

**THE RELATIONSHIP BETWEEN FINANCIAL SECTOR DEEPENING AND INCOME
INEQUALITY IN SOUTH AFRICA**

BY

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DECLARATION

I, Siyanda Mandleni, student number 22M7727, declare that this mini dissertation is my original work. I have properly acknowledged and cited all sources used. This work has not been submitted to any other academic institution in pursuit of an identical or any other qualification, and it will not be presented elsewhere in future.

Signed by: *S.Mandleni*

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Firstly, I dedicate this thesis to myself for persevering through this journey and to God for giving me strength and endurance to focus on my academic pursuits. Despite the difficulties, I stayed committed and saw it through to the end.

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ABSTRACT

This research analyzes the relationship between financial sector deepening and income inequality in South Africa from 1980 to 2019, using data from the World Bank Database and the Standardized World Income Inequality Database. An autoregressive distributed lag (ARDL) model is used to explore both the long- and short-run relationships that exist between these variables. Additionally, control variables like GDP, inflation, and structural changes that occurred, which include 1994 and 2005 are considered. According to the findings, the financial sector exacerbates income inequality in the long run.

These findings highlight the need for policymakers to prioritize inclusive financial sector reforms. One recommendation is to enhance the access of Small, Medium, and Micro Enterprises (SMMEs) to formal financial services. For example, promoting more black industrialists and SMMEs in the supply of financial products and services. Possible reforms may include adjusting credit requirements for different income groups or offering lower interest rates on loans for businesses. Ensuring that more financial sector gains are retained within black communities can foster inclusive growth by generating jobs and ensuring a more equitable distribution of income.

Table of Contents

CHAPTER 1	1
INTRODUCTION TO THE STUDY	1
1.1. Introduction and Background	1
1.2. Problem Statement	3
1.3. Goals of the Research	4
1.4. Contribution of the Study	4
1.5. Study Outline	5
CHAPTER 2	6
AN OVERVIEW OF FINANCIAL SECTOR DEEPENING AND INCOME INEQUALITY IN SOUTH AFRICA	6
2.1. Introduction	6
2.2. Overview of financial sector deepening in South Africa	6
2.2.1. Impact of technological innovations and COVID-19	7
2.3. Overview of income inequality in South Africa	10
2.4. Conclusion	12
CHAPTER 3	14
THEORETICAL FRAMEWORK AND LITERATURE REVIEW	14
3.1. Introduction	14
3.2. Theoretical Literature	14
3.2.1. Inequality narrowing-hypothesis	14
3.2.2. Inequality widening-hypothesis	15
3.2.3. Non-linear hypothesis	16
3.3. Empirical literature review	17

3.3.1. Studies with non-linear results on the relationship between financial sector development and income inequality	17
3.3.2. Studies with linear results on the relationship between financial sector development and income inequality	19
3.3.3. Empirical studies in South Africa	20
3.4. Conclusion	20
CHAPTER 4	22
RESEARCH METHODOLOGY, DESIGN AND DATA	22
4.1. Introduction.....	22
4.2. Research Paradigm.....	22
4.3. Research Design	23
4.3.1. Model specification and Theoretical Framework	23
4.3.2. Definition of variables.....	24
4.3.3. Data description and sources	25
4.3.4. Estimation Technique	26
4.3.5. Diagnostic test.....	29
4.4. Conclusion	29
CHAPTER 5	31
ESTIMATION AND INTERPRETATION OF RESULTS	31
5.1. Introduction.....	31
5.2. Descriptive Statistics	31
5.3. Stationarity Testing	33
5.4. Unit Root Test	34
5.5. Model Selection and ARDL Co-integration Test	37
5.6. Diagnostic Test	41
5.7. Conclusion	43
CHAPTER 6	44

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS AND RECOMMENDATIONS	
.....	44
6.1. Introduction.....	44
6.2. Key Findings	44
6.3. Policy implications and recommendations of the study.....	45
6.4. Limitations of the study and area for future research	46
6.5. Chapter summary.....	46
REFERENCES.....	47
APPENDICES	57
Appendix A: Diagnostic Tests.....	57

LIST OF TABLES

Table 5. 1: Summary of statistics	32
Table 5. 2: Unit root test at Level	35
Table 5. 3: Unit root test at First Difference	36
Table 5. 4: Lag Length	37
Table 5. 5: Bounds Test	38
Table 5. 6: ARDL Long Run Results	38
Table 5. 7: Error Correction Model.....	40
Table 5. 8: Diagnostic Test	41

LIST OF FIGURES

Figure 2. 1: Trends of Domestic credit to the private sector by banks (% of GDP)	9
Figure 2. 2: Trends of Gini Index.....	11
Figure 2. 4: Trends of Gini Index and Domestic credit to the private sector by banks (% of GDP)	12
Figure 5. 1: Graphical plot of variables at level	33
Figure 5. 2: Graphical plot of variables at first difference	34
Figure 5. 3: Cusum Test.....	42
Figure 5. 4: Cusum of Squares Test	43

LIST OF ACRONYMS

Akaike Information Criterion (AIC)	27	(EPWP)	10
Artificial Intelligence (AI)	8	Final Prediction Error (FPE).....	38
Augmented Dickey-Fuller (ADF)	27	Financial Sector Charter (FSC)	7
Autoregressive Distributed Lag (ARDL).....	5	First National Bank (FNB).....	7
Companies and Intellectual Property Commission (CIPC).....	10	Fully Modified Least Squares (FMOLS)	18
Consumer Price Index (CPI).....	25	Generalized Method of Moments (GMM).....	18
Cumulative Sum of Recursive Residuals (CUSUM)	30	Greenwood & Jovanovic (GJ).....	16
Cumulative Sum of Squares of Residuals (CUSUMSQ)	30	Hannan-Quinn Information Criterion (HQC)	27
Dynamic Ordinary Least Squares (DOLS).....	18	Jarque-Bera (JB)	29
Error Correction Model (ECM).....	28	Johannesburg Stock Exchange (JSE)	6
Error Correction Term (ECT).....	28	Kwiatkowski Phillips Schmidt Shin (KPSS)	27
Expanded Public Works Programme		Langrage Multiplier (LM).....	29
		Non-Linear Autoregressive Distribution Lag	

(NARDL).....	18	(SARB)	7
Phillips-Perron		South African Revenue Service	
(PP).....	27	(SARS).....	10
Pick n Pay		South African Social Security Agency	
(PNP).....	7	(SASSA)	7
Pooled Ordinary Least Squares		Standardised World Income Inequality Database	
(POLS).....	18	(SWIID)	26
Schwarz Information Criterion		Unemployment Insurance Fund	
(SIC).....	27	(UIF)	10
Small Medium and Micro Enterprises		World Inequality Lab	
(SMMEs)	2	(WIL)	1
Social Relief of Distress		Youth Employment Service	
(SRD).....	10	(YES).....	10
South African Reserve Bank			

CHAPTER 1

INTRODUCTION TO THE STUDY

1.1. Introduction and Background

Income inequality has been a major issue in many developing countries, raising serious concerns among researchers, and South Africa is no exception (Khan et al., 2022). South Africa's income inequality over the past decades has been on the rise, earning the country the unenviable title of being the most unequal country globally (Valodia, 2023). The 2023 World Inequality Report published by the World Inequality Lab (WIL) shows that the Gini index currently stands at 67%, showing persistent challenges on income distribution, while other African countries, including Zambia, report a Gini index of 57%, Namibia, 59%, and Mozambique, 54%. Furthermore, South Africa's top 10% earn more than 65% of the national income, and they rely more on labour market earnings, whereas the bottom 50% earn only 5.3%, and they rely mostly on social grants (Chatterjee et al., 2023).

Several studies, including Jaumotte et al. (2013), Atkinson (2003), and Valodia (2023), define income inequality as the unequal distribution of income within a population, measured using the Gini index, which ranges from 0 (perfect equality, meaning everyone has the same income or wealth) to 1 (perfect inequality) (Chen, 2018; Chancel & Piketty, 2021). High-income inequality results in several negative effects on South Africa's economy. Firstly, lower-income households may lack access to education and training opportunities necessary for developing a skilled and productive workforce (Claessans & Perotti, 2007). Secondly, the rich have a greater incentive and opportunity to prevent progressive taxation through political and bureaucratic corruption, thereby exacerbating tax evasion (Valodia, 2023). On the other hand, individuals from low-income earners, especially rural communities, have limited access to markets and a lack of financial services, which makes it difficult to participate in a broader economy (Valodia, 2023).

Furthermore, several studies, including Claessans & Perotti (2007), Seekings (2007), and Altbeker et al. (2010), identified several key drivers of income inequality. These include the labour market dynamics, the aftermath of the global financial crises, high unemployment rates, and the legacy of

racial segregation imposed by previous governments through discriminatory policies against the majority of the population.

According to available economic and financial literature, the development of a robust financial sector significantly influences economic growth and poverty reduction (Kapingura, 2017; Tchamyu & Asongu, 2017; Tchamyu, 2020). It stimulates economic growth by expanding credit availability, mobilising savings, producing investment data, and allocating capital to productive sectors (World Bank, 2012). Furthermore, it reduces poverty and inequality by boosting investment and productivity, resulting in higher incomes and increased access to finance for underprivileged and vulnerable groups (World Bank, 2012). Financial sector development can be classified into four key dimensions: access, stability, efficiency, and depth (Asongu & Odhiambo, 2020; Tchamyu, 2020; Altunbas & Thornton, 2019).

In South Africa, the financial system has experienced significant changes, influenced by both domestic and global economic forces (Altunbas & Thornton, 2019). During the 1980s and early 1990s, financial services were largely exclusive to the white minority, leaving the majority of South Africans without access to these services. Inclusivity was limited, with a small number of large banks dominating the sector, resulting in minimal competition (Bhorat et al., 2014). However, the transition to democracy marked a turning point, fostering financial inclusion and expanding services to previously excluded groups (Bhorat et al., 2014). There was also an increase in competition, with mutual banks, foreign banks, and registered banks emerging, along with greater integration into the global financial system (Bhorat et al., 2014).

The financial sector is increasingly sophisticated, well-regulated, and stable with a well-developed banking industry, capital markets, and non-banking institutions (Mandiefe, 2015). According to Allen et al. (2014), the financial landscape has undergone rapid transformation since the 1980s, and the financial sector was resilient during major crises, including the 2007/8 global financial crisis, the small banks' crisis of 2002/3, and remained strong throughout the COVID-19 pandemic (National Treasury, 2022). Although access to transactional accounts and financial products has significantly improved, regular and sustained use of these services remains limited, particularly among rural populations and low-income groups. Furthermore, it is recognized that the financial needs of Small, Medium, and Micro Enterprises (SMMEs) may not be adequately served (National Treasury, 2022). Therefore, ensuring effective financial inclusion requires not only improving

access to bank accounts but also providing a broad range of financial products and services that meet customer needs and economic growth (Mandiefte, 2015).

The relationship between financial sector development and income inequality has received attention from scholars, and the available studies suggest various perspectives on the finance-income nexus. Studies, including Mansur & Azleen (2017), and Sugiyanto & Yolanda (2020), suggest that as financial development improves, income inequality increases, benefiting the rich and well-connected individuals, while low-income individuals and firms may struggle to access banking or financial services due to required property or securities used as collateral. In contrast, some studies (Kapingura, 2017; Meniago & Asongu, 2018; Batuo et al., 2010) argue that financial development reduces income inequality. A robust financial system can reduce income inequality by improving access to financial services such as credit, savings, insurance, and payment systems, allowing individuals to invest in education, start businesses, and improve their standard of living.

While some studies (Nikoloski, 2013; Destek et al., 2020; Adams & Klobodu, 2019; Younsi & Bechtini, 2020) suggest that during the early stages of financial development, financial services are primarily available to a rich minority, while low-income individuals are excluded due to collateral. However, as the economy develops and reaches a certain threshold, the financial system becomes more accessible, easing credit constraints to be more inclusive of the poor.

1.2. Problem Statement

Several studies (Kasilam, 2022; Tita & Aziakpono, 2016; Tan & Law, 2012; Batuo et al., 2010; Meniago & Asongu, 2018; Seven & Coskun, 2016; Sugiyanto & Yolanda, 2020; Hassan & Meyer, 2021) have examined the connection between financial sector development, economic growth, and income inequality. These studies were conducted on cross-country, country-specific, and the South African context. However, there are gaps and limitations in the existing research, particularly in relation to South Africa, which this study aims to address in order to contribute to the literature.

Firstly, there is no study that specifically analyzed the relationship between financial sector deepening, particularly within the banking sector, and income inequality. Most existing research focused on other aspects of financial sector development, especially financial inclusion (Kapingura, 2017). Secondly, the findings of other studies are inconclusive because many rely on domestic credit to the private sector by banks (% of GDP) as a measure while primarily focusing

on financial inclusion or financial sector development as a whole. Thirdly, significant structural changes and financial reforms have taken place in South Africa since the post-apartheid era, but many studies have overlooked these developments. These gaps and limitations highlight the need for further research in this area.

1.3. Goals of the Research

The study aims to provide new insights into the relationship between financial sector development and income inequality by concentrating on the depth of financial sector development and the banking sector in South Africa, unlike many studies that consider various dimensions of financial sector development. The main research questions the study aims to tackle are:

- Does financial sector deepening reduce or exacerbate income inequality in South Africa?
- What measures have been taken to improve financial sector deepening?

The sub-goals of the study include:

- Empirically test the long-run relationship between income inequality and financial deepening in South Africa using time series models.
- Empirically test the short-run relationship between income inequality and financial deepening.

1.4. Contribution of the Study

The study aims to add new insights into the existing body of literature on the relationship between financial sector deepening and income inequality, providing empirical evidence in a South African context and achieving the goals. The study attempts to use a single measure for financial sector deepening; by doing so, the study will provide a broader understanding of how the depth of the financial sector affects income inequality.

South Africa is a country characterized by one of the highest levels of income inequality in the world. Given South Africa's distinct economic history, including the post-apartheid period and financial reforms, this research offers valuable insights into how structural changes in the financial sector impact inequality.

The study will employ an Autoregressive Distributed Lag (ARDL) model, which allows for both short-run and long-run relationships. This approach adds depth to the analysis by capturing how

financial sector deepening affects income inequality in different time horizons, using a sample of data from 1980 to 2019, and adding two dummy variables in the model, something that has not been explored. This will allow for a more nuanced understanding of how political and economic shifts have influenced the finance-inequality nexus.

1.5. Study Outline

Chapter 1 has outlined the study's purpose by discussing its background, providing the problem statement, presenting the study's research questions and objectives, and the contribution of the study. Chapter 2 reviews the development of South Africa's financial sector and the issue of income inequality. Chapter 3 examines both theoretical and empirical literature by identifying existing knowledge and gaps. Chapter 4 details the research methodology adopted and describes the data used in the study. Chapter 5 presents the findings of the research. Lastly, Chapter 6 summarizes the study and offers suggestions for future research.

CHAPTER 2

AN OVERVIEW OF FINANCIAL SECTOR DEEPENING AND INCOME INEQUALITY IN SOUTH AFRICA

2.1. Introduction

In this section, the study will outline the deepening of the financial sector and the distribution of income in South Africa. This will be divided into three key sections. The first section 2.2 provides an overview of the financial sector's deepening. The second section 2.3 provides a comprehensive overview of income inequality and the combination of both. The last part gives a summary and conclusion for the entire chapter.

2.2. Overview of financial sector deepening in South Africa

The World Bank (2012) defines financial sector deepening as improving and expanding financial systems. This includes increasing financial institutions' and markets' depth, liquidity, and size, as well as diversifying domestic financing sources and extending access to banking and other financial services. South Africa is a country with high inequality and unemployment, so deepening the financial sector is vital because it can contribute to broader economic participation by improving access to financial resources for businesses and individuals, particularly small and medium-sized enterprises (Abrahams, 2017).

South Africa is known as a developing country with highly developed and resilient financial system, with a wide range of financial products and services. It is one of the few African nations with significant depth (Abrahams, 2017). According to the World Bank (2022), South Africa's domestic credit to the private sector by banks (% of GDP), a measure of financial sector deepening has stood at 129%, surpassing other African countries such as Egypt (27%), Nigeria (12%), Kenya (33%), and Morocco (89%). Furthermore, according to the World Economic Forum's Global Competitiveness Report 2019, South Africa is ranked 18th out of 141 countries for bank soundness and the Johannesburg Stock Exchange (JSE) is recognized as one of the top 20 globally. The banking sector is mainly dominated by more than 30 commercial banks, including the five largest banks and a few mutual banks and they collectively hold 90% of the banking sector's assets (Rapapali & Simbanegavi, 2020).

Over the past two decades, the South African government has made significant strides in enhancing and expanding financial services (National Treasury, 2023). Rapapali & Simbanegavi (2020) note that government efforts, led by entities like the National Treasury and the South African Reserve Bank (SARB), have introduced numerous programs to strengthen the financial sector. These programs include the establishment of the Payment Association of South Africa (PASA) in 1996, the implementation of the Financial Sector Charter (FSC), and the Financial Sector Code of 2012, all aimed to promote transformation, inclusivity, and accessibility to financial services for previously disadvantaged groups (National Treasury, 2023).

2.2.1. Impact of technological innovations and COVID-19

In 2004, Standard Bank, First National Bank (FNB), Absa Group Limited, Nedbank, and the Post Office Bank collaborated to introduce the Mzansi Account. This affordable transactional account was aimed at extending banking services to South Africa's low-income segment (World Bank, 2018). The introduction of this basic account was a direct outcome of the banking sector's commitment to the Financial Sector Charter (FSC). Additionally, in 2005, the government gradually replaced cash payments with electronic payments for social grants, utilizing South African Social Security Agency (SASSA) gold cards. This transition significantly increased the number of individuals with access to financial services (World Bank, 2018).

Other initiatives aimed at strengthening South Africa's financial sector have included encouraging entry and competition, which resulted in the establishment of new banks like Bank Zero, Tyme Bank, and Discovery Bank (National Treasury, 2022). These banks have had a significant impact on lowering banking fees and implementing new distribution models. For example, collaborations with retailers such as Pick n Pay (PNP) have created more convenient access points for basic services like cash transactions for customers. Secondly, innovations like Discovery Bank's 'behavioural banking' approach promote good financial discipline, while Tyme Bank's 'buy now and pay later' service in collaboration with selected retailers offers a different approach (National Treasury, 2022).

Rapapali & Simbanegavi (2020) state that there has been development in digital technology. Artificial intelligence (AI) has had a significant impact on the financial sector by promoting financial inclusion, improving efficiency, and enhancing competitiveness in the financial system (Mhlanga & Moloji, 2020). Recently, technological innovation has become vital for the evolution

of financial services, adding value for financial institutions and customers. AI has given a chance for banks to offer innovative products, which include online payments, transferring funds, accessing credit, saving money, and obtaining insurance to reduce reliance on physical bank branches (Chu, 2018).

Mhlanga & Moloji (2020) state that in terms of accessing credit, AI played a significant role as many South Africans lack traditional credit histories, making it difficult for them to access loans from financial institutions. For example, companies such as Lulalend utilize AI to provide tailored microfinance solutions to individuals and small businesses, addressing gaps in the traditional banking system (Chu, 2018; Khrais, 2015). Moreover, there has also been a significant increase in mobile payment solutions. Popular mobile payment platforms like Ozow, Applepay, Payflex, PayU, and Yoco offer users convenient and secure transaction methods (Khrais, 2015).

Herrmann (2023) highlights that these digital services played a crucial role during the COVID-19 pandemic by enabling social distancing and allowing consumers to make payments without physical contact. This had a significant impact on the operational models of financial institutions. However, the risk of scams and cybersecurity issues also increased. Scammers targeted individuals, especially elders who were with digital transactions (Herrmann, 2023). While COVID-19 had negative effects in South Africa, the technological innovations introduced during that time continue to be implemented.

Nonetheless, financial services have been developed and expanded, but the financial sector has outlined ongoing challenges. A lack of access to appropriate credit products is a major issue of SMME development. Financial institutions generally require property or securities as collateral in addition to formal business records, which many SMMEs do not have (Herrmann, 2023). This means that young South Africans and people in rural areas are likely to be particularly disadvantaged in their attempts to start small businesses. The main reasons for the lack of formal finance products that are available to SMMEs include the absence of readily available credit information, the perceived riskiness of SMME finance, high costs of administration, inadequate record-keeping by SMMEs, and a lack of appropriate assets available to SMMEs to serve as collateral (National Treasury, 2023).

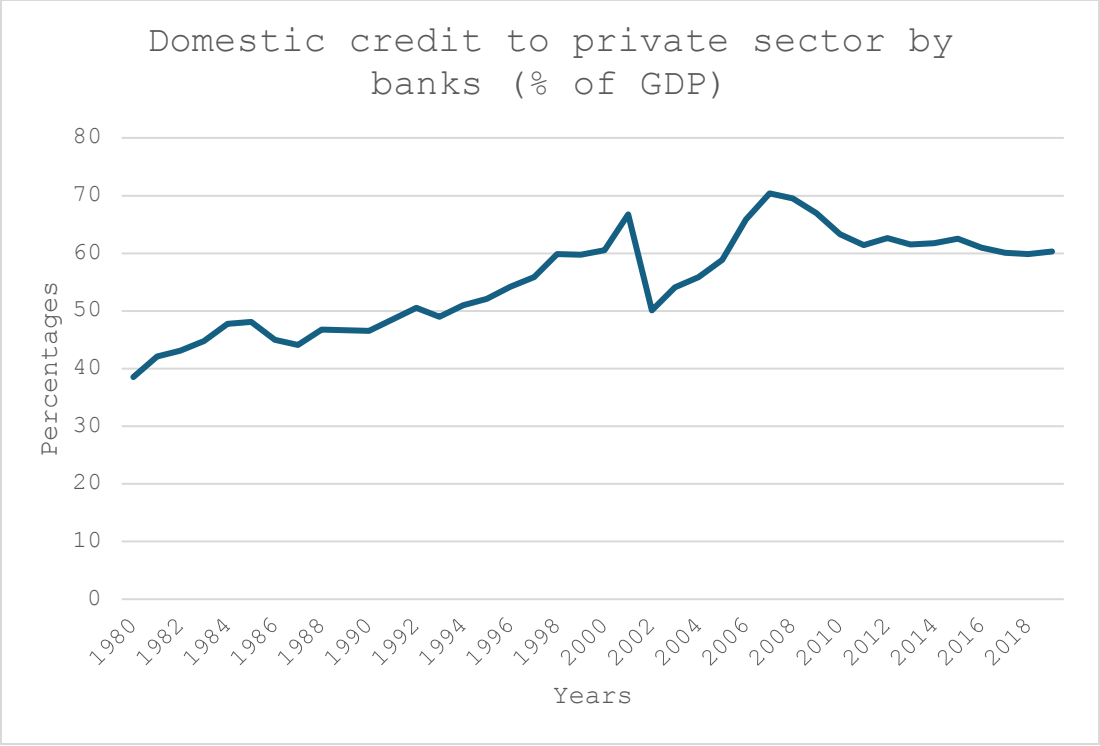


Figure 2. 1: Trends of Domestic credit to the private sector by banks (% of GDP)

Source: World Bank Database and own computation.

Figure 2.1 illustrates an increase in financial deepening since 1980. However, there was a sharp decline around 2002/3. This decline was attributed to the collapse of Saambou Bank, which had a ripple effect on South African small and medium-sized banks. As a result, 22 of these banks deregistered, leading to substantial and unforeseen financial burdens on individuals, the government, and society. This event is the most significant banking events in the economic history of South Africa (Havemann, 2019; Laven & Valencia, 2013).

Moreover, there was a further decline during 2007–2009 in the financial sector, which was caused by the global financial crisis. However, South Africa was better than many other countries (Allen et al., 2014). The resilience of financial institutions during this crisis was crucial for maintaining stability. However, the indirect impact, such as job losses and economic difficulties faced by many people, was devastating (Bordo & Haubrich, 2017).

2.3. Overview of income inequality in South Africa

Since 1994, the government has implemented various policies aimed at bridging the gap between the rich and poor (Hundenborn et al., 2018). These policies include minimum wage laws, progressive taxation, and social securities (Woolard & Leibbrandt, 2013; Van der Berg, 2014; Alvaredo & Atkinson, 2022; Bassier & Woolard, 2021). South Africa's government has implemented progressive taxation to redistribute wealth from high-income earners to low-income earners while also funding social services and welfare programs (Bassier & Woolard, 2021). Social grants have also played an important role in reducing income inequality by directly supporting the most vulnerable populations (Woolard & Leibbrandt, 2013). These grants include Child Support, Disability, and Old Pension Grants. Furthermore, President Cyril Ramaphosa during the COVID-19 pandemic, expanded social grants by introducing the Social Relief of Distress (SRD) grant to assist the unemployed.

The South African government have introduced various measures, such as the Expanded Public Works Programme (EPWP) and Youth Employment Service (YES), to address unemployment and income inequality by offering temporary job opportunities to unskilled, unemployed, and vulnerable individuals, including those with disabilities (Sindelo, 2019). However, although these initiatives have achieved some success, income inequality continues to present a major challenge, largely influenced by the labour market (Bassier & Woolard, 2021).

Nonetheless, SMMEs are a core part of the economy, and they were particularly vulnerable to a host of adverse effects from the COVID-19 pandemic. COVID-19 led to the implementation of measures to support SMMEs. For SMMEs to access debt relief from the Department of Small Business, some qualifying criteria were put in place (World Bank, 2018). These conditions included that a business must have been registered with the Companies and Intellectual Property Commission (CIPC) and be compliant with the South African Revenue Service (SARS) and the Unemployment Insurance Fund (UIF) (World Bank, 2018). Furthermore, the COVID-19 pandemic significantly worsened income inequality in South Africa, particularly due to widespread job losses and income reductions.

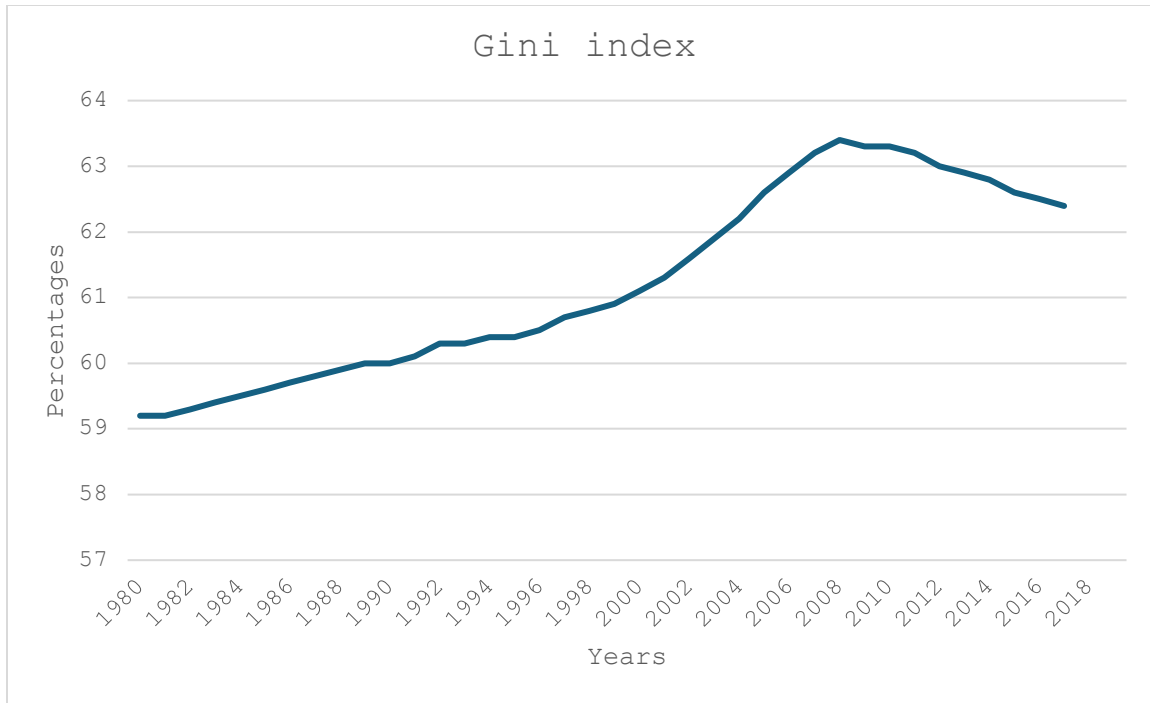


Figure 2. 2: Trends of Gini Index

Source: Standardised World Income Inequality Database and own computation.

Figure 2.2 illustrates South Africa’s income inequality from 1980 to 2017, showing a persistently high level of inequality. The Gini index rose sharply from 1980 to 1989; it ranged between 0.68 and 0.73, reflecting the challenges during the struggle for independence, marked by labour boycotts, mass actions, and disruptions in economic activity (Van der Berg, 2011). However, from 1992 to 1995, following the end of apartheid, the Gini index remained stable. This stability was attributed to the removal of institutional barriers to employment, income, and access to formal financial services for the previously marginalized majority (Van der Westhuizen, 2012; Leibbrandt et al., 2012).

Hundenborn (2021) states that as much as progress has been made in addressing income inequality, trends show it has been increasing since the end of apartheid. However, in 2008, after the global financial crisis, the Gini index began to fall. The decline continued further, and this was attributed to the expansion of various policies implemented by the government aimed at narrowing the wealth gap between different socioeconomic groups (Hundenborn et al., 2018).

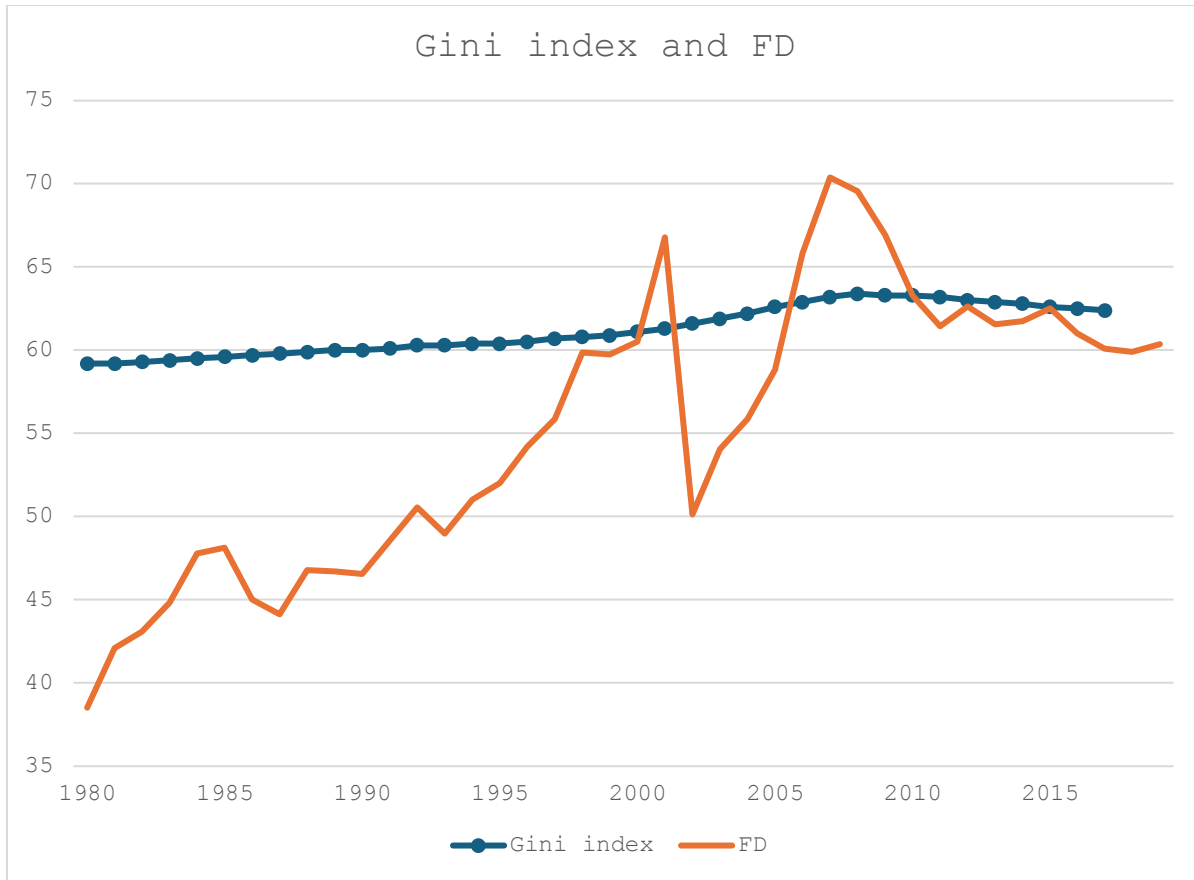


Figure 2. 3: Trends of Gini Index and Domestic credit to the private sector by banks (% of GDP)

Source: Standardised World Income Inequality Database, World Bank Database, and own computation.

Figure 2.4 illustrates the Gini index and financial deepening from 1980 to 2019. The Gini index indicates a gradual increase in income inequality over this period. Financial deepening demonstrates a significant growth, suggesting the development and expansion of the financial sector. However, there was a sharp decline in financial deepening around 2002/3, attributed to the collapse of Saambou Bank (Havemann, 2019; Laven & Valencia, 2013). Following the global financial crisis, financial deepening fluctuated, while the Gini index showed a slight decrease, which was linked to the implementation of various government policies (Hundenborn et al., 2018).

2.4. Conclusion

This chapter has provided an overview of financial sector deepening and income inequality in South Africa. Financial sector deepening, characterized by the expansion of financial services and

increased accessibility, has been vital to promoting economic participation. South Africa's financial system is among the most developed in Africa, with significant strides made in expanding access through technological innovations and government interventions. However, challenges such as limited access to credit for SMMEs and the disproportionate effects of economic shocks like the COVID-19 pandemic remain.

On the other hand, income inequality in South Africa continues to be a pressing issue despite various government policies aimed at addressing it. The persistence of inequality is reflected in the Gini index, which has remained high over the years, although it has shown some improvement in response to social policies and interventions. The data also suggest a complex relationship between financial deepening and income inequality, where deepening the financial sector has not necessarily led to significant reductions in inequality.

CHAPTER 3

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

3.1. Introduction

In this chapter, the study explores the relationship between financial sector deepening and income inequality by examining the various theories and empirical studies found in the existing literature. These theories include both linear and non-linear hypotheses, with the linear being further categorized into the inequality-narrowing hypothesis and the inequality-widening hypothesis. The main goal of this chapter is to gather existing knowledge, identify any research gaps, and situate the current study within the existing literature. The chapter is structured into three sections. Section 3.2 focuses on the theoretical framework for understanding the connection between financial sector deepening and income inequality. Section 3.2 reviews the empirical studies for evidence. Section 3.3 provides an overall assessment of the literature.

3.2. Theoretical Literature

The relationship between financial sector deepening and income inequality has been a topic of great interest in academic discourse. According to Dabla-Norris et al. (2015), the financial sector plays a role in poverty and inequality reduction by enhancing access to finance for the poor and vulnerable, improving their ability to manage economic risks, and boosting investment and productivity, all of which lead to higher incomes. Various theories have been proposed to explain the connection between financial sector deepening and income inequality, each presenting distinct perspectives and rationales.

3.2.1. Inequality narrowing-hypothesis

Galor & Zeira (1993) and Banerjee & Newman (1993) suggested that there is a negative linear relationship between financial sector development and income inequality. They proposed that a well-developed financial system could possibly alleviate income inequality by enhancing access to financial services, offering improved and more affordable savings opportunities, reducing credit constraints, and facilitating transactions. Furthermore, studies such as Mdingi & Ho (2021) and Kapingura (2017) believe that an increase in the financial sector may benefit the poor by enabling

investments in human and physical capital, such as access to education to improve skills and the ability to start or expand businesses that may generate employment. This can lead to long-term benefits, such as increased income.

Barajas et al. (2020) argue that providing access to financial services can help alleviate financial barriers that lead to inequality. Von Fintel & Orthofer (2020) and Dhrifi (2013) note that South Africa has made considerable strides in improving access to financial services, leading to a high number of people having bank accounts. For example, the FinScope survey in 2022 reported that the percentage of South African adults with a transaction account rose from 67% in 2012 to 82% in 2022, surpassing the acquisition of all other financial products. Insurance products have also increased from 48% in 2012 to 52% in 2022, following a decline caused by decreased disposable income due to global financial crises and COVID-19.

Despite this progress, there are still significant challenges. Ehrlich & Elliott (2019) state that the active usage of financial services and products, such as mobile and internet banking, remains low. Additionally, certain groups, such as SMMEs, have limited access to certain financial services. Von Fintel & Orthofer (2020) also believe that many people rely heavily on informal channels, like Stokvels, for savings, investments, and cash transactions, indicating that while financial institutions attempt to include low-income earners, meaningful engagement in the financial sector remains limited.

3.2.2. Inequality widening-hypothesis

Rajan & Zingales (2003) and De-Gregorio (1996) proposed the positive linear hypothesis, which suggests that an increase in income inequality is associated with financial development. They argued that a well-developed financial system primarily benefits the wealthy and well-connected minority by providing them with more access to external finance. Claessens & Perotti (2007) also support this idea, stating that low-income individuals and firms may struggle to access banking or financial services due to required property or securities used as collateral. This can further widen the gap between the rich and poor.

Several studies, including (Gwatidzo & Simbanegavi, 2024; Anthony, 2024; Seven & Coskun, 2016; Brixiova et al., 2020) believe that the high concentration of banks has contributed to inadequate attention to low-income individuals and SMMEs. In South Africa, SMMEs face

limitations due to restricted access to external finance, forcing them to rely on internally generated funds, which are often insufficient for expansion and growth (Bajaras et al., 2020). The FinScope 2020 survey reports that 42% of the South African population lacks insurance coverage, and 41.8% of SMME owners are excluded from the formal credit market because of loan applications that are rejected. Furthermore, lending banks also find it difficult to fund SMMEs and low-income individuals in South Africa due to strong risk aversion and lower profitability, which further increases financial vulnerability and contributes to continuing income inequality (Brixiova et al., 2020).

3.2.3. Non-linear hypothesis

In 1955, economist Simon Kuznets proposed the Kuznets Curve Theory, which suggests an inverted U-shaped relationship between economic development and income inequality. Kuznets (1955) argued that during the early stages of economic development, income inequality tends to rise due to factors such as rural-to-urban migration, labour force changes, and the concentration of wealth in certain sectors. However, as development progresses and reaches a certain level, inequality begins to decline, driven by factors such as increased education, urbanization, and a more diversified economy (Kuznets, 1955).

Nonetheless, in the 1990s, Greenwood & Jovanovic (GJ) built upon on the Kuznets hypothesis and developed a theoretical model that outlines a non-linear, inverted U-shaped relationship between financial sector development and income inequality. According to Greenwood & Jovanovic (1990), in the early stages of financial development, only the wealthy have access to financial services, while low-income individuals are excluded due to the costs associated. However, as the economy expands and reaches a certain threshold, the financial system becomes more accessible, easing credit constraints and extending services to the poor, resulting to a decrease in income inequality (Nikoloski, 2013; Greenwood & Jovanovic, 1990). Tan & Law (2012) proposed a non-linear U-shaped hypothesis. Tan & Law (2012) and Tita & Aziakpono (2016) argue that as a country's financial sector develops, inequality initially increases due to the uneven distribution of financial benefits. However, beyond a certain point, further financial developments can reduce inequality as more people gain access to financial services and opportunities.

South Africa's history is complex, with colonialism, apartheid, and the global financial crisis, all of which have shaped its economy and society. Initially, only a minority had access to financial

services, education, and business opportunities (Adams & Klobodu, 2019). However, the country has since made significant progress in including many previously excluded individuals in the financial system (Kapingura, 2017). This progress includes the introduction of affordable financial products, making services more accessible (Kapingura, 2017). Additionally, an increase in digital innovation in the 4th industrial revolution has led to new financial services. There has been a concentrated effort on enhancing consumer education and financial literacy, as well as the channeling of social grants via banks (National Treasury, 2022).

While these efforts have expanded access to financial services, challenges remain. Excessive fees on credit and debit orders and fraudulent deductions on bank accounts have limited the usage of banking services by low-income people (National Treasury, 2022). They now have deep mistrust of the formal financial sector due to fear of exploitation. For example, when social grants were directly deposited into bank accounts, financial institutions targeted grant recipients with financial products like funeral insurance and loans, leaving them with minimal funds to live on.

In this study, various theories were discussed, each offering different perspectives and arguments. A theoretical framework that seems particularly applicable and more realistic in the South African context might be the linear theory, specifically the inequality-widening theory. Despite having a robust financial system, South Africa has seen disproportionate benefits favoring certain groups. This theory aligns well with South Africa's experience, where financial sector development has not led to broad-based economic benefits and access to financial services has remained uneven, especially in underdeveloped townships or rural areas.

3.3. Empirical literature review

This section is divided into four subsections, a review of empirical studies explaining the non-linear results, and linear results (positive and negative) for both country-specific and cross-country studies, followed by a focus on studies in the South African context.

3.3.1. Studies with non-linear results on the relationship between financial sector development and income inequality

Younsi & Bechtini (2020) conducted research on BRICS nations using annual panel data from 1990 to 2015. They employed the Generalized Method of Moments (GMM) and Pooled Ordinary Least Squares (POLS) methods. Their investigation revealed substantial findings in favour of the

GJ hypothesis, showing a correlation between the development of financial sector and income inequality. In a similar vein, Nikoloski (2013) applied a dynamic multivariate panel regression model to analyze panel data from 1962 to 2006 encompassing both developed and developing countries. The study discovered robust and consistent empirical evidence supporting an inverted U-shaped hypothesis between financial sector development and income inequality.

Koçak & Uzay (2019) examined the period from 1980 to 2013 in Turkey and employed the Dynamic Ordinary Least Squares (DOLS) model and Fully Modified Least Squares (FMOLS). Their findings also provided support for the GJ hypothesis. In a separate study, Destek et al. (2020) conducted research on Turkey from 1990 to 2015, using the ARDL model and exploring various aspects of financial sector development. The results indicated that the banking sector confirmed an inverted U-shaped impact on income inequality, while the stock market revealed a reduction in income inequality.

In contrast to the GJ theory, Tita & Aziakpono (2016) carried out a comparative analysis of 15 African nations by employing time series data from 1985 to 2007. The study utilized the GMM estimator and concluded that there was an insignificant U-shaped relationship between financial development (measured through financial inclusion) and income inequality. Meanwhile, Tan & Law (2012) investigated 35 developing countries spanning from 1980 to 2000 using the GMM estimation technique. Their findings revealed a nonlinear, U-shaped association between financial deepening and income inequality.

In a recent study conducted in Ivory Coast, Séraphin & Cyrille (2022) utilized annual data from 1986 to 2016. Their research involved the use of ARDL and Non-Linear Autoregressive Distribution Lag (NARDL) models. According to the ARDL outcomes, the study revealed that while the development of the financial sector leads to a reduction in income inequality in the short term, it conversely contributes to an increase income inequality in the long term. On the other hand, the NARDL findings demonstrated an asymmetric effect of financial development on income inequality.

3.3.2. Studies with linear results on the relationship between financial sector development and income inequality

The research conducted by Batuo et al. (2010) focused on 22 African countries and analyzed panel data spanning from 1990 to 2004. In a separate study, Meniago & Asongu (2018) examined 48 African countries over the period of 1996 to 2014. Both research studies utilized the GMM method and discovered that as economies enhance their financial sector, there is a decrease in income inequality.

Hamori & Hashiguchi (2012) conducted a study using unbalanced panel data from 126 countries spanning from 1963 to 2002. The research suggests that increased financial deepening is associated with reduced income inequality. In contrast, Adeleye et al. (2017) examined Sub-Saharan African countries from 1996 to 2015 and found that financial development does not have a significant impact on reducing income inequality. Both studies used the GMM technique. Additionally, Shahbaz & Islam (2011) focused on Pakistan, using the ARDL method with data from 1971 to 2005. Their findings support the notion that the development of the financial sector leads to a reduction in income inequality.

In contrast to the studies suggesting a negative relationship between financial sector development and income inequality, a group of researchers has explored the inequality-widening hypothesis. These studies include work by Seven & Coskun (2016), Law & Tan (2009), Jobarteh & Kaya (2019), Mansur & Azleen (2017), Sugiyanto & Yolanda (2020), and Azwar et al. (2022).

The research conducted by Seven & Coskun (2016) utilized the dynamic panel GMM method to analyze 45 emerging nations over the period from 1987 to 2011. They concluded that improvements in the banking sector might contribute to increased income inequality in emerging nations. On the other hand, Jobarteh & Kaya (2019) investigated 23 African countries from 1990 to 2014 using panel data and a regime-switching model. Their study indicated that financial development exacerbates income inequality, yielding results that are both statistically and economically significant.

Research conducted by Sugiyanto & Yolanda (2020) examined 73 countries over the period from 1991 to 2015 using panel data regression and the ARDL method. Their findings indicated a significant and positive correlation between financial deepening and income inequality within

developing economies. Mansur & Azleen (2017) conducted a study from 1970 to 2007, while Law & Tan (2009) focused on the period from 1980 to 2000 in Malaysia. Additionally, Azwar et al. (2022) focused on Indonesia using time series from 2000 to 2020. These studies used ARDL model, and their findings were the same, they found a positive, long-run relationship. However, financial development was statistically insignificant in reducing income inequality.

3.3.3. Empirical studies in South Africa

Adams & Klobodu (2019) utilized yearly data from 1965 to 2014 and employed co-integration methods, specifically DOLS and FMOLS. Their conclusion supported the GJ hypotheses, suggesting an inverted U-shaped correlation between financial development and income inequality. Conversely, Hassan & Meyer (2021) examined data from 1970 to 2018 and used an ARDL model. The results suggested a U-shaped relationship, indicating that financial development decreases income inequality but may exacerbate it beyond certain thresholds.

On the other hand, Kasilam (2022) investigated the relationship from 1990 to 2015 by employing the ARDL model and various financial development indicators. The outcomes of the research indicated mixed results, showing both positive and negative impacts of financial sector development on income inequality. Kapingura (2017) examined quarterly data spanning from 1990 to 2012 using the ARDL model. The investigation revealed a negative linear relationship, proposing that increased financial development, particularly through improved financial inclusion, was associated with decreasing income inequality.

3.4. Conclusion

This chapter provides a comprehensive literature framework for containing input from both theoretical and empirical. The theoretical literature provides three primary hypotheses: the inequality-narrowing hypothesis, the inequality-widening hypothesis, and the non-linear hypothesis.

Empirical perspective shows that many studies, conducted on cross-country, country-specific, or in the context of South Africa, have explored various dimensions of financial sector development, including accessibility, stability, efficiency, and depth, utilizing various models and techniques. However, the findings differ greatly, making it challenging to reach definitive conclusions. While some studies suggest a linear correlation, others propose a more complex, non-linear relationship.

In the South African context, the evidence is mixed. Some studies suggest financial development has helped reduce inequality, while others highlight persistent challenges in accessing financial services, especially for the poor and small businesses. This study will build upon these existing findings by focusing on the South African experience, aiming to contribute to the ongoing debate and address the gaps identified in previous research.

CHAPTER 4

RESEARCH METHODOLOGY, DESIGN AND DATA

4.1. Introduction

In this section, the study will discuss the analytical framework employed to accomplish the objectives. The primary aim of this study is to investigate the relationship between the financial sector deepening and income inequality in South Africa in both the short and long term. It expands on the previous chapter, which established the theoretical and empirical framework that informed the choice of model, variables, and sample period. The chapter is structured into three sections. The first section 4.2 discusses the research paradigm employed to guide the study. The second section 4.3 outlines the research design, including model specifications, estimation techniques, variable definitions, data sources, and diagnostic tests. Finally, in section 4.4, the study summarizes the entire chapter.

4.2. Research Paradigm

Several studies, including those conducted by Kivunja & Kuyini (2017) and Park et al. (2020) define a research paradigm as a set of shared beliefs, values, and assumptions about the nature of reality, knowledge, and the methods of acquiring knowledge. These research paradigms are crucial because they influence how researchers develop research questions, collect and analyze data, interpret findings, and draw conclusions (Mackenzie & Knipe, 2006). Additionally, research paradigms are broadly categorized into two main types: positivism and interpretivism/constructivism.

Most qualitative studies in the social sciences involve methods such as interviews, case studies, and participant observation (Morgan, 2007). Research conducted within this framework is inherently subjective and greatly influenced by the researcher's personal perspective (Morgan, 2007). On the other hand, the positivism paradigm objectively approaches research. This paradigm is based on the belief that knowledge is best acquired through empirical hypothesis, involving the collection of quantitative data to identify patterns and explore quantitative relationships between variables, as highlighted by Igwenagu (2016) and Yong et al. (2021).

This study thus employs a post-positivism research paradigm. Panhwar et al. (2017) states that the post-positivism research paradigm is a continuation of positivism that focuses on objective truth. According to Scotland (2012), research in the post-positivism paradigm seeks to predict results, test hypotheses, and determine the strength of relationships between variables. As a result, this study employs the post-positivism paradigm to investigate the connection between financial sector deepening and income inequality and test hypotheses about these variables.

4.3. Research Design

4.3.1. Model specification and Theoretical Framework

The model presented here incorporates insights from a theoretical framework covered in the previous chapter. Greenwood & Jovanovic (1990) posit that in the early stages of financial development, income inequality rises as only the affluent can access financial services. As the financial sector matures and credit constraints are eased, income inequality decreases, becoming more inclusive of the less affluent. Conversely, Galor & Zeira (1993) and Banerjee & Newman (1993) argue that financial development reduces income inequality, while Rajan & Zingales (2003) contend that it exacerbates income inequality. The model also includes other variables that address important macroeconomic activities in South Africa.

To investigate the connection between income inequality and the financial sector deepening, an initial functional model was used, with income inequality as the dependent variable. The study adapted a model developed by Benczur & Kvedaras (2021). This model was then adjusted to account for potential non-linear effects by incorporating a quadratic term for the financial deepening variable. Specifically, the financial deepening variable was transformed by squaring it and including it in the regression analysis alongside its linear counterpart. This adjustment allows for the examination of both linear and non-linear (quadratic) relationships, capturing the possibility that the impact of financial deepening on income inequality may change at different levels of financial sector development. The base-adapted functional model used in the study is specified as follows:

$$GC = f(FD, INFL, GDP, SCDV) \dots\dots\dots (1)$$

Where:

GC (Gini Coefficient) represents a proxy measure of Income Inequality

FD represents Financial Deepening

INFL represents Inflation.

GDP represents Gross Domestic Product per capita.

SCDV controls for Structural Changes using Dummy Variables (1994 and 2005)

The base empirical model was expressed as follows:

$$GC_t = \beta_0 + \beta_1 FD_t + \beta_2 INFL_t + \beta_3 GDP_t + \beta_4 SCDV_t + \mu_t \dots \dots \dots (2)$$

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$ denote the model parameters.

μ_t represents the error term (white noise)

4.3.2. Definition of variables

GC (income inequality-dependent variable): This study utilized the Gini index to measure income inequality, as it is the most widely used indicator. A Gini index, defined by studies in this field, including (Benczur & Kvedaras, 2021; Meniago & Asongu, 2018), assesses income disparity within a population. According to Solt (2020), the Gini index ranges from 0 to 1, with 0 representing perfect equality and 1 representing perfect inequality, indicating that high-income individuals receive a significantly larger portion of the total income.

FD (Financial Deepening): defines financial sector deepening as improving and expanding financial systems. This includes increasing financial institutions' and markets' depth, liquidity, and size. The study employs domestic credit to the private sector by banks (% of GDP) as a measure for financial deepening (World Bank, 2012). This measure is preferred over other proxies of financial deepening, such as money supply (M2), as it effectively captures the essential role of financial intermediaries in transferring deposits from surplus to deficit units (Zhang & Naceur, 2019). Furthermore, research on financial deepening and income inequality has provided conflicting results. According to Zhang & Naceur (2019), financial deepening lowers inequality. However, some studies in this area (Denk & Cournede, 2015; Jauch & Watzka, 2016) indicate that financial deepening is associated with increased income inequality. In contrast, Biyase & Chisadza (2023) argue that financial deepening and income inequality follow an inverted U-shaped nonlinear curve. As a result, predicting an expected sign of financial deepening is impossible.

GDP (real GDP per capita): is a monetary measure that represents the market value of all final goods and services produced within a country or group of countries over a specified period, adjusted for population size. In this research, real GDP per capita serves as a measure of economic growth, which has also been used by a number of studies (Kim & Lin, 2011; Jauch & Watzka, 2016; Qureshi, 2018). Income inequality is expected to be negatively correlated because it may decrease as the economy improves. This expectation aligns with findings from prior research (Qureshi, 2018).

INF (Inflation): refers to the increase in the general price level of goods and services over time (Akinsola & Odhiambo, 2017). Derived from the Consumer Price Index (CPI), the study employs INFL to measure inflation. A positive relationship is expected with income inequality, as high inflation rates tend to disproportionately affect poor people due to limited access to financial services. This expectation is consistent with findings from prior research (Agnello et al., 2012).

Structural change dummy variables (1994 and 2005): were introduced to account for significant economic changes during these years. The 1994 dummy variable was utilized to capture the impact of gaining independence within a study covering the period from 1980 to 2019. This variable will take the value of 0 for the years 1980–1993 and 1 for the years 1994–2019. By including this dummy variable in the regression analysis, the model can isolate and examine the impact of independence on the dependent variable, allowing for a clearer understanding of the changes associated with this significant historical event.

The 2005 dummy variable was also used to capture the introduction of the South African Social Security Agency (SASSA). According to the World Bank (2021), SASSA was established in 2005 to manage the country's social security system, including the distribution of social grants. These grants include Social Relief of Distress, Child Support, Disability, and Old Pension Grants. This variable will take a value of 0 from 1980 to 2004 and 1 from 2005 to 2019. By including this dummy variable in the regression analysis, the model can isolate and investigate SASSA's impact on the dependent variable, allowing for a clearer understanding of the changes associated.

4.3.3. Data description and sources

This research utilized data from 1980 to 2019, collected in a yearly series. The reason for ending in 2019 is to exclude the COVID and post-COVID periods because of the extreme outliers. These

anomalies could skew the analysis and obscure the long-term trends and structural determinants of inequality that the study aims to capture. By excluding this period, the study maintains a focus on more stable and representative data, ensuring that the findings reflect underlying, consistent patterns rather than short-term, crisis-induced fluctuations.

Furthermore, the choice of the study period considers the post-positivistic paradigm, allowing for a comprehensive analysis of the subject matter over this period. The data for the variables is sourced from the World Bank Database and the Standardised World Income Inequality Database (SWIID). Empirical estimations are performed using the statistical software package E-Views.

4.3.4. Estimation Technique

In this research, the autoregressive distributed lag (ARDL) model was utilized to analyze the relationship between financial sector deepening and income inequality in South Africa, considering both short- and long-term dynamics. ARDL, as highlighted by Pesaran et al. (2001) and Pesaran & Shin (1995), is widely used for time series data analysis. Unlike other cointegration models, ARDL has the capability to estimate both short- and long-run connections between variables and offers several advantages. Pesaran & Shin (1995) note that the ARDL model is flexible in determining lag lengths and can handle variables with different orders of integration, such as $I(0)$ or $I(1)$. This makes it suitable for small sample analysis and applicable in situations with limited data availability, unlike the Johansen cointegration test, which requires all variables to have the same order of integration, such as $I(1)$ (Inder, 1993).

Moreover, Pesaran & Shin (1995) state that the ARDL model has an advantage over other cointegration techniques because it can effectively address both the issue of endogenous regressors and residual serial correlation at the same time.

4.3.4.1. Unit Root Test

In general, before developing any econometric model, it is essential to conduct a stationarity test to ascertain the integration order. Unit root analysis includes tests such as the Augmented Dickey-Fuller (ADF) by Dickey & Fuller (1979), the Phillips-Perron (PP) test by Phillips & Perron (1988), and the Kwiatkowski Phillips Schmidt and Shin test (KPSS) by Kwiatkowski Phillips Schmidt and Shin (1992).

The null hypothesis for these tests is established by comparing the test statistic with critical values. In ADF and PP tests, if the test statistic is lower than the critical value, the null hypothesis of a unit root is discarded, indicating that the time series is stationary. Conversely, if the test statistic exceeds the critical value, the time series is deemed non-stationary, or a unit root exists. On the other hand, the KPSS operates in a different manner; if the test statistic surpasses the critical value, the null hypothesis is rejected, implying that the time series is non-stationary. If the test statistic is below the critical values, the study does not reject the null hypothesis.

It is also important to note that there are also some differences between these tests. The ADF test was developed as an expansion of the Dickey-Fuller test to handle more complex and larger time series models. However, according to Hamilton & Susmel (1994), the PP test is considered to be more reliable than the ADF test when addressing serial correlation and heteroskedasticity issues. On the other hand, the KPSS test differs from both the ADF and PP tests. It assumes that a time series can be categorized into three types: deterministic trend, random walk, and stationary error.

4.3.4.2. Lag Length Criteria

In order to ensure the accuracy and interpretability of the ARDL model, it is important to determine the optimal lag length. This can be achieved by using model order selection criteria such as the Akaike Information Criterion (AIC) introduced by Akaike (1973), the Schwarz information criterion (SIC) proposed by Schwarz (1978), and the Hannan-Quinn information criterion (HQC) developed by Hannan & Quinn (1979). As noted by Liew (2004), the model selection criteria with the smallest criterion value is preferred as it generally performs better.

4.3.4.3. Cointegration Test

Once the stationarity of the variables is confirmed and the optimal lag length is determined, the cointegration tests will be employed in the study to examine whether a long-term relationship exists and to derive practical economic implications from the results. Therefore, the bounds test is chosen as the most suitable method because it can detect a long-run relationship between series with different levels of integration (Pesaran et al., 2001; Pesaran et al., 2004).

Firstly, the F-statistic is calculated and computed to the upper and lower critical bounds provided by Pesaran et al. (2001). These bounds are associated with the assumption that the variables are either I (0) or I (1). If the F-statistic surpasses the upper critical bound, it indicates that the series

are co-integrated. Conversely, if it falls below the lower critical bound, it suggests there is no co-integration. When the F-statistic falls within the upper and lower critical bounds, determining co-integration becomes uncertain. In such cases, knowledge of the cointegration rank of forcing variables is necessary to make further decisions.

After establishing a long-run relationship between the variables, the Error Correction Model (ECM) is employed to validate the convergence of short-term dynamics toward long-term equilibrium. This is achieved by verifying that the coefficient of the Error Correction Term (ECT) is both statistically significant and negative (Sgammini, 2016). Furthermore, Banerjee et al. (1998) suggest that short-term dynamics offer insights into the speed and extent to which changes in the explanatory variables impact the dependent variable over a short period. The ECT also indicates the speed of adjustment required to return to equilibrium. The estimation of the ARDL model is conducted as follows:

$$\begin{aligned} \Delta Gini_t = & \alpha_0 + \sum_{i=1}^{\rho} \beta_{1i} \Delta Gini_{t-i} + \sum_{i=1}^{\rho} \beta_{2i} \Delta FD_{t-i} + \sum_{i=1}^{\rho} \beta_{3i} \Delta INFL_{t-1} \\ & + \sum_{i=1}^{\rho} \beta_{4i} \Delta GDP_{t-1} + \sum_{i=1}^{\rho} \beta_{5i} \Delta SCDV_{t-1} + \lambda_1 Gini_{t-i} + \lambda_2 FD_{t-i} \\ & + \lambda_3 INFL_{t-i} + \lambda_4 GDP_{t-i} + \lambda_5 SCDV_{t-i} \\ & + \epsilon_t \dots\dots\dots (3) \end{aligned}$$

The Error Correction Model is estimated as follow:

$$\begin{aligned} \Delta Gini_t = & \alpha_0 + \sum_{i=1}^{\rho} \beta_{1i} \Delta Gini_{t-i} + \sum_{i=1}^{\rho} \beta_{2i} \Delta FD_{t-i} + \sum_{i=1}^{\rho} \beta_{3i} \Delta INFL_{t-1} \\ & + \sum_{i=1}^{\rho} \beta_{4i} \Delta GDP_{t-1} + \sum_{i=1}^{\rho} \beta_{5i} \Delta SCDV_{t-1} + \phi ECM_{t-1} \\ & + \epsilon_t \dots\dots\dots (4) \end{aligned}$$

Where α_0 denotes the intercept, Δ is the first difference, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ are the short-term dynamic coefficients of the model's adjustment long-run equilibrium. $\lambda_1, \lambda_2, \lambda_3, \lambda_4, \lambda_5$ are the long-run coefficients. ϕ represent the speed of adjustment of equilibrium. The ARDL model is tested on the following hypothesis:

H₀: $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = \mathbf{0}$, there is no long-run relationship between the variables.

H₁: $\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq \mathbf{0}$, there is a long-run relationship between the variables.

4.3.5. Diagnostic test

It is important to evaluate the robustness of an estimated econometric model using a variety of diagnostic tests to determine its trustworthiness. These tests are crucial for evaluating different aspects of the model's performance and ensuring that the estimated results are reliable and meaningful. A lack of reliable data may result in incorrect model specification, invalid inferences, and distorted residual distributions, leading to incorrect conclusions (Pesaran et al., 2004). This study uses three tests to determine the model's fitness: the Lagrange Multiplier (LM) test for serial correlation, the White test or Breusch-Pagan Godfrey test for heteroskedasticity, and the Jarque-Bera (JB) test for normality.

The LM test is employed to detect autocorrelation in the residuals, which can indicate that the model does not account for some time-series patterns in the data. The presence of autocorrelation might lead to inefficient parameter estimates and unreliable hypothesis tests (Pesaran et al., 2004). The White test, or Breusch-Pagan Godfrey test, is employed to check if heteroscedasticity exists in a regression model. Heteroscedasticity might result in invalid standard errors (Banerjee et al., 1998). The JB test is utilized to assess the goodness of fit of sample data by comparing the skewness and kurtosis of the data to those of a normal distribution. Non-normal residuals might cause biased coefficient estimates and incorrect p-values (Pesaran et al., 2004). Furthermore, for stability of both short-run and long-run, the study will use the Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) (Pesaran & Shin, 1995; Pesaran et al., 2001).

4.4. Conclusion

In this section, the study methodology, design, and data sources are outlined. Adopting a post-positivism paradigm, the study employed the ARDL model to investigate the relationship between income inequality and financial sector deepening in South Africa. The variables defined include income inequality as the dependent variable, financial sector deepening as the independent variable, and control variables such as GDP, inflation, and structural change dummy variables for significant years in the years 1994 and 2005. To ensure the robustness of the model, various

diagnostic tests were employed, including the LM, White, and JB tests. The following chapter will focus on estimating and interpreting the results.

CHAPTER 5

ESTIMATION AND INTERPRETATION OF RESULTS

5.1. Introduction

In this section the study discusses the findings from the methods and tests described in Chapter 4, which align with the research objectives introduced in Chapter 1. This chapter is divided into five sections. Section 5.2 examines descriptive statistics to assess the data used in the study. Section 5.3 concentrates on unit root testing to establish stationarity. Section 5.4 discusses the ARDL co-integration test, and Section 5.5 addresses diagnostic tests. Lastly, the chapter concludes with a summary of the findings.

5.2. Descriptive Statistics

In this section, the study explores descriptive statistics, which are essential for summarizing the characteristics of the data utilized in the study. It begins by highlighting measures of central tendency, such as the mean (average value), median (middle value), and maximum and minimum values, which reflect the current sample of the series. Next, it discusses the standard deviation, which indicates the degree of dispersion or spread in the data. Finally, the section examines measures of normality, specifically skewness and kurtosis.

According to Gujarati & Peter (2009), skewness measures the degree of asymmetry in a series. A distribution is considered to be normal when its skewness is zero, indicating symmetry around the mean. Positive skewness indicates a longer right tail, while negative skewness shows a longer left tail. Meanwhile, kurtosis determines whether a distribution is peaked or flat. A normal distribution has a kurtosis of 3, known as mesokurtic (Gujarati & Peter, 2009). Distributions with kurtosis greater than 3 are leptokurtic, indicating a positive kurtosis, whereas those with less than 3 are platykurtic, indicating a negative kurtosis (Gujarati & Peter, 2009).

Additionally, the Jarque-Bera test is used to check if the skewness and kurtosis of a sample data set are similar to a normal distribution. This test is done at the 5% significance level and the null hypothesis assumes that the data follows a normal distribution, while the alternative hypothesis suggests that it does not. (Gujarati & Peter, 2009).

Table 5. 1: Summary of statistics

	Gini Index	FD	LGDP	INFL
Mean	61.21579	55.19144	28.72088	8.771082
Median	60.85000	55.85300	28.64957	7.284714
Maximum	63.40000	70.38188	29.15362	18.65492
Minimum	59.20000	38.51745	28.34020	-0.692030
Std. Dev.	1.434427	8.354380	0.281104	4.652397
Skewness	0.169767	-0.078168	0.270356	0.331022
Kurtosis	1.514277	1.930340	1.509137	2.144547
Jarque-Bera	3.677542	1.947688	4.191737	1.950171
Probability	0.159013	0.377629	0.122963	0.377160
Sum	2326.200	2207.658	1148.835	350.8433
Sum Sq. Dev.	76.13053	2722.031	3.081766	844.1472
Observations	38	40	40	40

Source: Author's own computation using E-views 12

Descriptive statistics for the independent and dependent variables are presented in *Table 5.1*. The Gini index shows a mean value of 61.21 and a standard deviation of 1.43, suggesting a relatively high level of income or wealth inequality in South Africa. FD reports a mean value of 55.19 and a standard deviation of 8.35, indicating a higher level of financial depth and a greater integration of financial services into the economy. The range from a minimum of 38.51 to a maximum of 70.38 suggests substantial changes in financial deepening across time periods. The average LGDP value is 28.72, with a low standard deviation of 0.28, suggesting a stable economy over the period. Then INFL has a mean value of 8.77 and a standard deviation of 4.65, indicating both low and high inflation rates over the period.

Furthermore, the Gini Index, LGDP, and INFL have positive skewness values of 0.16, 0.27, and 0.33, respectively, indicating long right tails. In contrast, FD shows a long-left tail with a skewness of -0.07. This negative skewness could be attributed to the collapse of Saambou Bank in 2002/3, which triggered crises in South African small banks. All variables have kurtosis values less than

three, indicating a platykurtic distribution. The Jaque-Bera statistics for all variables show a high p-value, indicating that the null hypothesis of residuals fails to be rejected at a 5% level. As a result, we accept the null hypothesis that the residuals of these variables follow a normally distribution.

5.3. Stationarity Testing

Stationarity testing is required to prevent spurious regressions and to assist in determining the estimation technique to be used in the study. Stationarity can be determined using two methods: informal graphical analysis and formal unit root tests such as ADF, PP, and KPSS. These tests use the dataset to comprehend structural breaks, motion, and stationarity (Brooks 2008). As a result, in this study, each variable is examined in both level and first difference form, and more or less identical trends are discovered.

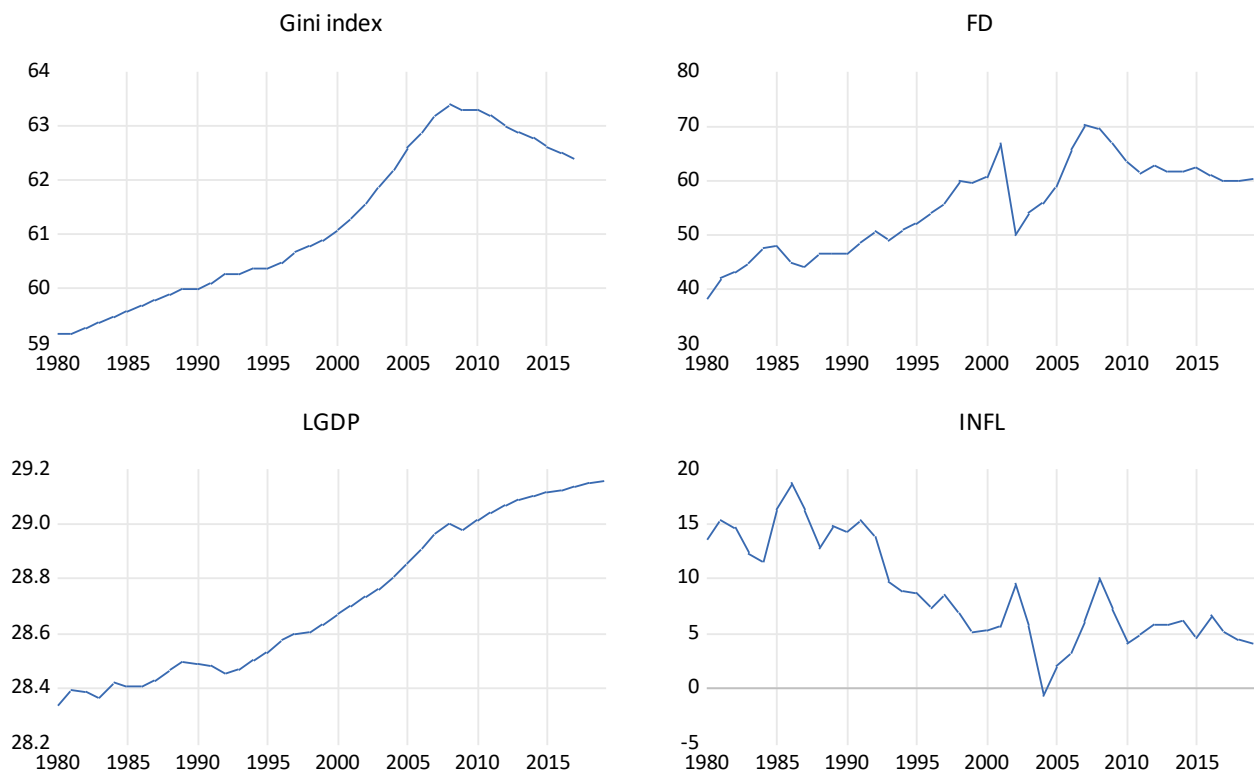


Figure 5. 1: Graphical plot of variables at level

Source: Author's own computation using E-views 12

Figure 5.1 depicts a plot of variable trends. The trends provide an informal test for stationarity. The plot shows that the variables are trending upwards and downwards, indicating non-stationarity

at the level form. Furthermore, the figure shows that both the mean and variance do not remain constant over time. As a result, all variables are evaluated using the first differences to determine their stationarity.

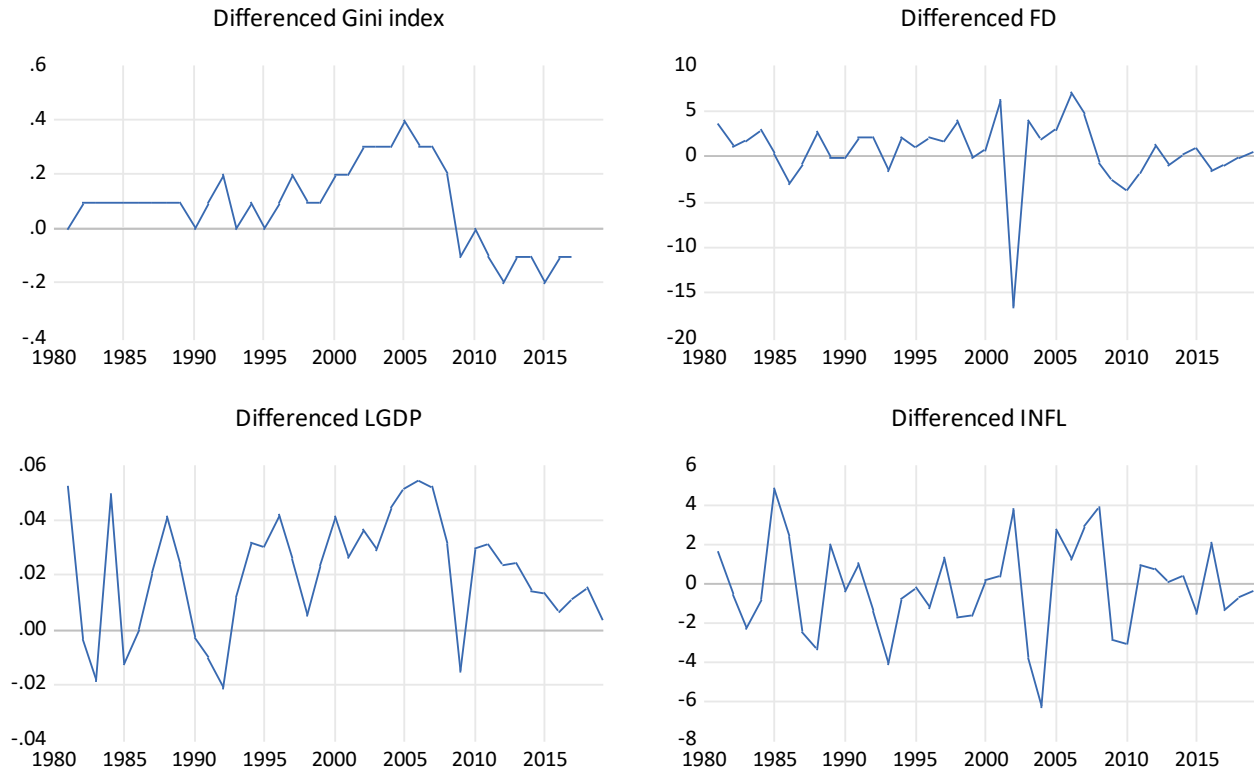


Figure 5. 2: Graphical plot of variables at first difference

Source: Author's own computation using E-views 12

Figure 5.2 shows an informal depiction that all the variables are stationary as they fluctuate around their means following the initial differenced form. However, because graphical interpretations are considered informal testing, no specific conclusions may be drawn from them. Therefore, formal tests, specifically unit root tests, are conducted below, employing the ADF, PP, and KPSS tests.

5.4. Unit Root Test

As previously stated, we cannot rely solely on informal testing. Therefore, formal testing like ADF, PP, and KPSS tests are utilized to check stationarity in the unit root. If the series is discovered to be non-stationary, the results will be unreliable and meaningless, making it impossible to conduct co-integration and other tests. Furthermore, if the variables are found to be non-stationary at level 0, the first differenced form, or the order of integration, $I(1)$, will be conducted.

Table 5. 2: Unit root test at Level

Variables	Augmented Dickey-Fuller			Philips Perron		
	Constant and Trend	Constant	None	Constant and Trend	Constant	None
Gini Index	-3.944667**	-1.762013	0.777176	-1.160891	-1.153424	1.739323
FD	-2.623714	-2.112940	0.631978	-2.699444	-2.090077	0.715292
INFL	-2.830159	-0.717452	-1.560666	-2.881407	-1.347731	-1.560505
LGDP	-2.503514	0.414120	2.944160	-1.683120	0.231910	5.026040

*** significant at 1%; ** significant at 5%; * significant 10%

Source: Author's own computation using E-views 12

Kwiatkowski-Phillips-Schmidt-Shin		
Variables	Constant and Trend	Constant
Gini Index	0.094711	0.677821**
FD	0.144734	0.682989**
INFL	0.161883**	0.633385**
LGDP	0.151721**	0.751311**

*** significant at 1%; ** significant at 5%; * significant 10%

Source: Author's own computation using E-views 12

In *Table 5.2*, the results of the unit root tests conducted at the initial level for all the variables are presented. The ADF test indicates that only the Gini index is statistically significant at the 5% level. This implies that the research rejects the hypothesis of a unit root, indicating stationarity.

However, for FD, INFL, and LGDP, both the ADF and PP tests suggest non-stationarity. This implies that the study fails to reject the null hypothesis of a unit root.

The results of the KPSS test indicate that the t-statistic for the Gini Index and FD is below the critical values at the 5% level for both constant and trend. This suggests that we cannot reject the null hypothesis of stationarity. However, when considering constant alone, the t-statistic for all variables surpasses the critical values at the 5% level, leading to the rejection of the null hypothesis of stationarity and suggesting the presence of a unit root. Consequently, it is advisable to test the variables for stationarity at the first difference, which is integrated into order I (1), to ensure that all variables are stationary.

Table 5. 3: Unit root test at First Difference

Variables	Augmented Dickey-Fuller			Philips Perron		
	Constant and Trend	Constant	None	Constant and Trend	Constant	None
GINI INDEX	-2.104674	-1.832649	-1.654049*	-2.141012	-1.920609	-1.649292*
FD	-7.056058***	-7.042044***	-6.995080***	-7.113210***	-7.056193***	-6.999448***
INFL	-5.280272***	-5.370554***	-2.654870***	-10.57110***	-9.656034***	-6.075654***
LGDP	-4.590483***	-4.510893***	-3.137806***	-4.651905***	-4.573501***	-3.101497***

*** significant at 1%; ** significant at 5%; * significant 10%

Source: Author's own computation using E-views 12

Kwiatkowski-Phillips-Schmidt-Shin		
Variables	Constant and Trend	Constant
GINI INDEX	0.132890	0.173128
FD	0.038197	0.123019
INFL	0.368410**	0.366070

LGDP	0.151411**	0.189001
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Source: Author's own computation using E-views 12

In *Table 5.3*, the variables FD, INFL, and LGDP show statistical significance at the 1% level in both the ADF and PP tests, suggesting stationarity as the study rejects the null hypothesis of a unit root for these variables. On the other hand, the Gini index only rejects the null hypothesis of unit root at the 10% level.

The results of the KPSS test show that the t-statistic for the Gini Index and FD is lower than the critical values at the 5% significance level, suggesting that we cannot reject the null hypothesis, which implies stationarity. However, when taking into account a constant and a trend, the t-statistic for INFL and LGDP exceeds the critical values at the 5% level, resulting in the rejection of the null hypothesis and indicating non-stationarity. As a result, the variables exhibit mixed order, and the ARDL model is selected as the most suitable model for the data and will be used in the analysis.

5.5. Model Selection and ARDL Co-integration Test

Table 5. 4: Lag Length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-197.4374	NA	1.645125	11.84926	12.02883	11.91050
1	-34.60740	277.7688	0.000294	3.212200	4.110059 *	3.518396
2	-12.82483	32.03320 *	0.000219	2.872049	4.488195	3.423201
3	8.094626	25.84168	0.000183 *	2.582669	4.917103	3.378778 *
4	24.43467	16.34004	0.000226	2.562667 *	5.615388	3.603732

Source: Author's own computation using E-views 12

As discussed in Chapter 4, selecting the appropriate number of lags for the ARDL model is crucial. *Table 5.4* presents various information criterions: the FPE, the AIC, the SIC, and the HQC, each criterion suggesting a different lag length, as indicated by the asterisks. According to Liew (2004), selecting the criterion with the smallest criterion value is recommended because it performs relatively better. As a result, this study employs the AIC, which suggests four optimal lag lengths for estimating the ARDL model.

Table 5. 5: Bounds Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	35.15411	10%	2.75	3.79
k	5	5%	3.12	4.25
		2.5%	3.49	4.67
		1%	3.93	5.23

Source: Author's own computation using E-views 12

According to *Table 5.5*, the study's F-statistic of 35.15 surpasses both the upper bound I (1) and lower bound I (0) at all significance levels (1%, 5%, and 10%). This suggests rejection of the null hypothesis of no long-run and acceptance of the alternative hypothesis. These results affirm that the model has successfully passed the co-integration test, indicating that the study will explore the long-term relationship between the variables presented in *Table 5.6*.

Table 5. 6: ARDL Long Run Results

Dependent Variable: Gini Index						
	Model 1			Model 2 (Non-Linear Model)		
Variables	Coefficient	Std. Error	t-Statistic	Coefficient	Std. Error	t-Statistic
FD	0.0949***	0.0245	3.8737	-0.0378	0.3074	-0.1230
FD_SQUARED	-----	-----	-----	0.0006	0.0026	0.2372
LGDP	-8.5152*	3.9895	-2.1343	-16.5804**	3.7161	-4.4616
INFL	-0.3534***	0.0547	-6.4519	-0.5778**	0.1260	-4.5822
DUM1_1994	-2.5091***	0.3822	-6.5645	-2.7027**	0.4503	-6.0019

DUM2_2005	1.7865	0.9770	1.8285	4.0981*	1.2043	3.4028
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Source: Author's own computation using E-views 12

Long term estimates are presented in *Table 5.6.* to examine the connection between the different variables. Model 1 is a linear model that demonstrates financial deepening without the squared term, along with control variables. Meanwhile, Model 2 is a non-linear model that incorporates the squared term of financial deepening to investigate the existence of the GJ hypothesis.

The findings from the first model suggest a long-term relationship between the explanatory variables, dummy variables, and the Gini index, with statistically significant coefficients. However, the second model, incorporating a squared term, portrays a positive yet statistically insignificant financial deepening coefficient, indicating the absence of a relationship between financial deepening and income inequality. Consequently, the GJ hypothesis does not apply in the South African context. As a result, model 1 is utilized to describe the relationship between the variables.

The results show that a 1% increase in financial deepening leads to a 0.094% increase in income inequality. These findings indicate that increasing South African financial depth tends to exacerbate income inequality. One possible explanation is that individuals with access to financial services accumulate wealth more quickly than those without access, contributing to a growing income disparity between socioeconomic groups. In South Africa, SMMEs encounter a lack of access to external finance, forcing them to rely on internally generated funds that are insufficient to finance expansion and growth (Bajaras et al., 2020). These findings align with multiple studies from other countries (Seven & Coskun, 2016; Jobarteh & Kaya, 2019; Denk & Cournede, 2015; Jauch & Watzka, 2016; de Haan & Sturm, 2016).

Secondly, the results show a significant negative relationship between economic growth and income inequality at a substantial level of 10%. Economic growth increases by 1%, leading to an 8.515% decrease in income inequality. These findings align with prior expectations (Qureshi, 2018). These studies highlight that South Africa's economic growth helps to reduce inequality by creating job opportunities and increasing investments in education and skills development, which benefits many people.

Inflation reports a negative long-term relationship with income inequality, statistically significant at 1%. Specifically, a 1% increase in inflation leads to a 0.353% decrease in income inequality. These findings correspond with Monnin (2014), who highlights that inflation reduces inequality, but beyond a certain point, inequality may rise again. The argument is that when inflation occurs, it is driven by demand-side dynamics, an indication of greater spending power in general, but central banks will then implement interest rate hikes. This is assumed to disproportionately benefit poor households, which are more likely to be in debt. Consequently, lower interest rates would reduce the burden of debt repayment for these households, ultimately improving their welfare (Zheng et al., 2023).

The study includes a dummy variable, dummy 1, which shows a base dummy (0) from 1980 to 1993, representing the apartheid era. From 1994 to 2019, a democratic era was represented and significant at a 1% level, indicating a break. According to the results, the democratic era led to a decrease in income inequality. The results are consistent with other prior studies (Pérez-Moreno & Angulo-Guerrero, 2016; Milanovic et al., 2001), highlighting that various factors, including policy changes, economic shifts, and social development, influence this decrease. Moreover, the democratic government of South Africa introduced the social grants, which offers financial support to individuals and families in need. These grants have had a significant impact on addressing disparities and improving the financial stability of vulnerable populations left behind by the apartheid regime (Pérez-Moreno & Angulo-Guerrero, 2016).

Dummy 2 represents the introduction of the SASSA system, which started in 2005. Despite having a positive coefficient, this dummy variable lacks significance. This could mean that there are structural inequalities in the financial system, or the quality of the financial services is poor.

Table 5. 7: Error Correction Model

Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	152.6538	7.7557	19.6826	0.0000
@TREND	0.0699	0.0040	17.1550	0.0000
D(FD)	0.0070	0.0017	3.9954	0.0072

D(LGDP)	-3.3814	0.4409	-7.6684	0.0003
D(INFL)	-0.0309	0.0036	-8.3768	0.0002
D(DUM1_1994)	-0.2658	0.0366	-7.2527	0.0003
D(DUM2_2005)	0.2943	0.0582	5.0497	0.0023
CointEq(-1)*	-0.5059	0.0257	-19.6645	0.0000

R² 0.9914 Prob (F-statistic) 0.0000
Adj R² 0.9742 Durban-Watson stat 2.5799

Source: Author's own computation using E-views 12

The results in *Table 5.8* show that the ECM (-1) coefficient is -0.5059 and considered highly significant at the 1% level. This suggests that the Gini index adjusts at a rate of 50.59% from the previous period to the current year, indicating convergence from the short-run to the long-run equilibrium. The short-run estimate for the independent variable aligns with the long-run estimate and is also highly significant. Additionally, other variables exhibit statistical significance at the 1% level. Furthermore, the R-squared value stands at 99.1%, indicating a good fit of the model to the data, with the explanatory variables explaining most of the variation in the dependent variable.

5.6. Diagnostic Test

Table 5. 8: Diagnostic Test

Test	H ₀ or H ₁	Test Statistic	P Value	Conclusion
Jarque-Bera	The residuals follow a normal distribution.	JB statistic= 1.099991	0.576952	The residuals are normally distributed.
Breusch-Godfrey	The residuals do not exhibit autocorrelation.	F-statistic= 2.657471	0.1844	The residuals are serially uncorrelated.

White	There is no heteroscedasticity in the residuals.	F-statistic= 0.420718	0.9434	The residuals are homoskedastic.
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Source: Author's own computation using E-views 12

The ARDL model's robustness in this study has been verified through various diagnostic tests, as shown in *Table 5.8* above. Additionally, the stability of both short-run and long-run models has been confirmed through the CUSUM and CUSUMSQ demonstrated in *Figures 5.3 and 5.4*.

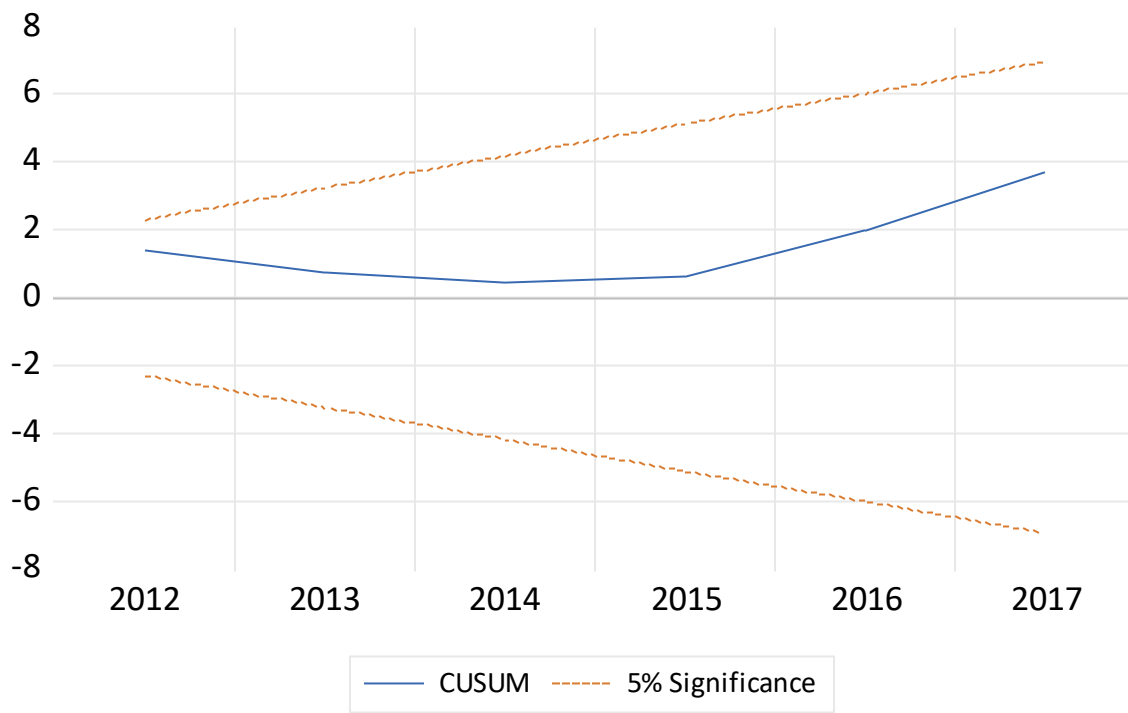


Figure 5. 3: Cusum Test

Source: Author's own computation using E-views 12

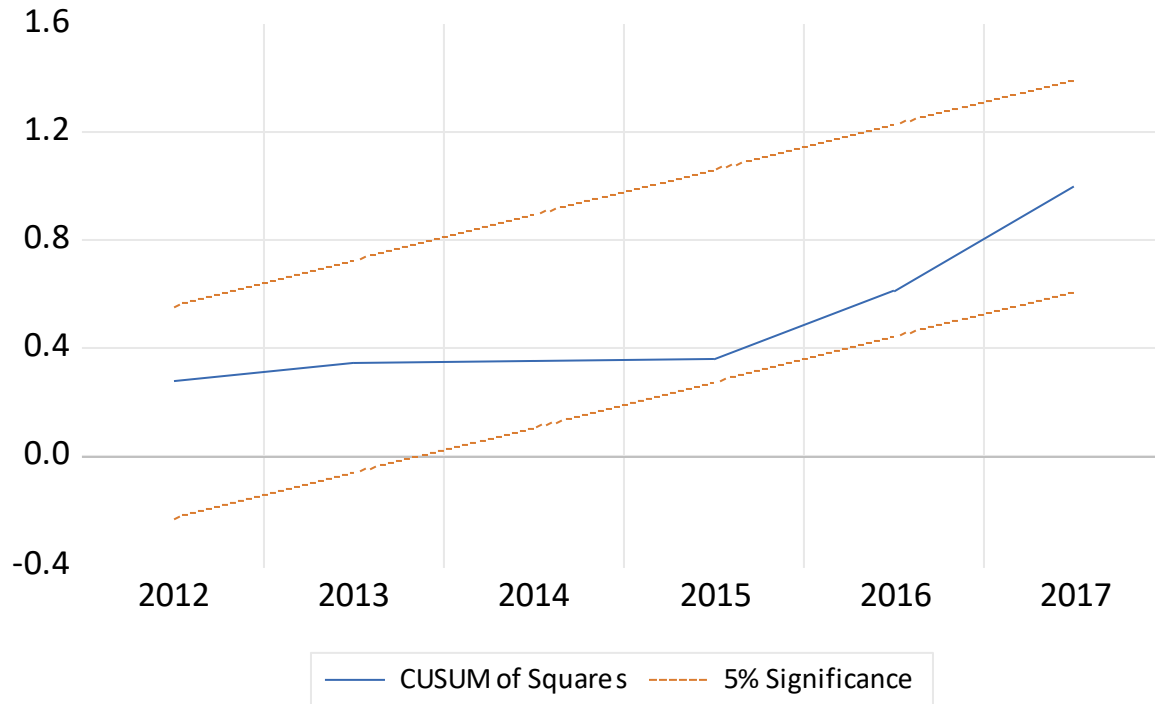


Figure 5. 4: Cusum of Squares Test

Source: Author's own computation using E-views 12

Stability and accuracy are assessed using *Figures 5.3 and 5.4*. Therefore, the model satisfies the stability condition at a 5% significance level since the cumulative sum does not surpass the critical lines.

5.7. Conclusion

In this section, the study analyzed the results of the ARDL model and ensured that the investigation aligns with the research objectives outlined in Chapter 1. The data presented in descriptive statistics provided valuable insights into the characteristics of variables. Secondly, by conducting stationary testing, the study was able to establish the reliability of the data, which enabled us to perform the ARDL co-integration test. The results confirmed the existence of both long- and short-run relationships between the Gini index and the explanatory variables, with many of them being statistically significant. Furthermore, the findings suggested that increased financial deepening contributes to widening income disparities in South Africa. Finally, diagnostic and stability tests were carried out to validate the robustness of the model. Chapter 6 will summarize the study's findings, concludes, and offer recommendations for future research.

CHAPTER 6

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS AND RECOMMENDATIONS

6.1. Introduction

In the first chapter, the study's background, problem statement, research significance, and objectives were delineated. Initially, the aim was to empirically examine the long-run relationship between income inequality and financial deepening. The second objective was to empirically test the short-run correlation between income inequality and financial deepening. The third goal was to propose strategies that can be taken to improve income inequality. Chapter 2 examines developments in the financial sector and income inequality. Chapter 3 contextualizes the theoretical framework and empirical literature. Chapter 4 outlines the data used in the analysis and the methodologies and procedures employed to draw empirical conclusions. Finally, Chapter 5 presents the empirical findings.

6.2. Key Findings

This study explored the trends in the financial sector deepening and income inequality. South Africa's financial sector is becoming more robust, making it one of the developing countries with the strongest financial systems. Significant efforts by the South African government and financial institutions have focused on enhancing and broadening financial services. Key initiatives that have strengthened the financial sector include Mzansi Accounts, the transition to electronic social grants, and the establishment of new banks like Bank Zero, Tyme Bank, Discovery Bank, Furthermore, the study explored the impact of AI technologies and COVID-19 pandemic on financial sector deepening. Despite challenges such as the 2007–2009 financial crisis, collapse of Saambou Bank, and COVID-19 pandemic the financial sector recovered (Rapapali & Simbanegavi, 2020). On the other hand, despite significant post-apartheid progress, such as improved access to education and credit, South Africa continues to face high levels of income inequality, maintaining its status as one of the most unequal countries globally.

The research also employed the ARDL model to analyze the long-term and short-term relationship, both non-linear and linear, between financial sector deepening and income inequality (Pesaran et al., 2001). The study examined various variables including the Gini index, financial deepening, inflation, GDP, and structural changes using dummy variables (1994 and 2005) from 1980 and 2019. The primary results indicated that the linear model shows a significant long- and short-run relationship between the explanatory variables, dummy variables, and the Gini Index. However, the non-linear model was statistically insignificant, suggesting that there is no relationship between financial deepening and income inequality in South Africa, implying that the linear theoretical assumptions provide a better explanation for the relationship.

The linear results indicate that increasing South African financial depth tends to widen income inequality. Bajas et al. (2020) believe that the high concentration of banks has contributed to inadequate attention to low-income individuals and SMMEs. This demonstrates that SMMEs are constrained by a lack of access to external finance, requiring them to rely on internally generated funds, which are insufficient to fund expansion and growth.

6.3. Policy implications and recommendations of the study

The study suggests that it is important for policymakers to implement measures that support fair distribution of income. Financial products and services have grown or improved in South Africa. However, there is still potential for enhancement, especially in less developed urban and rural areas. It is imperative for policymakers to guarantee high quality of financial services and introduce strategies to tackle fundamental problems within the financial system that contribute to income inequality.

Secondly, supporting SMMEs by increasing their access to formal financial services is essential. For example, policies should encourage more black industrialists and SMMEs to supply financial products and services. Reforms may include different credit requirements for different income groups, as well as lower interest rates on business loans. Retaining more financial sector gains in black communities can help to promote inclusive growth by creating jobs and distributing income more evenly. Furthermore, policymakers should ensure the implementation of financial literacy programs that educate individuals on how to manage their finances, understand financial products, and assess the risks associated with them.

6.4. Limitations of the study and area for future research

The main challenge was the limited availability of income inequality data. Despite efforts to gather relevant data from different sources, data scarcity necessitated the selection of the sample period from 1980–2019. Firstly, future research should incorporate more recent data, if available, to assess its impact on the findings. Secondly, the current study's findings are relevant to the South African context; future research should consider including countries from the BRICS group in comparative analyses to develop a broader understanding of the correlation between financial sector deepening and income inequality. Thirdly, the study's findings indicate that financial sector deepening increases income inequality, while economic growth dummy variable (1994) led to a decrease in income inequality. This raises an area of concern, and future researchers should extend the study by bringing new information or adding more variables.

6.5. Chapter summary

This study, covering the period from 1980 to 2019, presented the main findings, identified limitations, and made recommendations. Overall, the study discovered that financial sector deepening has led to an increase in income inequality, primarily due to the high concentration of banks and the limited accessibility of financial services for low-income individuals and SMMEs. To summarize, addressing income inequality within the framework of financial sector deepening necessitates concerted efforts from policymakers, financial institutions, and the broader society to ensure that the advantages of a robust financial system are equitably distributed across all segments of the population.

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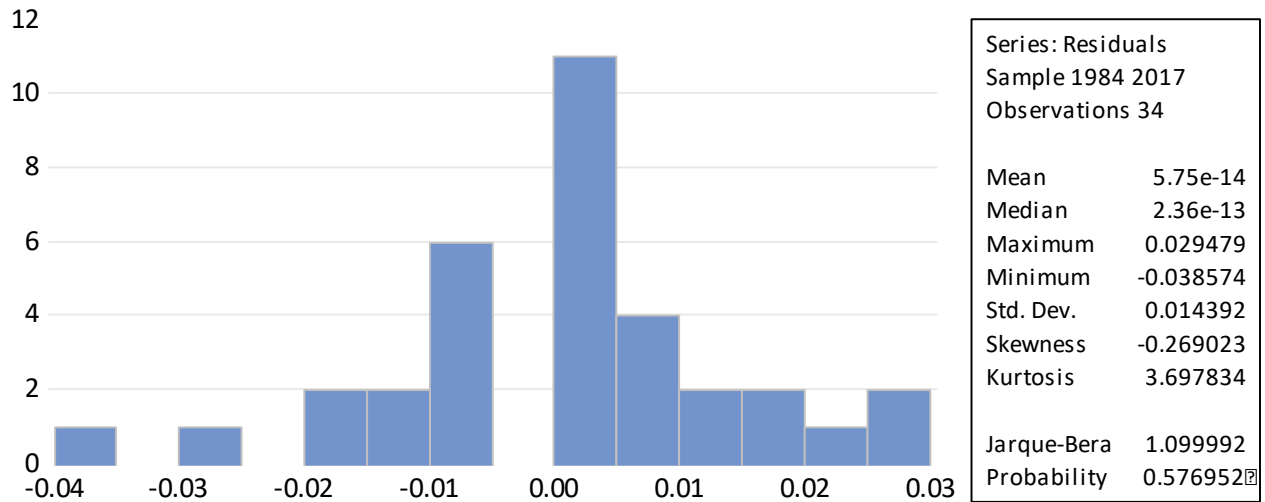
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APPENDICES

Appendix A: Diagnostic Tests



Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	2.657471	Prob. F(2,4)	0.1844
Obs*R-squared	19.39980	Prob. Chi-Square(2)	0.0001

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	0.420718	Prob. F(27,6)	0.9434
Obs*R-squared	22.24843	Prob. Chi-Square(27)	0.7246
Scaled explained SS	0.934607	Prob. Chi-Square(27)	1.0000