The literature review examines the relationships between past pandemics and inequality, narrowing the focus down to COVID-19 in South Africa. The global inequality impacts of the

pandemic during its initial and peak phases, and succeeding phases for different income determinants (race, gender, region) have been examined. Literature points to the pandemic perpetuating income inequality, particularly for the most vulnerable groups, that is, Black, female, rural and less educated workers globally. In attempts to understand whether similar that have been observed in South Africa hold, the next section tests the intuition of the literature by discussing the methodology used in decomposing income inequality by income sources, income sources and sub-populations.

CHAPTER 4: METHODOLOGY, DATA AND ANALYTIC APPROACH

4.1 Introduction

To address the subgoals of the study two approaches are used. The first sub-goal of the study is to identify the income source which contributes the most to total income inequality South Africa. This goal is achieved by employing the Lerman and Yizhaki (1985) Gini decomposition method, which disaggregates the Gini coefficient of total income by income sources (such as wealth, government grant, labour, and remittance income). To address the second and third sub-goal of decomposing labour income by income determinants and by sub-groups, the Field's (2003) regression-based decomposition method is applied. The chapter includes discussions of the data and sample sets employed, the analytic approach, as well as a detailed description of the variables used in the analysis.

4.2 Data and Sample

The National Income Dynamics Study (NIDS, 2018) is a nationally representative survey of South African households which comprises of a total of five distinctive periods (other wised known as 'waves'). The NIDS (2018) survey was conducted by collecting written responses from a questionnaire completed by South African participants. The more recent NIDS (2018) Wave 5 dataset is used in the decomposition of total income by income sources as proposed by Lerman and Yitzhaki (1985). The NIDS (2018) survey was conducted as an initiative of the Southern Africa Labour and Development Research Unit (SALDRU) based at the University of Cape Town, with the aim of providing information and statistics on changes in areas including poverty, unemployment, education, health and economic activity.

The first wave of NIDS was conducted in 2008 and comprises a sample of 28 000 participants from 7 300 South African households/individuals and the survey has since been repeated using the same participants (Continuing Sample Members – CSMs) every two years. In an instance where other individuals become part of the household (Temporary Sample Members – TSMs), they are consequently interviewed, but are not tracked in the following waves. The research focuses primarily on the most recent Wave (5) of the NIDS (2018), which comprises of 37 000 participants and 13 719 households (Brophy *et al.* 2018). Moreover, it is important to note that due to the significant decline in the survey participation of Indian, White and high-earning individuals, a Top-Up sample (of 2 775 CSMs) was included in the NIDS (2018) Wave 5 with the aim to maintain the accuracy and representativeness of the sample.

To analyse the labour income inequality impacts of COVID-19, the National Income Dynamics study- Coronavirus Rapid Mobile Survey (NIDS-CRAM, 2021) is employed for decomposing labour income by income determinants as proposed by Field (2003). The aim is to identify the inequality changes faced in different population sub-groups particularly between April 2020 and March 2021, that is, Wave 1 to 5 of the NIDS-CRAM (2021) survey. Although, these results are also presented for Wave 5 of NIDS (2018), caution should be taken when comparing the NIDS (2018) estimates with NIDS-CRAM (2021) as the different manner in which these datasets were collected does not render them completely comparable.

Additionally, the NIDS-CRAM (2021) estimates are prone to instantaneous changes mostly due to the varying lockdown levels implemented between April 2020 and March 2021. However, the NIDS-CRAM (2021) is a broadly national recognized panel follow-up study on a subsample of adult participants from NIDS (2018) Wave 5 households and individuals and these comparisons are useful. Studies by Ardington (2021) and Kerr *et al.* (2020) find that when comparing results from the NIDS and the NIDS-CRAM datasets, the item non-response rate, the relationships between key variables (the correlates of earnings, employment trends), and the associations between key outcomes and demographic characteristics (gender, race, region, age, education) are fairly consistent across the NIDS (2018) and NIDS-CRAM (2021) and thus making the two datasets relatively comparable.

In view of the COVID-19 containment regulations, NIDS-CRAM (2021) employed over 50 call-centres to facilitate a 20-minute telephonic survey of a representative sub-sample of NIDS (2018) participants. The NIDS-CRAM (2021) makes use of the same people across five distinctive time periods (between April 2020 and March 2021) who answered questions relating to their level of employment, welfare, income, and their behavioural responses the COVID-19 pandemic.

The first wave of NIDS-CRAM occurred between May and June 2020 comprising of 7 073 randomly selected adults from the NIDS (2018) Wave 5 sample, and includes questions and responses on income and employment for the month of February, March and April 2020 (before and at the beginning of the first lockdown period in South Africa) and thus Spaull *et al.* (2021 p.21) notes that "the results of the NIDS-CRAM Wave 1 study are a helpful baseline from which to compare changes over time, and thus shedding light on who is being affected, how they are being affected, and how might government and civil society respond to this unfolding crisis". The other four waves of NIDS-CRAM (2021) are included in the study following the same sample of respondents, making the NIDS-CRAM (2021) survey a panel study which can be used in assessing how the COVID-19 pandemic and lockdown measures impacted South Africans within between different subpopulation groups, as well as the efficiency of government's socioeconomic relief policies (i.e., Special COVID-19 Social Relief of Distress Grant[4]) during this period.

[4] A government funded monthly payment of R350 issued to unemployed South African aged 18 and above who were able to prove that their job-loss was associated with COVID-19 pandemic and its lockdown regulations.

Research limitations center around the key differences in the nature and process in which the NIDS (2018) Wave 5 and NIDS-CRAM study surveys were conducted. Firstly, unlike the NIDS (2018) survey, the NIDS-CRAM (2021) was limited with regards to lockdown regulation, timeframe and resources which led to its failure in collecting information on every member living with the participant. Additionally, the telephonic method used in conducting the NIDS-CRAM (2021) survey acted as a major constrained with regards to the length and depth of the questionnaire. Furthermore, the limited wealth data included in the NIDS-CRAM (2021) (which excludes important household wealth variables such as pension funds) has limited efforts in estimating wealth inequality Gini coefficients. While tax records data would be a broader and a better database to estimate the changes in wealth, they do not exist for short-term changes, and thus the NIDS (2018) and NIDS-CRAM (2021) databases, are the most appropriate national representative household surveys available.

The employment, earnings and individual-level economic outcomes data from the NIDS (2018) and NIDS-CRAM (2021) datasets are included in the study, and the different income sources are presented for different sub-groups (gender, race, region, and the level of education of South African adults aged between 18-64[5]). The NIDS (2018) and the NIDS-CRAM (2021) databases are employed due to the uncomplicated manner in which they present socioeconomic data collected for the period under study and the availability of different measurement points as the pandemic has unfolded. Data from the NIDS (2018) is employed due to its simplified nature (comprehensive questionnaire) of collecting and presenting socioeconomic data of households and individuals. In measuring the changes in labour income inequality, the sample was restricted to employed participants.

The longitudinal nature of NIDS-CRAM (2021) provides a rich set of 2018 individual and household-level characteristics to draw from. Given that NIDS-CRAM (2021) is a stratified 30% subsample of participants in Wave 5 of NIDS (2018), this will increase the comparability of the results. Furthermore, post-stratification weights are applied for both waves of the NIDS (2018) and NIDS-CRAM (2021) datasets to allow for more accurate population estimates.

Having discussed the data and sample datasets used in the study, the following section expands on the methods, analytic approach, and variables use in the decomposition of total income and labour income by income sources and income determinants respectively.

[5] Given goal that one of the main goals of the study is to decompose labour income inequality, sample is restricted to this particular age range (18-64) as it represents that part of the South African population that are within the legal working age.

4.3 Analytic Approach

4.3.1 Lerman and Yitzhaki's (1985) Gini decomposition method

The first sub-goal of the study is to measure the changes in total income inequality by income source using the Gini decomposition methodology. Robert Lerman and Shlomo Yitzhaki (1985) proposed an analytical approach in their empirical study on the effects of income inequality by income sources in the US. This method is an extension of the Gini decomposition method proposed by Kakwani (1977) and Shorrocks (1983, 1982), which derives the contribution of different income sources to total income. Lerman and Yitzhaki's (1985) Gini decomposition method measures the contribution of each income source in the Gini coefficient of total income as a product of: the Gini coefficient of the income source, the income sources' share of total income, and the income sources correlation with the distribution of total income. Moreover, this method is efficient for estimating the marginal effect[6] that different sources of income have on overall income inequality. The method has been employed in a variety of income inequality studies including Cichello (200); Stark (1980); Todaro (1980); and Taylor (1986), Mussini (2013), Saylor (2020). It is pivotal in answering the question "what impact does a small change in a particular income source have on total income inequality?". Lerman and Yitzhaki (1985) show that the Gini coefficient for total income inequality (G) can be represented by the following equation:

$$G = \Sigma^{k}_{k=1} = S_k G_k R_k \quad (1)$$

Where each income source's contribution to total income inequality can be measured as the product G_k (the Gini coefficient of the income source k), S_k, (defined as the share of source k in total income) and R_k (the Gini correlation of income from source k with the distribution of total income). The Gini correlation of income from a particular income source k with total income (R_k) can be derived from the equation:

$$R_k = \frac{\text{Cov } \{yk, F(y)\}}{\text{Cov}\{yk, F(yk)\}} \quad (2)$$

Where F(y) and F(yk) are the cumulative distributions of total income and of income from source k respectively. The Gini correlation (R_k) has a parameter ranging from -1 to +1, meaning that R is positive when an income source is an increasing function of total income, and negative when an income source is a decreasing function of total income. Similarly, the share of a particular income on total income inequality (calculated the product of Rk, Sk and Gk) is positive when an income source increases total income inequality, and negative when an income source is a decreasing function of total income. However, Sk, the share of source k in total income) of a particular income source, cannot hold a negative value, neither can the relative Gini coefficient of the income sources

[6] Marginal effects in this case refers to the degree to which a change in a specific independent variable (in this case: a particular income source) has on the dependent variable (that is, total income inequality).

(Gk). This means that when the Sk and Gk values of each income source are closer to 0 than 1, the income source in question has an equalising impact on overall income inequality. In other words, the close Sk and Gk are to 1, the more the benefit the higher-earning individuals in the population and thus increases total income inequality.

Contrary to R_k, when G_k (the relative Gini coefficient of the income source k) of a particular income source takes a value that is closer to 0 than 1, this suggests that the particular income source has an equalising (decreasing) impact on overall income inequality. The product of R_k, G_k and S_k yields the contribution (share) that each income source has in total income inequality and thus helps identify which income source is the main driver of overall income inequality in South Africa in 2018.

In order to estimate the importance or share of each oncome source in total income inequality, the *"descogini"* command in Stata (Lerman and Yitzhaki, 1985) is used, and the contribution (S_k), Gini coefficients (G_k), and the Gini correlation (R_k) of the income sources are estimated. Moreover, the share of each income source in total income is estimated and compared across the different income sources. Apply this method to the NIDS Wave 5 dataset insights into which income source may consequently have the largest influence in reducing/increasing overall income inequality in South Africa in 2018 are estimated. Lastly, the Lerman and Yizhaki (1985) method is also efficient in estimating the marginal effect that each income source has on total income inequality.

Marginal effects in the study refers to what a 1% increase in the size of a particular income source will have on overall income inequality, holding all other income sources constant. The marginal effects of income sources on total income inequality are calculated using equation 3:

$$\frac{\partial G/\partial e}{G} = \frac{Sk(Gk.Rk)}{G} - S_k \qquad (3)$$

Once the share of each income source in total income and the marginal effect that the income sources have on overall income inequality are generated, the command *"boostrap"* is applied to generate the standard error corresponding to the marginal effect that each income source has on total income inequality.

Having identified the income source that has the greatest share in total income and greatest marginal effect on total income inequality in South Africa, the next sub-goal of the research is to estimate the impact of income determinants on income inequality using Field's (2003) regression-based decomposition method.

4.3.2 Field (2003) regression-based decomposition method

The second sub-goal of the study is to decompose labour income by income determinants, that is, by age, gender, race, geographical region, and the level of education of South African individuals. This is done by using the decomposition method by Field (2003) which was initially introduced by Blinder (1973) and Oaxaca (1973) and further developed by Morduch and Sicular (2002), extending it to decompose income inequality for both income sources and determinates (age, gender, race, region, education level). Four steps were used to estimate the determinants of income inequality for the total sample as well as by sub-group.

The first step is generating Gini coefficients of income determinates particularly between April 2020 and March 2021 (COVID-19 pandemic), which is important how labour income inequality has increased or decreased during the varying lockdown levels of the pandemic by using the Gin coefficient as an indicator. The analytic software Stata is used by applying the command *"ineqgini",* followed by the dependent variable (labour income) and then listing the relative dummy variables associated with each income determinants.

The second step of the regression-based decomposition method is to generate partial regression coefficients, which helps estimate an individual's ability to generate labour income (income generating model). The third step in the Field's (2003) decomposition method seeks to answer the question of how much each income determinant contributes to labour income inequality in South Africa by applying the semi-log regression. Lastly, the regression-based decomposition is used to decompose total income at sub-group level within gender, race, and region of different labour income determinants, and seeks to answer the question of; which labour income determinants contribute to inequality within each sub-group studied.

Steps 2-4 of the decomposition of labour income by income determinants starts with applying a semi-*log* regression, where the dependent variable; *log* of total labour income, and the independent variables; gender (male and female), race (Black and White), region (rural and urban), age (youth, prime age, middle aged, and older age), and level of education (less than matric, matric, and tertiary qualification).

The linear regression function can be presented as follows:

$$\log Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \cdots \beta_1 X_{i1} + \beta_k X_{ik} + \varepsilon_{i,} \qquad i = 1, 2, \ldots\ldots n. \qquad (4)$$

Where $logY_i$ is the logarithm of total labour income South African Rands for observation i and β_0; X_1 , X_2 ,…X_{ik} are the exogenous explanatory variables, that is, the income determinants gender (male and female), race (Black and White), region (rural and urban), age (youth, prime age, middle aged, and older age), and level of education (less than matric, matric, and tertiary qualification) for each individual. Variables β_1, β_2,…β_k represent the coefficients for each income determinant.

The error term of each observation is represented by ε_i and the sample size is represented by n. The coefficients and standard errors of the independent variables (1) are generated by using the Ordinary Least Square method, as generated by the command *"regress"* in Stata. The results are estimated using a merged NIDS (2018) Wave 5 and NIDS-CRAM (2021) wave 1 -5 database.

The next step is to calculate the share of log-variance of income, that is, the relative inequality weights (S_k) for each income determinant (age, gender, race, region, education). This is done by employing the following equation:

$$Sk = \frac{\sum_{k=1}^{k} \hat{\beta}_k \, Cov(x_k, lny_i)}{Var\,(lny_i)} = 1, 2, \ldots, K \qquad (5)$$

The estimated coefficient for the *kth* predictor in the linear regression function (equation 4) is expressed as $\hat{\beta}_k$ and $Var\ (lnyi)$ represents the outcome variable, and $Cov\ (xk,\ lnyi)$ is the covariance between the *kth* age, gender, race, region, education) predictor and the outcome variable (income inequality). The income determinants effects on income inequality are determined by the sign of the estimated factor inequality weight (S_k). When S_k is < 0 the income determinant will have a decreasing effect on income inequality. Contritely, when $S_k > 0$ it will have an increasing impact on labour income inequality. The sum of all labour income inequality weights equal to R^2 as expressed by equation 6, and hence important in explaining the degree of variation from the income generating model (equation 4).

$$\sum_{k=1}^{k} s_k = \frac{\sum_{k=1}^{k} \hat{\beta}_k \, Cov(x_k, lny_i)}{Var\,(lny_i)} = \frac{Var\,(ln\hat{y}_i)}{Var\,(lny_i)} = R^2 \qquad (6)$$

Field's decomposition method (2003) can be employed by either ruling out or including the error term (εi in equation 4). When the error term is left out, the decomposition of predicted income (Field, 2003) is applied which excludes the residual error term expressed in the linear regression function. When the error term in included in the decomposition method, equation 7 is used to estimate the unexplained percentage of inequality allocated to each income determinate:

$$Se = 1 - R^2 \qquad (7)$$

The decomposition of total labour income by income sources includes the contribution of net residual and the factor inequality weights for each income determinant, expressed as a function of the income generating model. The degree of covariance between the *log* of total labour income and the income determinants, as well as the variance of the *log* income, are also estimated (with post-stratified weights applied) in Stata. Moreover, estimates can be expressed as both for Yi (equation 1) and predicted Y suggested by Fiorio and Jenkins (2007). For the sake of comparability between the two data sets, the predicted i is decomposed and the error term is excluded from the decomposition. Estimates from decomposing the predicted i show how much

age, race, gender, region and education levels contribute to labour income inequality. Similarly, the study uses the same processes in generating sub-group level results, by restricting the labour income and determinants estimated by the race, gender and region sub-groups. This helps in understanding the changes in labour income inequality within the mention sub-groups.

The next section presents the variables and how the strengths and limitations of each has been taken into consideration in meeting the research goals of decomposing total income by income sources (Lerman and Yizhaki, 1985) and decomposing labour income by income determinants (Field, 2003).

4.4 Variables

4.4.1 Total income inequality decomposition by income sources

The decomposition of total income inequality by income sources is important for understanding the relationship between the income sources and their contribution to total income inequality. The most prevalent sources of income inequality studied by authors such as Rani and Furrer (2016); Amarante (2016); Keifman and Maurizio (2012); Lustig *et al.* (2013); Bigotta *et al.* (2015); Bourguignon (1979); Spaull (2014); Lambert and Aronson (1993), include labour income, government income, remittance income, and wealth income. The mentioned income sources from the NIDS Wave 5 dataset have been used for this study.

Table 3: Descriptive statistics used in income decomposition by income sources, 2018.

Income sources	**Number of Observations**	**Mean**	**Std. Dev**	**Gini-coefficient**
Income Sources				
Total income	52 361	9184.98	27935.64	0.64
Remittance income	11 420	1500.22	1893.87	0.48
Labour market income	27 198	8485.42	12825.73	0.76
Government grant income	30 900	1956.25	1454.07	0.36
Wealth income	5 1204	293.09	15261.4	0.88

Source: The NIDS (2018) wave 5; post-stratified weights applied.

Table 3 presents descriptive data of the main income sources used to estimate total income, namely total remittance income, total labour income, government grant income and total wealth income of South African populations aged between 18 and 64. The mean, standard deviation and Gini coefficients of the continuous variables are presented in Table 3. NIDS (2018) provides a significantly large sample or income sources variables, and the Gini coefficients are generated in Stata by using the command *"ineqgini"*. The Gini coefficients show that wealth and labour income have the highest Gini coefficients (0.88 and 0.76 respectively) compared to the other income sources, and thus are likely to play an important role in alleviating total income inequality in South Africa

4.4.2 Labour income inequality decomposition by income determinants

As previously mentioned, the decomposition of labour income inequality by population sub-groups *before* the pandemic, focuses on five income determinants, mainly, race, age, gender, geographical regions, and level of education of South African individuals using Wave 5 of the NIDS (2018) survey data. These income determinants have been used in labour income inequality studies from StatsSA (2019); Tanith *et al.* (2020); Lakner *et al.* (2021) (2021); Dang and Viet Nguyen (2020); Casale and Shepherd (2021); Espi *et al.* (2021); Kohler and Hill (2021); Visagie and Turok (2021), and Nwosu *et al.* (2021), whose findings conclude that income determinants have a significant impact on labour income inequality in South Africa.

These same income determinants are used for the decomposition of labour income inequality by population sub-groups *during* the pandemic, that is, between April 2020 and March 2021 are presented in Table 4. The subpopulation samples across the five NIDS-CRAM (2021) are smaller in size than those in the NIDS (2018). Moreover, the NIDS-CRAM (2021) was collected during COVID-19 when lockdown levels were impacting people's ability to attend work and earn a salary, resulting in lower response rates and thus making estimates prone to some bias. However, the NIDS-CRAM (2021) reports by Kerr *et al.* (2020) and Ardington (2020), affirm that "while such biases can be important for precise estimates of job loss, the trends identified in the NIDS-CRAM are indicative of current labour market dynamics in South Africa" (Ardington, 2020 p9). The NIDS-CRAM (2021) quality report further notes that item level non-response does not pose a significant problem for the NIDS-CRAM (2021), particularly with the addition of top-up samples and stratified weights which have been effectively applied in this study.

The time period under study is subject to varying levels of COVID-19 lock down regulation which was characterized by the closure of various non-essential occupations, schools and business. This has impacts on the rising and falling of work force employment rates (Table 5), thus affecting the level of labour income inequality across the five NIDS-CRAM (2021) waves. During Level 5 of the COVID-19 lockdown the South African government, guided by the World Health Organization (WHO), implemented very stringed social distancing measure including an initial 21 day of stay-at-home isolation, closure of all non-essential shops and businesses, closure of schools, and

restricted travels (April and May 2020). These lock down measures were slightly relaxed by June 2020 to Level 3, with the reopening of small business, increased number of social gatherings with compulsory COVID-19 measure such as sanitization stations and the wearing of masks. By March 2021 the lockdown levels were relaxed further to Level one with reopening of in-person school and work.

Table 4: Measurement of the variables included in the analysis, NIDS (2018) and NIDS-CRAM (2021) Wave 1 – 5.

Variables employed in the decomposition of labour income by determinants						
Labour income determinant variables used in analysis		NIDS W1 obs	NIDS W2 obs	NIDS W3 obs	NIDS W4 obs	NIDS W5 obs
Age	**Categorical**	**6235**	**5104**	**5511**	**5051**	**5259**
Youth (18-24)	1	1053	1434	1700	1300	834
Prime age (25-39)	2	2736	2805	2780	2520	2241
Middle age (40-54)	3	1842	865	880	832	1562
Older age (55-64)	4	604	640	405	500	582
Gender	**Dummy**					
Male	1	2478	2013	2183	1965	5219
Female	0	3757	3091	3324	3086	2033
Race	**Dummy**					
White	1	232	179	168	153	160
Black	0	5373	4928	5343	4898	4585
Region	**Dummy**					
Urban	0	4845	3754	3382	3324	3445
Rural	1	1385	1522	1205	1109	1518
Education	**Categorical**					
Less than Matric	1	3245	4209	3309	2705	2751
Matric	2	1550	2001	1782	1711	1299
Tertiary	3	1417	1492	1200	1107	1151

Source: NIDS (2018) and NIDS-CRAM (2021) datasets; post-stratified weights applied.

The fluctuations in the labour market between April 2020 and March 2021, and the corresponding changes in the Gini coefficients of the income determinants are mostly explained when paralleled with the respective COVID-19 lockdown levels associated with this time period (Table 5) and should be taken into consideration when interpreting the results of the study. However, the NIDS-CRAM (2021) is still the most relevant dataset which can be used to analysis the income disparities associated with the COVID-19 pandemic (Ardington, 2021). Moreover, the NIDS-CRAM (2021) reports by Kerr *et al.* (2020) and Ardington (2020), affirms that "the trends identified in NIDS-CRAM are indicative of current labour market dynamics in South Africa" (Ardington, 2020 p9). The NIDS-CRAM (2021) quality report further notes that item level non-response does not pose a significant problem for NIDS-CRAM (2021), particularly with the addition of top-up samples and stratified weights which have been effectively applied in this study.

Table 5: Lockdown levels across NIDS-CRAM (2021) waves

NIDS-CRAM waves	Lockdown levels	Employment levels of South African individuals
Wave 1 April 2020	Lockdown Level 5 (L5)	6 574 268
Wave 2 June 2020	Lockdown Level 3 (L3)	11 817 506
Wave 3 October 2020	Lockdown Level 1 (L1)	16 640 795
Wave 4 January 2021	Lockdown Level 3 (L3)	11 817 506
Wave 5 March 2021	Lockdown Level 1 (L1)	16 640 795

Source: Quarterly Labour Force Survey 2019 Q4 (Statistics South Africa, 2019); NIDS-CRAM (2021)

4.5 Conclusion

Now that the data, methods, analytic process and variables of decomposing total income inequality by income sources and income determinants by population sub-groups has been elaborated and the benefits and limitations of the study identified, the next chapter presents a discussion of the main findings of the research.

CHAPTER 5: FINDINGS AND DISCUSSION

5.1 Introduction

This chapter presents the results of decomposing income inequality by income sources and income determinants by population sub-groups, such as gender, race, and region. The results for the income inequality decomposition by income sources are based on the NIDS 5 wave dataset, and the decomposition by income determinants and sub-groups is based on the NIDS-CRAM Waves 1–5 survey datasets.

5.2 Total income inequality decomposition

This section examines the overall contribution of the different income sources to inequality by employing Lerman and Yitzhaki's (1985) method to decompose the Gini coefficients. Using this Gini decomposition method estimates the marginal effect[7] that a particular income source will have on total income inequality, that is, the effect that a 1% change in income source k has on total income inequality (represented under the last column of Table 6). Total income is decomposed in Table 6 by different income sources, including labour, wealth, government, and remittance income from the NIDS Wave 5 (2018).

The results are important in determining the most important income source, which is then decomposed by income determinants and population sub-groups for 2020 and 2021 from the NIDS-CRAM datasets. Table 6 shows estimates of the share of the income sources in total income (*Sk*), the relative Gini coefficient of the income sources (*Gk*), and the Gini correlation of the income sources (*Rk*) with total income. The product of these three components (*Sk*, *Rk*, and *Gk*) yields the contribution that each income source has to total income inequality (Column 5). The impact that a small increase in a specific income source has on total inequality is presented in Column 6 of Table 6.

[7] Marginal effects measure the impact that an instantaneous change in one variable has on the outcome variable while all other variables are held constant (in the simple Ordinary Least Square (OLS) model with linear effects, estimated coefficients are always equal to marginal effects). In other words, this value expresses how much a 1% increase in the size of a particular income source will increase (+) or decrease (-) total income inequality (values are recorded in row 6 of Table 6).

Table 6: Decomposition by income sources from Wave 5 the NIDS (2018)

Income Source (k)	Share of k in total income (*Sk*)	Gini coefficient of k (*Gk*)	Gini correlation between k and total income distribution (*Rk*)	Share of k in total income inequality (I)	Marginal effect of k on total inequality. (I – *Sk*)
Labour income	0.4841	0.6377	0.9112	0.5098	0.0257 (0.0584)
Wealth income	0.2584	0.8761	0.9812	0.2768	0.0184 (0.0555)
Government grant income	0.1830	0.3311	0.3749	0.1544	-0.0326 (0.0019)
Remittance income	0.0745	0.41011	0.5041	0.061	-0.0135 (0.0062)
Total income	1.00	0.6355		1.00	

Notes: The error terms for the inequality share of the income sources are included in brackets. Source: the NIDS Wave 5 (2018); Author's own calculations. Post-stratified weights applied.

Column 2 shows the share of the different income sources to total income (*Sk*) (based on the NIDS Wave 5 survey, 2018). Labour market income is estimated as the largest contributor (48%) to South African individuals' total income. The second biggest contributor to total income is wealth (25% of total income), while government grant income and remittance income contribute 18% and 7% of total income, respectively.

Column 3 shows the Gini coefficient corresponding to each income source (*Gk*), and is an inequality estimate that indicates which income sources have an equalising effect on total income inequality. A large Gini coefficient (when value is closer to 1 than 0), indicates greater inequality, with affluent individuals gaining a much higher percentage of total income relative to low-income or poorer individuals. Results show that the income source with the highest Gini coefficient is wealth income, with a high 0.87 Gini coefficient. The second highest Gini coefficient is that of labour income (0.65), indicating a gap between high- and low-earning individuals which benefits the former more than the later. Although the Gini coefficient of labour market income is less than that of wealth income, it is still much higher than the Gini coefficients of remittance income and

government grant income, which are recorded as 0.41 and 0.33 respectively. Government grant income and remittance income thus both have equalising effects on total income inequality.

Column 4 presents the estimated Gini correlations between the income sources and the distribution of total income (*Rk*) and ranges between -1 and +1, where *Rk* equals to +1 (or -1) when an income source is associated with an increase (or decrease) in total income inequality. Findings show that wealth income is strongly correlated with the distribution of total income, that is, it is very likely to contribute to an increase in total income inequality. Labour income is estimated as having the second highest Gini correlation of 0.91. The high correlation between labour market income and the contribution of total income suggests that labour market income favours high-earning individuals more than is does lower-income earners. The income source with the lowest Gini correlation is government grant income (0.37), which suggests that income from government grants is associated with a decline in total income inequality. This is consistent with expectations that government grants benefit lower-income earners more than they do higher-income earners. Remittance income has a Gini correlation of 0.50 which suggests it benefits the rich more than the poor.

The contribution of each income source to total income inequality (I) (Column 5), is graphically represented in Figure 2. As expected, findings show that approximately 50% of total income inequality originates from the labour market. Wealth income accounts for 27% of total income inequality, while government grant income and remittance income contribute the lowest at 15% and 6% percent, respectively.

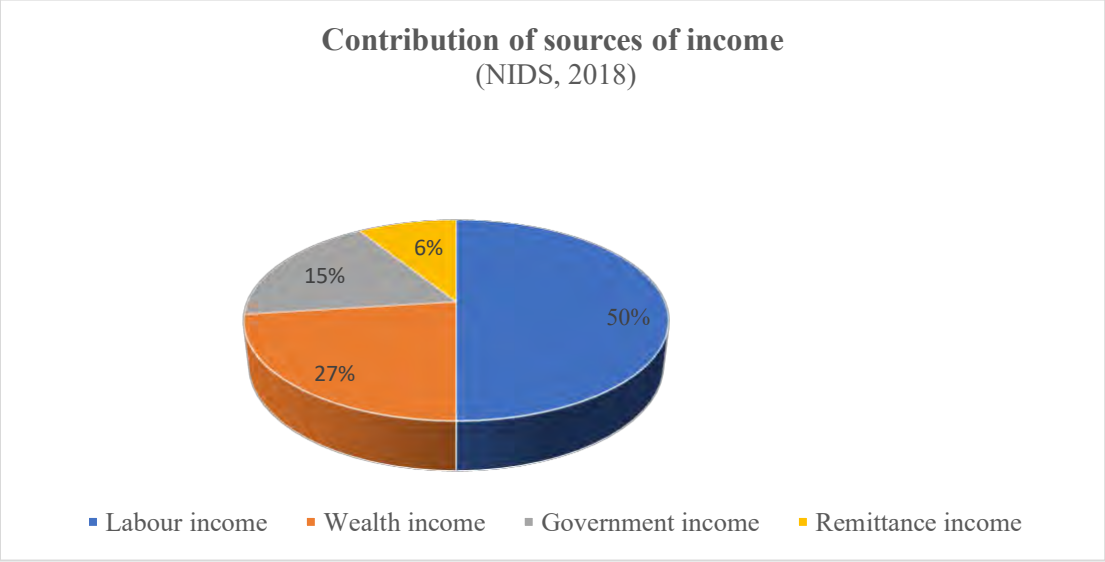

Figure 2: The share of income sources in total income (2018).
Source: The NIDS Wave 5: Author's own calculations; Post-stratified weights applied.

Having established labour market income as the main driver of total income inequality relative to other income sources, the next question to be answered is: by how much will a small change in each income source increase or decrease inequality? This refers to the impact that a 1% increase in the size of a particular income source will have on total income inequality (Column 6). The marginal effects[8] can take values ranging between negative and positive infinity, where a positive (negative) value indicates an increasing (decreasing) impact on total income inequality.

Findings suggest that marginal increases in wealth and labour incomes have an increasing impact on total income inequality. Marginal increases in remittance and government grant incomes have a decreasing impact on total income inequality, as a 1% increase in these income sources is associated with an approximate 3% and 1% decrease in total income inequality, respectively. This suggests that government grant income does play an important role in alleviating total income inequality in South Africa, with approximately 18.2 million South Africans (31% of the population) dependent on government grants in 2018 (Granlund *et al.,* 2020). Additionally, results show that *ceteris paribus*, a 1% increase in labour income is associated with an approximate 2.5% increase in total income inequality. When other income sources are held constant, a 1% increase in wealth income is associated with 1.8% increase in total income inequality, suggesting that labour market income increases total income inequality much more than all the other income sources. Thus, focusing socioeconomic policies on alleviating labour market inequality becomes critical for reducing total income inequality in South Africa.

Having identified the labour market as the driver of total income inequality, the next question is: which socioeconomic groups within the labour market experienced the highest levels of inequality, and how has this changed throughout the course of the pandemic? To answer this question, the Gini coefficients of labour income determinants age, race, gender, region, and the level of education are presented in Table 7.

5.3 Gini coefficient estimates for labour income determinants

This section aims to identify the inequality changes in different population sub-groups between April 2020 and March 2021, using Waves 1 to 5 of the NIDS-CRAM (2021) survey. Although, results are also presented for Wave 5 of the NIDS (2018), caution should be taken when comparing the NIDS (2018) estimates with the NIDS-CRAM (2020–2021) survey results. The different manner in which these datasets were collected renders them not completely comparable. The NIDS-CRAM (2021) sample is, however, a stratified 30% subsample of participants in Wave 5 of the NIDS (2018) and is thus presented in Table 7. It should also be noted that the NIDS-CRAM (2021) estimates are prone to sudden large changes, mostly due to the varying lockdown levels

[8] Marginal effects are calculated by dividing equation (8) by the overall Gini as explained in detail in chapter 4. Marginal effect: $\frac{\partial G/\partial e}{G} = \frac{Sk(Gk.Rk)}{G}$

implemented between April 2020 and March 2021 that were applicable at the time of the NIDS-CRAM surveys, as noted in Table 7.

The Gini coefficient estimates are presented to compare labour market income inequality before (NIDS, 2018) and during the pandemic, for the whole sample, as well as for the different socioeconomic population sub-groups studied, namely, gender, race, region, and education.

Table 7: Estimated Gini coefficient for the NIDS (2018) and the NIDS-CRAM (2021) by income determinants.

	NIDS 5 (2018)	**CRAM 1 (Apr 2020) L5**	**CRAM 2 (June 2020) L3**	**CRAM 3 (Oct 2020) L1**	**CRAM 4 (Jan 2021) L3**	**CRAM 5 (March 2021) L1**
Total sample						
Total labour income	0.55	0.57	0.57	0.55	0.56	0.55
Gini coefficients by determinants						
Age groups						
Youth (18-24)	0.51	0.56	0.59	0.60	0.54	0.55
Prime age (25-39)	0.54	0.53	0.53	053	0.52	0.53
Middle age (40-54)	0.55	0.57	0.60	0.58	0.59	0.58
Older (55-64)	0.62	0.61	0.65	0.64	0.64	0.65
Gender						
Male	0.53	0.54	0.55	0.54	0.54	0.53
Female	0.55	0.57	0.58	0.56	0.55	0.57
Race						
White	0.43	0.46	0.48	0.47	0.47	0.43
Black	0.52	0.56	0.55	0.52	0.54	0.53
Region						
Rural	0.54	0.58	0.56	0.57	0.56	0.55
Urban	0.52	0.56	0.57	0.56	0.56	0.56
Education						
< Matric	0.49	0.53	0.51	0.50	0.51	0.49
Matric	0.53	0.50	0.51	0.50	0.50	0.49
Tertiary	0.57	0.49	0.51	0.53	0.52	0.53

Source: The NIDS-CRAM Waves 1 to 5 dataset; Post-stratified weights applied.

Findings from the NIDS (2018) dataset show that the Gini coefficient for total labour income was 0.55 in 2018, prior to the pandemic. The NIDS-CRAM (2021) results show that labour income inequality initially worsened during the pandemic and then returned to pre-pandemic levels as the pandemic unfolded. At the peak of the pandemic (lockdown Levels 5 and 3), coinciding with the April and June 2020 NIDS-CRAM surveys, the Gini coefficient for total labour income was as high as 0.57, and then dropped to 0.55 in October 2020 (lockdown Level 1). This was followed by a slight increase to 0.56 in January 2021, when lockdown levels moved from Level 1 back to Level 3, before returning to 0.55 in March 2021, when lockdown levels were eased from Level 3 to Level 1. The findings therefore suggest that the changes in the Gini coefficients of total labour income across the NIDS-CRAM (2021) waves coincide with the varying lockdown levels, that is, the Gini coefficients are higher during stricter lockdown levels (5 and 3) and lower during eased lockdown levels (Level 1). This suggests that the COVID-19 pandemic worsened labour income inequality when lockdowns were at their strictest, which in turn, was likely to increase overall inequality, given that labour income inequality has been shown to be the biggest contributor to overall income inequality (see Table 6).

When observing the labour inequality changes by population sub-groups, starting with age, the findings suggest that older population groups (50–64) experienced higher levels of labour income inequality than the youth (18–29) and middle-aged (30–49) groups. Inequality worsened the most for the youngest population group (16–24 years) during the pandemic, with the Gini for this group rising from 0.51 pre-pandemic to 0.60 in October 2020. The Gini for the prime age group (25–39 years) fell from 0.54 pre-pandemic to 0.53 in the NIDS-CRAM Waves 1, 2, 3 and 5 and to 0.52 in Wave 4. These finding are in line with the findings of the NIDS-CRAM (2021) study by Espi *et al* (2021), which found that youth experienced the highest increase in employment (2.5%) during the pandemic, followed by middle-aged adults (1% increase), while older adults faced a steep 3% decline in employment (from 45% to 41%) between April 2020 and March 2021. The Gini coefficients for youths, middle-aged, and older-age populations peaked at 0.59, 0.60 and 0.63, respectively, in April and June 2020 (during the strictest lockdown levels) and declined to 0.55, 0.53 and 0.60, in March 2021 (NIDS-CRAM Wave 5) as lockdown regulations were eased to Level 1.

With regard to labour income inequality changes by gender, the results suggest that, in both the NIDS (2018) and the NIDS-CRAM (2021) datasets, female workers experienced higher levels of labour income inequality than males. The highest levels of inequality for females were recorded in the NIDS-CRAM Waves 1 and 2, that is April and June 2020 (0.57 and 0.58 respectively). Although the Gini coefficients of males also rose during this same period of strictest lockdown (to 0.54 and 0.55 in the NIDS-CRAM Waves 1 and 2), inequality for males was still lower than for females. The NIDS-CRAM study by Espi *et al.* (2021) affirms that men's employment-to-

population ratio[9] was higher in March 2021 than its pre-pandemic levels (62.8% to 65% between February to March 2021), whereas women's employment-to-population ratio declined during this same period from 50.4% to 48.5%. The findings by Espi *et al*. (2021) support those of this study and suggest that the COVID-19 pandemic impact on employment and earnings inequality was felt harder by female than male workers.

With regard to race, the results suggest that labour income inequality was much higher for Black than White workers across the NIDS and the NIDS-CRAM datasets. The Gini coefficient for labour income of Blacks workers in the NIDS (2018) survey was 0.52, which is 9 percentage points higher than that of White workers (0.43). Inequality rose for both Whites and Blacks during the pandemic, peaked for Blacks under Level 5 lockdown (NIDS_CRAM Wave 1) and slightly later for Whites under lockdown Level 3 (NIDS_CRAM Wave 2). As the lockdown levels eased from Level 5 to Level 1, the results show that the labour income inequality for Blacks fell to 0.52 and 0.53 (versus 0.48 and 0.47 for White populations respectively) in October 2020 and March 2021, which coincides with the lowered lockdown Levels 1. These findings are congruent with the general literature on race inequality within the South African labour market, that is, females workers earn less than male workers in most industries.

The results for labour income inequality by region show that labour income inequality was worse in rural areas than urban areas in 2018 (NIDS Wave 5), that is, the Ginis were 0.54 and 0.52, respectively. During the pandemic, inequality rose in both rural and urban areas, with the Gini peaking in rural areas under Level 5 lockdown (NIDS_CRAM Wave 1) and in urban area under Level 3 (NIDS-CRAM Wave 2). An important change to note is the differences in rural and urban inequality during the pandemic. In the NIDS-CRAM Wave 4, inequality was the same in rural and urban areas, and in Waves 2 and 5 inequality was shown to be slightly higher in urban than rural areas. One reason for this is proposed in the study by Espi *et al.* (2021), which finds that while the employment-to-population of urban dwellers remained stable between April 2020 and March 2021, that of rural dwellers increased slightly from 47.2% to 51.3% in March 2021. The rise in rural employment during March 2021 is likely to have contributed to the reduced level of labour income inequality in rural areas.

Estimates of the labour income inequality impact of COVID-19 includes labour income Gini coefficient calculations for individuals with different levels of education (ranging from those who lack a matric certificate, those with matric, and those who have a tertiary level qualification). The results suggest that individuals with a tertiary level education faced the highest levels of labour income inequality in 2018 (NIDS Wave 5) of 0.57, compared to those who have or lack a matric certificate (0.53 and 0.49 respectively). This is mainly because, amongst the three education categories (less than matric, matric, and tertial level of education), the tertiary group is much

[9] The employment-to-population ratio is defined as the percentage of a particular population group that is employed and is calculated by: (Employment ÷ Civilian Noninstitutional Population) x 100.

broader (includes individuals with diplomas, tertiary certificates, bachelors, honours Masters, and PhDs) thus includes a wider range of income levels than the other two categories. The earnings for individuals with less than a matric certificate is significantly lower than that of people in the other education categories, but inequality for this group is lowest.

The results from the NIDS-CRAM (2021) datasets show that in April 2020, when Level 5 lockdown measures were implemented, individuals with a tertiary level education experienced a sharp fall in income inequality, with the Gini coefficient dropping to 0.49 from 0.57 pre-pandemic. In April 2020 inequality for those with tertiary income was now lower than for those who have or lack a matric certificate (0.53 and 0.50 respectively). However, by March 2021, as the lockdown regulations fell to Level 1, the labour income Gini coefficient of individuals with a tertiary level education rose to 0.53, while that of those who have or lack matric certificates fell to 0.49. By March 2021 (NIDS-CRAM Wave 5) labour income inequality for those with a tertiary education or a matric certificate was lower than pre-pandemic, while for those lacking a matric certificate it was back to the same level as in 2018 (NIDS 5). It is likely that people with tertiary education fell into this category. Why did inequality for tertiary workers initially fall? It is possible that the very high-income earners that make inequality within this category of workers exceptionally high (e.g., doctors, lawyers, bankers) were unable to match pre-pandemic income during the severest categories of lockdown, so inequality amongst tertiary workers initially fell and then started to widen as lower lockdown levels were applied.

To conclude this section, the labour income distribution for the 5th wave of the NIDS (2018) and Waves 1 to 5 of the NIDS-CRAM (2021) have been presented by estimating the labour income Gini coefficient for South African adults in total as well as by different ages, races, genders, regions and levels of education. The results suggest that total labour income inequality worsened compared to pre-pandemic levels, and was highest during the periods where strictest levels (Level 5) of COVID-19 lockdown regulations were implemented. It declined slightly as lockdown levels were reduced (Level 3), and fell further during lockdown Level 1 in March 2021.

The categories of workers examined did not all experience rising inequality, and when inequality rose, it impacted differently on different categories of workers. The results suggest that females, Blacks, and rural workers experienced higher levels of labour income inequality than males, Whites, and urban dwellers. Inequality initially worsened for these categories of workers during the strictest stages of lockdown and improved as lockdown regulations were eased. But for all categories, inequality was worse in March 2021 (NIDS-CRAM Wave 5) than in 2018 (NIDS 5). Interestingly, inequality in March 2021 was lower in rural than urban areas.

Now that the changes in labour income inequality (as expressed by the Gini coefficients) have been estimated and discussed for both before (NIDS, 2018) and during (NIDS-CRAM, 2021) the pandemic (where different lockdown levels were put in place) for different labour income

determinants and their sub-groups, the next question to be answered is: which labour income determinant has had the biggest influence on the (in)ability for population groups to generate labour market income during the pandemic? In other words, which income determinant contributes the most to rising labour income inequality and by how much did this change during the varying lockdown levels of the pandemic? In order to answer this question and gain a better understanding of the distribution of labour income inequality, partial regression coefficients from the income generating model for the NIDS (2018) and the NIDS-CRAM (2021) datasets are presented next and thereafter the results from the regression-based inequality decomposition are shown and discussed.

5.4 Partial regression coefficient from labour income generating model

The estimated results from the income generating model, from which the Fields (2003) regression-based decomposition method is developed, are essential for understanding which of the labour income determinants, age, race, gender, region, or level of education, had the biggest influence on the labour income of individuals before and during the pandemic. Results from the estimated semi-*log* income generating model, where the *log* of per capita income is the dependent variable, and the gender, race, and geographical regions of households are the independent variables are presented in Table 8.

The sample analysed includes all individuals aged between 18 and 64 who formed part of the labour market in Wave 5 of the NIDS (2018) and Waves 1 to 5 of the NIDS-CRAM (2021). The findings are congruent with similar NIDS (2018) and NIDS-CRAM studies, including Daniels *et al*. (2021); Casale and Shepered (2021); and Bassier *et al.* (2021). The model shows that education has the strongest correlation with labour income compared to other income determinants. Additionally, race, and gender are strongly associated with labour income.

Table 8: The partial regression coefficients from the income generating model.

Variable in Model	NIDS W5 (2018)		NIDS-CRAM W1 (April 2020) **(L5)**		NIDS-CRAM W2 (June 2020) **(L3)**		NIDS-CRAM W3 (Oct 202) **(L1)**		NIDS-CRAM W4 (Jan 2021) **(L3)**		NIDS-CRAM W5 (March 2021) **(L1)**	
Dependent variable: *log* of total wage income	β in OLS	Std error	β in OLS	Std error	β in OLS	Std error	β in OLS	Std error	β in OLS	Std error	β in OLS	Std error
Race												
White	**0.83**	0.0824	**0.74**	0.1008	**0.73**	0.1062	**0.98**	0.1087	**0.83**	0.1188	**1.24**	0.1104
Gender												
Male	**0.45**	0.0335	**0.47**	0.0453	**0.46**	0.0456	**0.41**	0.0411	**0.47**	0.0452	**0.42**	0.0419
Region												
Urban	**0.30**	0.0358	**0.35**	0.0588	**0.33**	0.0538	**0.30**	0.0465	**0.32**	0.0516	**0.26**	0.0475
Education												
Matric	**0.47**	0.0457	**0.43**	0.0578	**0.55**	0.0583	**0.41**	0.0512	**0.46**	0.0567	**0.32**	0.0528
Tertiary	**1.09**	0.0392	**1.03**	0.0542	**1.07**	0.0547	**0.85**	0.0513	**0.99**	0.0562	**0.83**	0.0511
Age												
Prime	**0.33**	0.0394	**0.65**	0.0837	**0.54**	0.0570	**0.67**	0.0688	**0.48**	0.0797	**0.43**	0.0739
Middle	**0.39**	0.0888	**0.75**	0.0865	**0.70**	0.0867	**0.78**	0.0725	**0.63**	0.0829	**0.56**	0.0771
Older	**0.31**	0.0580	**0.85**	0.1009	**0.72**	0.0783	**0.72**	0.0980	**0.42**	0.1135	**0.39**	0.1067
R2	**0.34**	--	**0.23**		**0.30**	--	**0.25**		**0.25**	--	**0.25**	--

Source: Wave 5 NIDS (2018); Wave 1-5 NIDS-CRAM (2021); Author's own calculations. Post-stratified weights applied. Notes: Only in March 2021 was the difference for race and age greater than in 2018.

The results show that the level of education attained plays the biggest role in the level of labour income generated, followed by race, gender, and the geographical region of individuals. Labour income is estimated to be 109% greater for individuals with a tertiary education than for those who have less than a matric qualification. With regard to race, the partial regression coefficient results show that Whites who were working had a labour income in 2018 85% higher than individuals from other race groups. When looking at the NID-CRAM (2021) study period (April 2020 to March 2021), White workers' labour income fell to 74% higher than that of other races in April 2020, during the implementation of lockdown Level 5. This percentage falls slightly to 73% in June 2020 (lockdown Level 3), but then rises sharply to approximately 124% by March 2021 (lockdown Level 1).

The results also suggest that gender is strongly associated with labour income. The partial coefficient estimates show that the labour income of male workers was 45% higher than that of women in 2018 (NIDS, 2018). In April 2020 and October 2021, when high lockdown Levels 5 and 3 were implemented, the partial coefficient estimates show that the labour income of male workers was 47% higher than that of women workers and fell to 42% higher by March 2021

(lockdown Levels 1). The peak of the pandemic (April 2020) was characterised by stricter lockdown regulations and evidenced a higher degree of association between gender and labour income, which diminished as the lockdown levels eased to Level 1 (March 2021).

The geographical region's partial coefficient estimates show a similar trend to that of gender, given that the labour income of urban dwellers was estimated to be 30% higher than rural dwellers in 2018 (NIDS Wave 5 dataset). During the course of the pandemic, the NIDS-CRAM (2021) partial coefficient estimates of urban and rural dwellers, suggest that the association between labour income and region was highest in April 2020, when labour incomes of urban dwellers were 35% higher than rural dwellers. As lockdown levels were eased to Level 1 in March 2021, the labour incomes of urban dwellers were estimated as 26% higher than rural dwellers.

With regard to age, working individuals within the prime age (25–34), middle age (35–49) and older age (50–64) groups are included in the decomposition regression. Results show that all three age groups earned higher labour incomes than those in the youth age group (18–24). The labour income association with each age group was highest during periods of strict COVID-19 regulations (Waves 1, 2, and 4 of the NIDS-CRAM), and diminished in March 2021 when re-adjusted lockdown Level 1 regulations were in place.

5.5 Regression-based inequality decomposition results

The contribution of each labour income determinant, including age, race, gender geographical region, and level of education, is shown in Table 9. The decomposition can be expressed as both for Yi (equation 4 in Chapter 4) and the predicted $\hat{Y}i$ as suggested by Fiorio and Jenkins (2007). The decomposition of the predicted $\hat{Y}i$ means that the error term is excluded from the decomposition.

Table 9: Factor contributions to inequality using Fields' Regression-Based method

Variable in Model	NIDS W5 (2018) **L0**		NIDS-CRAM W1 (April 2020) **L5**		NIDS-CRAM W2 (June 2020) **L3**		NIDS-RAM -W3 (Oct 2020) **L1**		NIDS-RAM -W4 (Jan 2021) **L3**		NIDS-CRAM W5 (March 2021) **L1**	
Dependent variable: *log* of total wage income	$lnY\ i$	Predicted $lnY\ i$	$lnY\ i$	Predicted $lnY\ i$	$lnY\ i$	Predicted $lnY\ i$	$lnY\ i$	Predicted $lnY\ i$	$lnY\ i$	Predicted $lnY\ i$	$lnY\ i$	Predicted $lnY\ i$
Income determinants	Factor inequality weight sjx100	% Contribution net of residual	Factor inequality weight sjx100	% Contribution net of residual	Factor inequality weight sjx100	% Contribution net of residual	Factor inequality weight sjx100	% Contribution net of residual	Factor inequality weight sjx100	% Contribution net of residual	Factor inequality weight sjx100	% Contribution net of residual
Race												
White	4.42	**11.08**	3.05	**9.31**	3.46	**8.56**	3.80	**11.97**	2.93	**8.49**	7.56	**17.90**
Gender												
Male	5.21	**16.72**	3.56	**15.07**	5.49	**19.25**	6.69	**26.42**	7.23	**28.58**	6.57	**27.65**
Region												
Urban	2.98	**10.25**	0.17	**0.96**	1.24	**4.82**	1.00	**3.71**	1.77	**7.73**	1.61	**6.68**
Education level												
Matric	0.22	**2.97**	0.26	**0.86**	0.91	**4.16**	0.36	**1.61**	0.41	**2.39**	0.04	**0.59**
Tertiary	20.54	**52.61**	14.92	**53.35**	16.14	**49.82**	9.76	**34.00**	11.92	**41.74**	10.08	**36.92**
Age category												
Prime age	1.08	**5.48**	0.90	**10.89**	0.94	**5.96**	2.28	**11.97**	0.50	**4.96**	0.79	**4.51**
Middle aged	0.10	**0.07**	0.22	**7.25**	2.12	**5.94**	2.13	**7.52**	0.07	**4.61**	0.07	**5.83**
Older Age	0.04	**0.11**	0.21	**1.84**	0.03	**1.13**	0.01	**0.96**	0.02	**0.59**	0.11	**1.03**
R2/residual	65.18	--	76.76		70.00	--	75.00	--	74.74	--	74.65	--

Source: The NIDS (2018) Wave 5; The NIDS-CRAM (2021) Wave 2 and 5; Author's own calculations. Post-stratified weights applied.

Table 9 shows the factor inequality weights for each income determinant, expressed as a function of the income-generating model (Gini coefficients discussed in Table 7). The degree of covariance between the *log* of total labour income and the income determinants, as well as the variance of the *log* income, are also estimated. The discussion of results is focused on the decomposition of predicted $\hat{Y}i$, which tells us how much age, race, gender, region, and education levels contribute to overall labour market inequality.

The contribution of gender to labour income inequality is 16.72% in 2018 (NIDS Wave 5), and at the onset of the pandemic in April 2020 (NIDS-CRAM Wave 1, lockdown Level 5), gender's contribution falls slightly to 15.07%. As the lockdown regulations were eased to Level 1 in March 2021 (NIDS-CRAM Wave 5), gender's contribution to labour income inequality rises sharply to 27.65%. Similarly, the contribution of race to labour income inequality falls from 11.08% pre-

pandemic to as low as 9.31%, 8.56% and 8.49% during higher lockdown levels (Waves 1, 2 and 4 of the NIDS-CRAM 2021) and rises to 11.97% and 17.90% in Waves 3 and 5 of the NIDS-CRAM (2021). The contribution of region, although smaller than the other income determinants discussed, shows a similar trend to that of gender and race, that is, its contribution to labour income inequality was much higher during the higher lockdown levels (April and June 2020) and much lower when lockdown regulations were eased (March 2021). The contribution of age to labour income inequality differs across the different age categories. Prime age (25–34) shows a reduction in contribution from 10% to 4.5% between the NIDS-CRAM Waves 1 and 5 (April 2020 and March 2021). Middle-aged (35–50) and older (50–64) populations also show a reduction in contribution from 7.25% to 4.6% and 1.8% to 0.59% between the NIDS-CRAM Waves 1 and 5 (April 2020 and March 2021), respectively.

The findings suggest that tertiary education is the largest contributing factor to labour income inequality across all the waves (from 2018 to March 2021). Gender and race also make notable contributions to labour income inequality, while age and region play a lesser role for both the NIDS (2018) and the NIDS-CRAM (2021) datasets. While education is the greatest determining factor of income inequality compared to the other income determinants included in the study, its contribution to total labour income inequality is highest during periods of harsh lockdown regulation (April 2020, June 2020, and January 2021), and lowest during time periods of eased COVID-19 lockdown regulations (October 2020 and March 2021). This suggests that as the economy re-opened and employment levels recovered, the contribution of education towards total labour income inequality fell. Consequently, the lower contribution of education in March 2021, where COVID-19 levels were less severe, is replaced in importance by the other income determinants, such as gender, race, and region.

Table 7 shows that inequality declined for individuals with a matric and tertiary level education during the severest lockdown period. However, here the contribution to inequality of tertiary education increased, suggesting that while the severest lockdown levels reduced labour income inequality for those with tertiary education, the fact that workers in this category were most likely to be able to work at home meant that the contribution of tertiary education to overall inequality increased.

Tertiary education as the main driver of labour income inequality in South Africa, particularly during the peak of the pandemic can be explained in two ways. First, the closure of schools during the pandemic was mainly experienced by those in lower levels of education, while workers with a tertiary level education benefited from WFH policies, suggesting an increase in education inequality between lower and higher levels of education. The rise in education inequality is associated with the increased contribution of tertiary education to total labour income inequality and consequently increased labour income inequality. Secondly, South Africa faces high and increasing rates of returns to education, meaning that it is prone to the composition effect (Clift

and Robles, 2021) which suggests that the rise in years of schooling is associated with high income inequality because of higher earnings rates of returns for those with high levels of education.

During the peak of the pandemic, primary and high schools closed while tertiary institutions were able to remain open, resulting in higher average levels of schooling. However, the higher average levels of schooling did not result in a reduction of labour income inequality; in fact inequality increased because of the higher earnings returns for the top (composition effect). This also helps to explains why education is found to be more important for Whites and urban dwellers as opposed to Black and rural dwellers.

The results therefore show notable differences in the contributions of the income determinants to labour income inequality within the short time and different lockdown levels represented by the NIDS-CRAM (2021) Waves 1 to 5. Most of the differences can be attributed impact of the varying lockdown levels across the NIDS-CRAM (2021) waves.

Now that the changes in the contribution of each labour income determinant to total labour income inequality have been discussed for both the NIDS (2018) and the NIDS-CRAM (2021) datasets, the next question to answer is: where does the labour income inequality within the income determinants sub-groups come from? In order to answer this question and gain a better understanding of how the contribution of the income determinants vary within population sub-groups, the labour income decomposition by population sub-groups is presented next. Findings at sub-group level can give more insight into how the contribution of income determinants varies within population sub-groups and the implications thereof.

Having estimated both the partial coefficients for all the income variables in the income generating model, the next sections estimate the factor contributions that each income determinant has on overall labour income inequality.

5.6 Labour income decomposition by gender, race, and region

At the sub-group level, the results in Tables 8 and 9 affirm that the level of education remains the largest contributor to labour income inequality for all sub-groups. It should be noted that the various NIDS-CRAM waves show quite large fluctuations in the contributions to labour income inequality for some sub-groups, so the analysis here will look exclusively at pre-pandemic (NIDS 5), the start of the pandemic when lockdown levels were most severe (NID_CRAM Wave 1, March 2020), and the most recent period, March 2021, when lockdown levels were eased to Level 1 (NIDS-CRAM Wave 5). Despite being statistically significant, the results for all the sub-groups need to be interpreted with caution, given different R-squares ranging from 0.25 to 0.57 for the income models.

From examination of all the sub-groups and time periods it is evident that a tertiary level of education has a greater determining influence on income inequality within the White, urban, and female sub-groups than within the Black, rural, and male sub-groups. These findings are supported by Cheeseman (2019) who finds that individuals with some form of tertiary education, for example, a Bachelor's degree, can earn up to double the earnings of co-workers with no degree. With regard to race, results show that within the Black and White population sub-groups, tertiary education contributed 57.58% and 80.40%, respectively, to the labour income inequality within these groups in 2018 (NIDS Wave 5). During the onset of the pandemic (April 2020) the contribution of tertiary education to labour income inequality within the Black and White population sub-groups amounted to 57.49% and 77.31%, respectively, and then fell to only 38.94% for Blacks but was largely unchanged at 76.76% for Whites by March 2021 as lockdown levels were eased to Level 1.

Furthermore, the results show that within the race sub-group, gender contributed more to the labour income inequality experienced within the Black sub-group (21.0%) than within the White population sub-groups (15.62%) in 2018 (NIDS Wave 5). During the pandemic (NIDS-CRAM, 2021), the contribution of gender to labour income inequality within the Black sub-group rose from 24.30% and during lockdown Level 5 (April 2020) to 42.21% in March 2021 (lockdown Level 1) but was unchanged at 19.76% and 19.21% for Whites over the same periods. Importantly, in March 2021, gender was a more important (42.21%) contributor to labour income inequality for Blacks than tertiary education (42.21%). For Whites, tertiary education (76.76%) was much more important than gender (19.21%) in determining labour income inequality.

The contribution of age and region was much smaller relative to that of gender and education for both the Black and White sub-groups. Region contributed 11.47% for Blacks and 0.03% for Whites in 2018 (NIDS Wave 5). Between April 2020 and March 2021, the contribution of region to labour income inequality fell to 1.04% and rose to 7.17% for Blacks. For Whites, region contributed 0.39% in April 2020 but an unusually large 4.35% in March 2021.

With regard to gender, the results show that within the male and female population sub-groups, tertiary education contributed 57.19% and 65.22%, respectively, to labour income inequality in 2018 (NIDS Wave 5). For males, the contribution of tertiary education fell to 41.49% at the onset of the pandemic (April 2020), when lockdown levels rose to Level 5 and was at much the same level (40.01%) in March 2021when lockdown eased to Level 1. For females, the contribution of tertiary education jumped to 78.45% in March 2020 (lockdown Level 5) but fell to 53.19% by March 2021 as lockdown levels eased to Level 1. The contribution of tertiary education to labour income inequality is higher within the female population sub-groups than the male population sub-groups across all the NIDS (2018) and the NIDS-CRAM (2021) waves. This gap widened during periods where lockdown Levels 3 and 5 were implemented and narrowed when lockdown regulations were eased to Level 1.

Furthermore, results show that within the male and female sub-groups, race contributed more to the labour income inequality experienced within the male sub-group (15%) than to the female sub-groups (11%) in 2018 (NIDS Wave 5). During the pandemic (NIDS-CRAM, 2021), the contribution of race to labour income inequality within the female and male sub-groups rose from 9%–19% and 10%–28%, respectively, between April 2020 (lockdown Level 5) and March 2021 (lockdown Level 1). The contribution of race to labour income inequality is estimated as being higher within the male population group than the female population sub-group in each of the datasets studied. This gap widened when lockdown regulations were eased to Level 1 (March 2020) and narrowed during periods when lockdown Levels 3 and 5 were implemented (April and June 2020).

Table 10a: Contribution of income determinants of income inequality, by sub-group

	Labour income per wave		
Sub-groups	**Predicted $lnY\ i\hat{}$		
Income determinants	NIDS-W5 (2018)	NIDS-CRAM W1 (April 2020)	NIDS-CRAM W2 (June 2020)
WHITE	R-squared (0.3284)	R-squared (0.3505)	R-squared (0.4911)
Gender	**15.62**	**19.76**	**6.78**
Region	**0.03**	**0.3980**	**0.85**
Age	**4.35**	**8.69**	
Tertiary Education	**80.40**	**77.31**	**63.37**
BLACK	R-squared (0.2925)	R-squared (0.2505)	R-squared 0.2264
Gender	**20.9951**	**24.30**	**27.41**
Region	**11.4675**	**1.04**	**4.85**
Age	**0.03**	**5.31**	**15.12**
Tertiary Education	**57.5806**	**57.49**	**50.35**
MALE	R-squared (0.2806)	R-squared (0.2105)	R-squared 0.2443
Race	**15.2611**	**10.45**	**12.44**
Region	**9.7843**	**0.50**	**3.97**
Age	**17.7**	**15.13**	**13.99**
Tertiary Education	**57.187**	**41.49**	**44.78**
FEMALE	R-squared (0.3558)	R-squared (0.2324)	R-squared 0.2804
Race	**11.1486**	**9.76**	**7.37**
Region	**12.9454**	**1.99**	**7.31**
Age	**10.7**	**3.04**	**0.09**
Tertiary Education	**65.2207**	**78.45**	**70.48**
URBAN	R-squared (0.3761)	R-squared (0.2325)	R-squared 0.2948
Gender	**13.91**	**14.53**	**11.11**
Race	**15.27**	**11.17**	**17.52**
Age	**6.74**	**9.69**	**9.02**
Tertiary Education	**64.08**	**54.81**	**55.23**
RURAL	R-squared (0.2171)	R-squared (0.2361)	R-squared 0.2275
Gender	**33.0116**	**17.9**	**28.98**
Race	**1.5650**	**3.19**	**1.80**
Age	**16.99**	**21.00**	**9.40**
Tertiary Education	**47.6784**	**52.25**	**42.47**

Source: NIDS (2018) Wave 5; NIDS-CRAM (2021) Wave 1 and 2; Author's own calculations. Post-stratified weights applied.

Table 10b: Contribution of labour income determinants to income inequality, by sub-group.

	Labour income per wave		
Sub-groups	**Predicted *lnY i^*		
Income determinants	NIDS-CRAM W3 (Oct 2020)	NIDS-CRAM W4 (Jan 2021)	NIDS-CRAM W5 (March 2021)
WHITE	R-squared (0.4316)	R-squared (0.3180)	R-squared 0.3291
Gender	**9.79**	**21.99**	**19.21**
Region	**0.02**	**1.05**	**4.35**
Age	**24.35**	**18.48**	**0.02**
Tertiary Education	**65.84**	**58.48**	**76.76**
BLACK	R-squared (0.2863)	R-squared (0.2019)	R-squared 0.1777
Gender	**34.11**	**35.54**	**42.21**
Region	**3.50**	**8.06**	**7.17**
Age	**7.44**	**4.71**	**5.53**
Tertiary Education	**34.01**	**42.73**	**38.94**
MALE	R-squared (0.2029)	R-squared (0.2013)	R-squared (0.1949)
Race	**14.87**	**13.64**	**28.25**
Region	**1.17**	**3.33**	**3.17**
Age	**12.09**	**7.79**	**9.16**
Tertiary Education	**34.50**	**46.33**	**40.01**
FEMALE	R-squared (0.2199)	R-squared (0.2093)	R-squared 0.2197
Race	**15.23**	**8.13**	**19.75**
Region	**8.50**	**17.07**	**13.32**
Age	**6.51**	**1.78**	**5.41**
Tertiary Education	**53.182**	**60.91**	**53.19**
URBAN	R-squared (0.2406)	R-squared (0.2430)	R-squared 0.2520
Gender	**22.07**	**26.36**	**23.17**
Race	**16.13**	**13.01**	**26.73**
Age	**11.27**	**4.26**	**7.94**
Tertiary Education	**34.93**	**46.23**	**36.22**
RURAL	R-squared (0.2291))	R-squared (0.2200)	R-squared 0.2164
Gender	**41.33**	**40.95**	**48.3883**
Race	**2.60**	**1.02**	**0.1101**
Age	**1.88**	**0.0**	**0.08**
Tertiary Education	**35.06**	**38.94**	**39.46**

Source: The NIDS-CRAM (2021) Waves 3, 4 and 5: Authors own calculations; Post-stratified weights applied.

The contribution of region to labour income inequality within the female and male population sub-groups is relatively smaller than that of gender and education, that is, 12% and 9%, respectively, in 2018 (NIDS Wave 5). Between April 2020 and March 2021, the contribution of region to labour income inequality was negligible at 1.99% and 0.50% in April 2020. By April 2021 it returned to above pre-pandemic levels for females (13.32%) but was only 3.17% for males. Similarly, the contribution of age to labour income inequality first fell from 10.70% and 17.70% for females and males, respectively, in 2018 to 3.04% to 15.13% in April 2020, and to 5.41% and 9.16% in March 2021. Across all the NIDS (2018) and the NIDS-CRAM waves (2021), age contributed more to labour income inequality within the male sub-group than the female sub-group.

Region, however, contributed more to labour income inequality within the female as opposed to male sub-group. Region contributed 12.94% of female and 9.78% of male labour income inequality in 2018. This fell dramatically to 1.99% and 0.50% for females and males in March 2020 and jumped back to 13.32% for females, but to only 3.17% for males in March 2021.

With regard to the contributions to regional labour market inequality, the results show that within the rural and urban population sub-groups, tertiary education contributed 47.68% and 64.98% to labour income inequality experienced within the respective groups in 2018 (NIDS Wave 5). In April 2020, as lockdown Level 5 regulations were put in place, the contribution of tertiary education to labour income inequality rose within the rural sub-group to 52.25% and fell to 54.81% for the urban sub-group. It then fell sharply to 39.46% and 36.22% for the rural and urban sub-groups by March 2021 as lockdown levels were eased to Level 1.

The results show that gender contributed more to the labour income inequality experienced within the rural sub-group (33.01%) than within the urban population sub-group (13.91%) in 2018 (NIDS Wave 5). During the pandemic (NIDS-CRAM, 2021), the contribution of gender to labour income inequality within the rural and urban sub-groups was higher throughout for rural areas. After falling in rural areas in April 2020 (lockdown Level 5) the importance of gender rose in both rural and urban areas and accounted for 48.38% of rural and 23.17% of urban labour income inequality in March 2021.

Between April 2020 and March 2021, the contribution of race to labour income inequality faced within rural and urban sub-groups increased from 11% to 13% within the urban population sub-group and fell from 3% to 1 % within the rural sub-group. The contribution of age to labour income inequality within the rural and urban population sub-groups fell from 21% to 5% and from 9% to 7% within rural and urban sub-groups, respectively, between April 2020 and March 2021. Across all the NIDS (2018) and the NIDS-CRAM waves (2021), tertiary education and gender contributed more to the labour income inequality faced within the rural sub-group than urban sub-groups. Age and race contributed more to labour income inequality within the urban sub-group.

In summary, results show that the labour market is the driving force of total inequality amongst other income sources with the Gini coefficient of labour income reaching its highest during the peak of COVID-19. This is in line with the general literature of the main drivers of inequality in South Africa as observes by StatsSA (2019); Summers (2014); Tanith *et al.* (2020); Sweatman *et al.* (2020). The disparities in the labour market can be linked back the South Africa's apartheid history, which was characterised by education inequality, where non-Whites were under the Bantu education system which robbed them of the same opportunities and resources offered in . The lower quality of education offered to the non-white South Africa populations birthed an unequal job maker, with highly educated and skilled workers being mostly white, male and from rural regions of the country. Findings reveal that these disparities have widened under the strict lockdown measures associated with the COVID-19 pandemic. The literature suggests that the main job industries that were hit as a result of the pandemic were those dominated by less educated, female, Black and rural workers, and unsurprisingly, the results affirm that labour income inequality was felt worst during the pandemic by Blacks, females, and rural workers.

Moreover, findings show that tertiary level education plays the biggest role in the level of labour income generated, and was the largest contributing factor to labour income inequality. The closure of schools during the peak of the pandemic created further education disparities, particularly regarding access to lower levels of education (high school) versus access to higher levels of education (tertiary education). Individuals who were in tertiary institutions benefited from work from home policies and online resources that enabled them to continue to pursue their studies, while those in high school were forced to stop learning and consequently fell behind. The widening gap in the levels of education further feeds the labour inequality gap between skilled and low skilled workers. As expected, those with tertiary education are earned more than those with matric or less; males earned more than females; urban dwellers earned more than rural workers, and the prime age more than all the other age groups.

The labour income inequality gap between White and Black, urban and rural, male and female was the greatest during the peak of the COVID-19 pandemic (April and June 2020) where lockdown regulation levels were raised to Levels 5 and 3, respectively, and improved by March 2021 (lockdown Level 1). These findings are in line with the literature, that is, the peak of COVID-19 and the implementation of strict measures to contain it (such as level 5 lockdown, closing of schools and non-essential businesses), led to salary cuts, and unemployment of predominantly female, rural, Black and less educated workers. However, over time and with the fall in COVID-19 cases, the strict containment measures were relaxed, leading a recovery in the job market (Spaull, 2021), and reopening of schools, which improved the levels of labour income inequality amongst the different subpopulation groups by March 2021. Findings point to the importance of promoting strong primary and high school education structures that will produce new, larger numbers of entrants of less-educated individuals in tertiary institutions, thus lowering the returns experienced at the top and promoting reduced labour income inequality.

5.7 Conclusion

Results are congruent with the available literature on the detrimental impact of COVID-19 on the South African labour market when different lockdown levels were applied. The findings are, as expected, that increased inequality in the labour market was the biggest contributing factor to rising income inequality in South Africa during the pandemic, and that labour income inequality levels spiked during periods where stricter lockdown levels were implemented. The impact was greatest for women, Blacks, and rural dwellers. Education was the most important determining factor in labour income inequality across all time periods, particularly for White, urban and female participants. Although education remains a driving factor of labour income inequality, its contribution lessened as the economy started to recover from the pandemic by March 2021. Consequently, the contributions to income inequality of gender, race, age, and region increased during the period of recovery.

At sub-group level, findings suggest that race was the biggest determining factor on labour income inequality within the male and urban categories compared to female and rural workers categories across all waves. This simply means that amongst male workers, those who were White experienced less labour income inequality compared to Black male workers, similarly, White urban workers experienced higher levels of labour income inequality compared to Black urban worker, suggesting that the COVID-19 has widened the persistent racial inequality born out of the Apartheid history of SA. Findings are in line with that of Nwosu and Oyenubi (2021); Ranchhod and Daniel (2021); WHO (2021) who suggest that Black workers had higher rates of economic and health hardships during the pandemic compared to White workers.

Similarly, geographical region mattered more for Black than for White workers, more for females more than males. When investigating the regional inequality impact of COVID-19 in South African urban areas, Visagie and Turok (2021) Bassier *et al*. (2021); Berkhout *et al.* (2021) Inequality Report (2021) and StatsSA (2021) found that shack-dwellers bore the brunt of the pandemic, characterized by the highest unemployment rate, lower job security, and little to no recovery. Conversely, suburban regions faced the mildest employment downturn (and fully recovered by March 2021), and had the steadiest jobs during the lockdown period. In other words, the COVID-19 pandemic had adverse employment outcomes for all South African regions; however, rural and shack-dwellers were affected far worse than other South African regions (with greater job losses and weaker recovery) as of March 2021.

Lastly, gender mattered more for rural than urban dwellers, and for Blacks more than for White workers. The disparities within the population subgroups are also linked to the predictions highlighted in the literature. Particularly, the high importance of gender for Black and rural dwellers can be explained by studies from Casele and Shepperd (2021); Shen *et al*. (2021); Irlacher and Koch (2021); Sweatman *et al.* (2021); Aquino *et al.* (2021), and the Lakner *et al.* (2021) Report (2021) which found that women not only experienced greater job losses than men during the peak

of the pandemic, but employed women also saw a much bigger decline in the mean hours worked, relative to men. The rising gender inequality helps in understanding why female urban workers and female Black workers experienced more labour income inequality compared to male urban workers and male Whiter workers.

The next chapter presents the summary, conclusions, policy implications and prospects for future research.

CHAPTER 6: SUMMARY AND CONCLUSION

The COVID-19 pandemic has raised new concerns about global income inequality, particularly for socioeconomically disadvantaged groups. In South Africa, Summers (2014) and Van der Berg (2010) claims of rising inequality in the labour market is the theoretic framework upon which this study hinges on. Berkhout *et al.* (2021) reported that women, Blacks, rural, and low-skilled workers were more likely to lose their jobs than males, Whites, urban, and highly educated workers during the pandemic. Considering the persistently high level of income inequality, this paper achieves three main goals in aims to add to the limited research on the inequality impact of the COVID-19 pandemic in South Africa.

The first goal of the research was to estimate the contribution of income sources in total income inequality, and thus identify the income source that contributed the most to the rising inequality in South Africa. This was achieved by decomposition of total income by income sources from Wave 5 the NIDS (2018) and finding the marginal impact that each income sources had on total income inequality. The findings from the income decomposition showed that labour income was the driving force of income inequality and consequently had the largest marginal impact on total income inequality.

The second goal of the research was to measure the changes in the level of labour income inequality for different sub-populations during the initial and peak periods of the pandemic relative to pre-pandemic periods. This was achieved by generating and analysing the changes in the Gini coefficient for labour income determinants before and during the pandemic. Findings from the Gini coefficient analysis showed that the level of labour income inequality for all population sub-groups peaked during the peak of the pandemics, and that the labour inequality impact of the pandemic was especially severe for Blacks, females, and rural workers.

The third goal of the research was to measure changes in labour income inequality by income determinant sub-group, particularly within gender, race, and geographical region education before and during the COVID-19 pandemic. This was achieved by running a regression-based decomposition labour income by labour income determinants at sub-group level, within gender, race, region and level of education. The regression-based decomposition results showed that tertiary level education plays the biggest role in the level of labour income generated, and was the largest contributing factor to labour income inequality.

This chapter provides a detailed summary of the research, policy implications of findings, and prospects for future research.

6.1 Summary and conclusion

The literature highlights the main theoretical causes of inequality. While Kuznets (1955) claimed that inequality is more prominent in the early stages of economic development and falls when economic development progresses, modern studies have found that, in more recent decades, inequality has been rising in developed countries. The most prominent study by Piketty (2014) suggested that rising inequality is inevitable in a capitalist system, and he views wealth as the main cause of inequality. Piketty (2014) argues that the rate of return of capital is always higher than the economic growth rate (which drives growth of wages) in the long run. Piketty's (2014) claim that wealth is the main source of rising inequality has been widely criticised by various authors, including Summers (2014), who stated that income inequality is actually growing in the labour market.

The literature and empirical studies discussed provide evidence that inequality is growing in developing countries, as Piketty indicated. Yet, contrary to his views, evidence reviewed suggests that inequality is predominantly growing in the labour market, as noted by Summers (2014) and other authors. The evidence reviewed suggests that the reason for rising inequality in the labour market is closely associated with the monopoly status or the state-dominated nature of big organisations, the widening gap between Large Conglomerates (LCs) and Small- and Medium-sized Enterprises (SMEs), and the reduction in collective and individual bargaining power of workers, coupled with substantial wage gains for those at the very top of wage distribution.

The rising labour income inequality, particularly in South Africa, raises concerns about the possible impact of the COVID-19 pandemic on inequality. Before examining this, the impacts on inequality of past pandemics and economic crises, (the Black Death, the Spanish 'flu, the Great Depression and the Global Financial Crisis) were examined. The income inequality impact of past pandemics and crises depended upon the nature of the pandemic or crisis, as well as the policy responses. Pandemics and crises that spread equally across the population (the Black Death, the Spanish 'flu) reduced inequality, while those that impacted unevenly (the Great Depression and the Global Financial Crisis) widened overall income inequality. In the case of COVID-19, different lockdown regulations were implemented periodically from 2020 and thus the income inequality impacts of the COVID-19 pandemic varied across different time periods.

The initial stage of the pandemic was characterised by a crash in the stock exchange, high levels of job losses, and global income reductions, which were all indicative of decreasing wealth and income inequality. This, however, changed in magnitude and impact as the pandemic unfolded. During the peak of the pandemic, the initial crash in the stock market (in early 2020) was not long lived and so the world's richest were able to recover their wealth within nine months of the pandemic. However, the closure of schools and non-essential businesses resulted in rising unemployment globally, which in turn, increased labour income inequality (Lakner *et al.*, 2021); ;

Forsythe *et al.* (2020); Montenovo *et al.* (2020); Nwosu *et al*. (2021); Spaull (2021); Bassier *et al,* (2021)). That the impact of COVID-19 has not been felt uniformly is confirmed by an examination of social measures of inequality. In confirmation of global findings, the study finds that Black, female, rural workers were more likely to lose their jobs during the peak of the pandemic and were also paid less than their White, male, urban worker counterparts. The pandemic and its consequent lockdown regulations contributed to a 36% unemployment rate in South Africa in 2020, rising unemployment impacting hardest unskilled workers who could not benefit from work-from-home policies. The results find that the pandemic worsened overall inequality in South Africa. This finding was confirmed by decomposing total income by income sources, and by decomposing labour income by income determinants and sub-groups.

The results of the decomposition of total income by income sources are presented in detail in Chapter 5. In line with van der Berg (2010) and Summers (2014), the findings are that labour income makes up the biggest share of total income (48%) and also has an increasing marginal effect on total income inequality. That is, holding all other factors constant, a 1% increase in labour income is associated with an approximately 2.5% increase in total income inequality. These findings are in line with the available studies on the income inequality impact of COVID-19 in South Africa. They suggest that policies to reduce labour market inequality are critical for reducing total income inequality in South Africa.

The results of the decomposition of labour income by labour income determinants as well as by population sub-groups show that changes in the level of labour income inequality across the five NIDS-CRAM (2021) waves coincides with the varying COVID-19 lockdown levels. The Gini coefficients of labour income are highest during stricter lockdown levels (Levels 5 and 3 in April and June 2020) and lower during eased lockdown levels (Level 1 in March 2021). The findings thus suggest that the COVID-19 pandemic worsened labour income inequality when lockdowns were at their strictest. This, in turn, increased overall inequality, given that labour income inequality is the biggest contributor to overall income inequality. Labour income inequality during the peak of COVID-19 increased most for Blacks, women, and rural dwellers compared to Whites, males, and urban dwellers. It is important to note that while inequality initially worsened for Blacks, women, and rural workers at the peak of the pandemic (April and June 2020) during the strictest stages of lockdown, it improved as lockdown regulations were eased by March 2021. Nonetheless, inequality was worse in March 2021 (NIDS-CRAM Wave 5) than it had been in April 2020.

To further understand the distribution of labour income inequality for all labour income determinants, partial regression coefficients from the income generating model for the NIDS (2018) and the NIDS-CRAM (2021) datasets were estimated. The findings for the whole period under study are that the level of education attained plays the biggest role in the level of labour income generated, followed by race, gender, and geographical region. Labour income is estimated to be 109% greater for individuals with a tertiary education than for those who have matric

certificates or less. With regard to age, the results show that working individuals within the prime age (25–34), middle age (35–49) and older age (50–64) groups all earned higher incomes than those in the youth age group (18–24). Male, White, urban dwellers earned more income than female, Black, rural workers across all waves under study. The labour income inequality gap between White and Black, urban and rural, male and female was greatest during the peak of the COVID-19 pandemic (April and June 2020) when lockdown regulations levels were raised to Levels 5 and 3, respectively, and improved by March 2021 (lockdown Level 1).

Tertiary education was found to be the largest contributor to labour income inequality across all the waves (from 2018 to March 2021). The impact of tertiary education was highest during periods of strict lockdown regulation (April 2020, June 2020, and January 2021), and fell when COVID-19 lockdown regulations were eased (October 2020 and March 2021). Gender and race also made important contributions to labour income inequality, while age and region played a lesser role across all the NIDS (2018) and NIDS-CRAM (2021) datasets.

Tertiary education being the main driver of labour income inequality in South Africa, particularly during the peak of the pandemic, can be explained in two ways. First, the closure of schools during the pandemic was mainly experienced by those in lower levels of education, while workers with a tertiary level education benefited from work-from-home policies, thus driving the contribution of tertiary education to total labour income inequality up, and consequently increasing labour income inequality. Secondly, South Africa faces high and increasing rates of returns to education, meaning that it is prone to the composition effect, which suggests that the rise in years of schooling results in reductions in income inequality because of higher earnings rates of returns for those with high levels of education. The policy implication related to this is expanded below.

Lastly, decomposition of labour income determinants at sub-group level provides more insight about how the contributions of income determinants vary within population sub-groups (particularly within race, gender, region, and level of education). The results show that across all time periods included in the study, having a tertiary level of education had a greater determining influence on labour income inequality within the White, urban, and female sub-groups than within the Black, rural, and male sub-groups. Race has the greatest determining influence on labour income inequality within the male and urban categories compared to the female and rural categories across all waves. The importance of race for the male and urban categories was highest during periods of eased lockdown regulation (March 2021), and much lower during the peak of the pandemic (April and June 2020). Geographical region mattered more for Black than White workers and for females more than males. Lastly, gender mattered more for rural than urban workers, and more for Black than White workers.

In conclusion, the results of this study show that while income inequality in South Africa was already very high in 2018 (pre-pandemic), income inequality, particularly labour income

inequality (which is the largest contributor to overall income inequality in South Africa) increased even further during the COVID-19 pandemic. Inequality was highest in April and June 2020 (when strict lockdown regulations were applied), particularly for Black, female, and rural workers. Labour income inequality fell again by March 2021 (when lockdown regulations were eased) but was still higher than pre-pandemic. Tertiary level education is the most important determining factor in labour income generation, and consequently makes the largest contribution to labour income inequality.

The findings suggest that alleviating the rising income inequality associated with the COVID-19 depends upon increased employment opportunities, as well as the attainment of tertiary level education, particularly for Black, female, and rural workers. Detailed policy recommendations based on the research findings as well as suggestions for possible future research are discussed in the following section.

6.2 Policy recommendations and possible future research

6.2.1 Education

The research identifies labour market inequality as the largest contributor to inequality in South Africa. The main drivers of labour market inequality are the high unemployment rate (36% in 2020) and widening earning disparities between low and high earners. According to a Statistics South Africa study (StatsSA, 2014), approximately 76% of the 6.2 million jobs created in South Africa in the period 1994 to 2004 were skilled or semi-skilled (Makgetla, 2020). Although job creation is important for poverty alleviation, van der Berg (2010) argues that it will do little to reduce overall inequality, as the oversupply of low-skilled labour means newly employed, low-skilled workers will earn very low wages. Hence even if more people are employed, the high-level aggregate inequality will not be significantly affected.

To meaningfully reduce labour income inequality the high earnings gap between low- and highly skilled workers must be reduced. The disparities in the labour market call for a much more efficient educational system which ensures that unemployed individuals and new entrants into the labour market acquire the necessary skills that will allow them to move from low to higher wage positions. Thus, in order to reduce unemployment and shrink the gap in earnings between skilled and unskilled workers, van der Berg (2010) suggests improving access to as well as the quality of education, particularly for Black African, rural dwellers and female-headed households. The research findings echo this as the closure of schools due to the COVID-19 pandemics worsened education inequalities in South Africa and is thus likely to have negative consequences on future income inequality. This finding calls for government to act urgently to put in place processes whereby learners can catch up on teaching that was missed, particularly at lower levels of education where labour income inequality is shown to be the highest, relative to tertiary institutions which benefited from work from home resources.

Moreover, during the peak of the pandemic, primary and high schools closed while tertiary institutions were able to remain open, resulting in higher average levels of schooling. However, the higher average levels of schooling did not result in the reduction of labour income inequality, in fact, it rose because of the higher earnings returns for the top (composition effect). This indicates the importance of promoting strong primary and high school education structures that will produce new, larger numbers of entrants of less-educated individuals in tertiary institutions, thus lowering the returns experienced at the top and promoting reduced labour income inequality.

6.2.2 Social grants and progressive tax

Approximately 17 million South Africans relied on child support, disability, old age pensions, and care dependency grants prior to the COVID-19 pandemic (SAMRC, 2019). During the pandemic, government introduced a temporary Social Relief of Distress (SRD) grant to support people who were unemployed as a result of the COVID-19 pandemic. Coupled with top-ups to existing social grants, this helped alleviate some of the increased income inequality associated with the pandemic. However, top-ups to existing social grant were discontinued in October 2020 and then reinstated in 2022, with very strict requirements for those who could quality due to the National Treasury concerns about its affordability. Research findings from the International Food Policy Institute (IFPI, 2021) suggest that more social grant support targeting the most vulnerable groups is an effective way of reducing income inequality and it should be continued in the post-pandemic recovery period.

The decomposition of overall income by income sources in this study shows that wealth income has the second biggest share in total income (26%), after labour income. Redistributive efforts may require that high-income earners are taxed even more than currently, and the additional tax revenue be used to fund further social grant programmes (Makgetla, 2020). However, it is important to note that the impact will be relatively small. Due to the high level of income inequality, only 1.3% of the working-age population in 2015 earned about a third of taxable income and paid just under half of total personal income tax (Makgetla, 2020). Overall, only 7% of working-age people paid any income tax. The effect of higher taxes on the rich will therefore have only a modest impact on government's ability to expand the existing grants system (Makgetla, 2020) and cannot be a substitute for policies to reduce high earning disparities in the workplace.

6.3 Future research

Considering the limited available data on the COVID-19 wealth inequality impact in the NIDS-CRAM dataset, and given that wealth income has been found to be the second biggest contributor to overall income inequality in South Africa, future research may look at estimating the changes in wealth income associated with COVID-19 for different socioeconomic groups and their implications for alleviating overall inequality in post-pandemic South Africa. Additionally, future research may also aim to measure the impact of COVID-19 on education inequality, focusing on

how the pandemic and its lockdown regulations impacted education inequality at different education levels (pre-school, primary, high school, tertiary), particularly for most vulnerable groups such as rural dwellers, females, and Black South Africans. Future research aimed at analysing the wealth and education inequality impact of COVID-19 will allow for policy recommendations on how to reduce wealth and education inequality efficiently in South Africa and thus promote increased welfare and economic growth and redistribution in a post-pandemic South Africa.

The COVID-19 pandemic has further exposed the persistent labour inequality in South Africa, and the importance of education in the accumulation of labour for different population sub-groups. The increased labour inequality across all population sub-groups, left Black, female, rural, and less educated workers, particularly, worse-off relative to their White, male, urban, and highly educated counterparts. Identifying who the inequal impact of pandemic has impacted provides insights that emphasise the importance social grant systems in bridging the inequality gap associated with COVID-19. Moreover, an efficient education system that promotes the movement of lower to higher educated workers in the labour market is key in reducing labour income in the long run. Increases in high-skilled education results in more skilled workers, and consequently helps in reducing labour income inequality. Given its large contribution to income inequality in South Africa, reduced labour income inequality with improved education forms an important step in total income inequality reduction.

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